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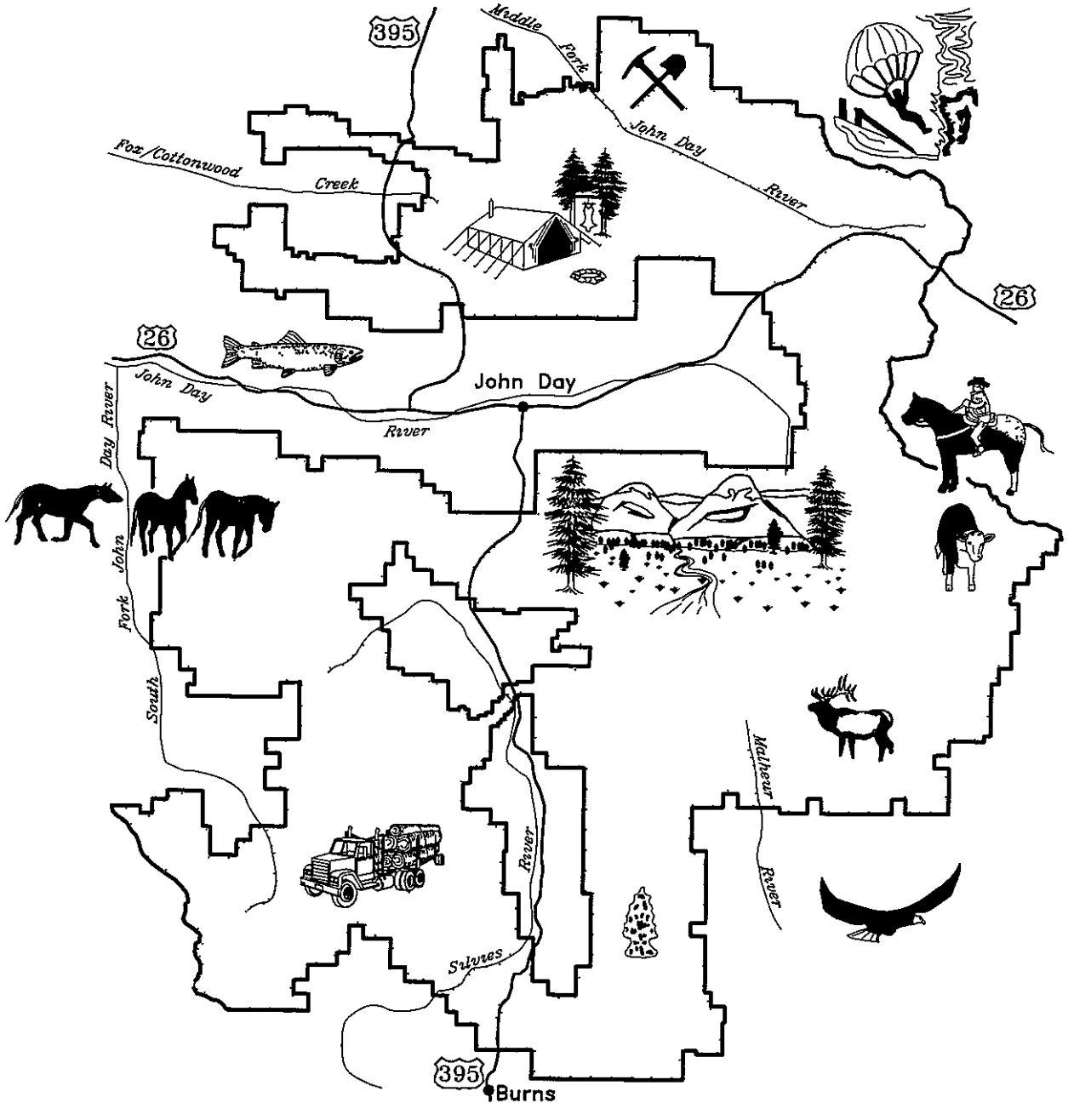
Pacific
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Region

1990

Final Environmental Impact Statement

Land and Resource Management Plan

Malheur National Forest



FINAL ENVIRONMENTAL IMPACT STATEMENT
MALHEUR NATIONAL FOREST
LAND AND RESOURCE MANAGEMENT PLAN
Grant, Harney, Baker, and Malheur Counties, Oregon

May 1990

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ABSTRACT

This Final Environmental Impact Statement describes six alternative ways of managing the land and resources of the Malheur National Forest Alternative NC (No Change) represents continuing the management direction of the existing timber management plans Alternative A (No Action) continues the management direction of existing plans, in compliance with standards for all viable alternatives Alternative B-Modified emphasizes intensive timber management in an attempt to meet levels assigned in the Regional Guide Alternative C-Modified emphasizes semiprimitive recreation and nongame fish and wildlife Alternative F emphasizes intensive timber production, with a combination of fish and wildlife values, dispersed recreation, and forage production Alternative I reduces harvest intensity in riparian zones, features uneven-aged management on up to 30 percent of the suitable timber lands, and adds more regeneration harvests on mixed conifer acres where severe defoliation due to spruce budworm infestations and other damaging agents has recently taken place

In reviewing the public comments to the Proposed Plan and the Draft Environmental Impact Statement, additional key issues were identified as having significant importance to the Forest planning process These additional issues, as well as other public concerns, were addressed between the issuance of the Draft Environmental Impact and this Final Environmental Impact Statement through analysis and alternative development These issues played a valuable role in the development and identification of Alternative I as the preferred alternative

Alternative I is the Forest Service's preferred alternative, which is the basis for the Land and Resource Management Plan (Forest Plan) which accompanies this document Upon approval, the Forest Plan will guide management of the Forest's 1,459,422 acres for the next 10-15 years

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Summary

Summary

Introduction

The Final Environmental Impact Statement (FEIS) discusses the alternative strategies for management of the Malheur National Forest, one of which is developed into the Land and Resource Management Plan (Forest Plan) The Draft Environmental Impact Statement was published in draft form for public review and comment Subsequently, responding to and incorporating these public comments, this Final Environmental Impact Statement and Forest Plan have been prepared The Forest Plan, unless revised sooner, will be in effect for 10 to 15 years

This is a general summary of the entire Final Environmental Impact Statement It emphasizes the issues and concerns raised by the public and local, State, and Federal agencies regarding the management of the Malheur National Forest It briefly describes the purpose and need for the Final Environmental Impact Statement, the six alternatives, the affected environment, and the environmental consequences of implementation of each of the alternatives

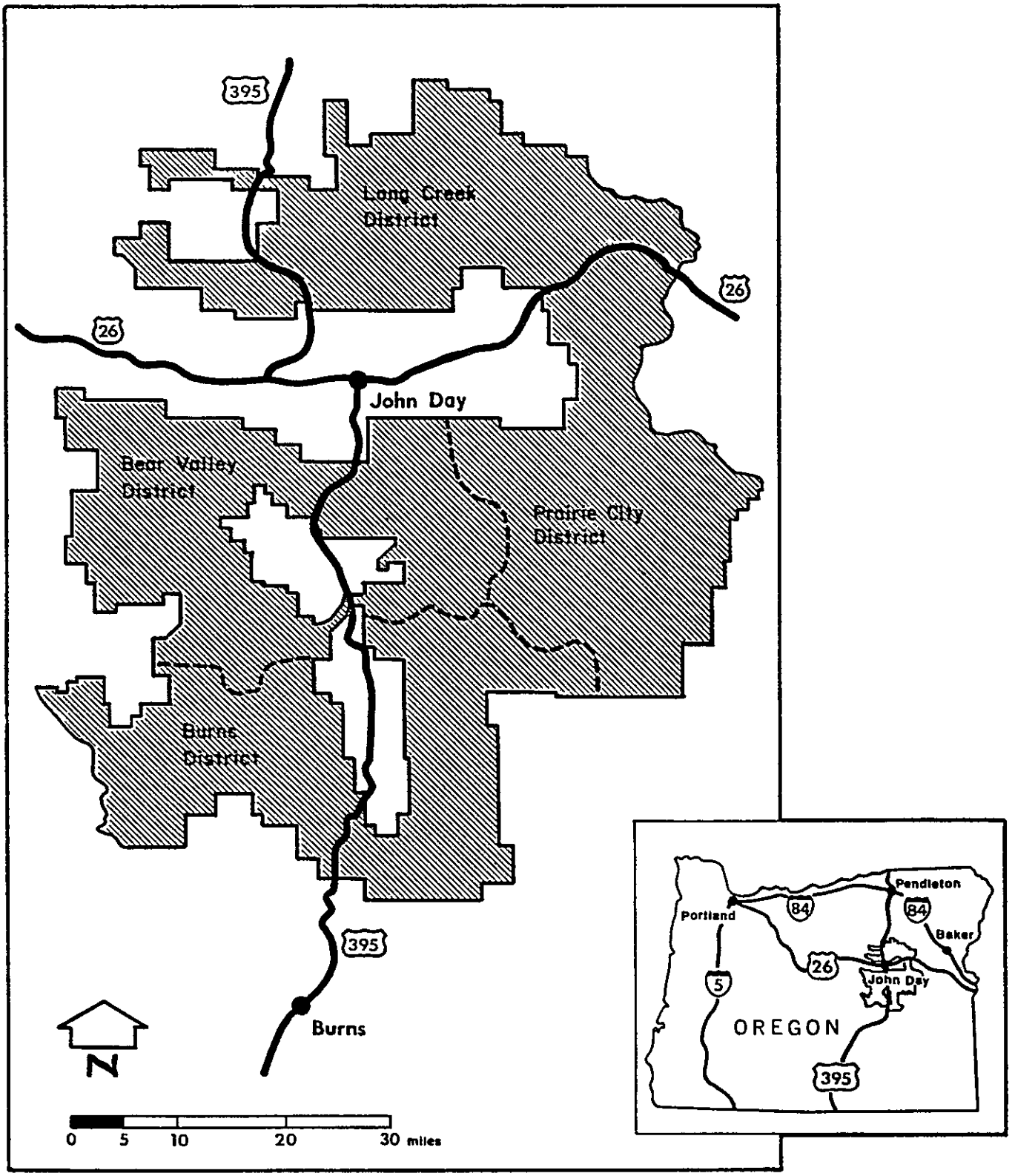
B The Malheur National Forest

The Forest's 1,459,422 acres are located in eastern Oregon, approximately equidistant from the borders of Washington, Idaho, and Nevada The Strawberry Mountain Range, part of the Blue Mountains, extends east to west through the center of The Forest This range splits the Forest into two geologic provinces–the Columbia Basin to the north and the Great Basin to the south. Elevations on the Forest vary from 3,900 feet at the Forest boundary south of Mt Vernon, Oregon to 9,038 feet on top of Strawberry Mountain The result is a diverse and productive landscape of grasslands, sage, and juniper, forests of pine, fir, and other tree species, and mountain lakes and meadows

The northern portion of the Forest is drained by the John Day River system into the Columbia River Basin The southern part of the Forest is drained principally by the Silvies River system into the Great Basin and by the Malheur River system into the Snake River

These lands are in Grant (1,119,161 acres), Harney (293,876 acres), Baker (45,786 acres), and Malheur (599 acres) counties The Forest is within a day's drive from Portland, Oregon U.S 26 and U S 395, winding two-lane, rural highways, are the principal access routes There are two main population centers the John Day Valley from Dayville to Prairie City, and a 5-mile radius around Burns

FIGURE S-1: General Location Map



C Purpose and Need

The purpose of the Forest Plan is to direct all natural resource management activities on the Forest Preparation of the Forest Plan 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), and the associated National Forest System Land and Resource Planning Regulations (36 CFR 219 - Refers to Part 219 of Title 36 of the Code of Federal Regulations dated 9/30/82)

The preparation of an Environmental Impact Statement disclosing a preferred alternative and a broad range of additional alternatives is required by the National Environmental Policy Act of 1969 (NEPA), the Council of Environmental Quality (CEQ), NEPA Regulations (40 CFR 1500), and the implementing regulations of NFMA (36 CFR 219) This Environmental Impact Statement is required because the Forest Plan is a major federal action with a significant effect on the quality of the human environment Its purpose is to describe effects on the environment in enough detail to aid in the selection of management direction for the Forest. Equally important, its purpose is to make this same information available to the public, and to encourage public participation in the development and refinement of that information.

Planning Process

The National Forest Management Act implementing regulations require that several planning steps be used to develop the Environmental Impact Statement and the accompanying Forest Plan These planning steps are

1 Identification of issues, concerns, and opportunities
2 Development of planning criteria
3 Inventory of data and collection of information
4 Analysis of the management situation
5 Formulation of alternatives
6 Determination of estimated effects of the alternatives
7 Evaluation of alternatives
8. Selection of the proposed action
9 Plan implementation
10 Plan monitoring and evaluation

Issues, Concerns, and Opportunities (ICO's)

Different people and groups prefer to see the Forest managed to emphasize different outputs, uses, and conditions Because all the resources, uses, and conditions of a Forest are interconnected, management decisions to emphasize some resources result in changes in others There are practical and natural limits to what a Forest can provide These different preferences of individuals and groups and the physical, biological, and legal limits of Forest management are identified in the issues and concerns which guide the Forest planning process

Public issues and management concerns were identified through citizen participation including public meetings, requests for comments, and personal contacts with individual members of the public, owners of adjacent private land, other agencies, local industry and conservation groups, and Indian tribes The process used to identify and define the issues, concerns, and opportunities is presented in more detail in Appendix A of the Final Environmental Impact Statement

During the early planning stages, over 30 issues and concerns were identified Some issues were beyond the jurisdiction of the Forest Service, resolved by existing laws, or best handled on a case-by-case basis These issues are not addressed in this Environmental Impact Statement The remaining issues and concerns, which indicated a need to examine current management direction, were then grouped based on common elements and similarities Described on the following pages are the issues that guided the Forest planning process

ECONOMIC STABILITY: How will management of Forest resources affect local communities?

The Malheur National Forest comprises about 39 percent of Grant County's acreage and 5 percent of Harney County's acreage, as well as small acreages in Baker and Malheur Counties Because of the substantial acreages, distinct economic ties, and the people's use patterns, the Forest's primary zone of influence has been determined to be Grant and northern Harney counties

Malheur National Forest policies have a direct impact on local, dependent industries which in turn affect business income, wages, employment, and revenues to the counties The principal industries in the Forest's zone of influence are wood manufacturing, agriculture (i e., ranching), and retail trade These three industries account for about half of all employment in the area Another large part of the economy is government employment, and much of that is also based on timber and livestock management

Forest management activities and the resulting outputs influence job opportunities, incomes, and the way of life of the approximately 15,000 residents in local communities It follows that changes in Forest outputs and activities will affect the social and economic life of the local population

Economic stability is acknowledged to be very important, and social stability is strongest when the local industries are healthy Some people equate stability with a sustained supply of Malheur National Forest timber adequate to meet the demands of local industry Some also think that the counties have been too dependent on timber manufacturing, and that a more diversified economy should be cultivated, including growth in tourism Currently, most tourism occurs during the fall hunting season

The Malheur National Forest also plays a role in county finances through payment of 25 percent of its revenues to the counties This money, of which 99 percent is from timber-generated receipts, has a significant effect on the finances of county schools and roads In 1989, Grant County received $8.7 million and Harney County received $2 3 million from resource utilization on the Malheur National Forest

Indicators of Response

-Changes in jobs and income (first decade and long-term change)
-Payments to counties (first decade)

TIMBER MANAGEMENT: What level of sustained annual yield of timber products should the Forest provide while still maintaining Forest productivity and meeting local, regional, and national needs? How much timber land should be managed for wood fiber production; what species should be favored; and what management methods should be used to achieve the desired harvest level and species mix?

The Forest has been providing timber products to the local and national market for over 70 years. The average annual volume of timber sold over the last 10 years (1980-1989) has been 228 million board feet per year During this period, the goal of the timber sale program on the Forest has been to gradually increase the annual volume sold to reach 270 million board feet by 1990 in order to have an average annual sell volume of 230 million board feet over the decade 1980-1990 (Malheur National Forest 1979 Timber Resource Management Plan) It appears that the timber sales program has come very close to meeting those objectives This planned increase is within the physical ability of the Forest to produce timber.

An analysis of the Forest's ability to produce timber indicated that the Forest could supply up to 59 1 million cubic feet (about 326 million board feet in the first decade) per year on a nondeclining flow harvest schedule

The ability to increase future timber supply levels could have future implications for the local timber industry which is almost totally dependent on the Forest for its supply of raw material Resource Planning Act National and Regional projections show an increasing demand for timber in future decades This National and Regional increase in demand for timber could increase demand for Malheur National Forest timber.

The primary timber-producing species are ponderosa pine, Douglas-fir, western larch, true firs, and lodgepole pine In the past, the majority of the volume sold has been from mature, open ponderosa pine stands (approximately 70 percent of the total volume sold), especially those found in fairly level, easily roaded areas However, available areas for timber harvest are increasingly found in steeper areas forested predominantly with Douglas-fir, western larch, white fir, and grand fir As timber stands are brought under management, trees of all species would be harvested at ages ranging from 50-150 years to maximize the utilization of the wood fiber production potential of the Forest Most trees are currently harvested at ages of 200 years and older

Management of the timber resource interacts with every other resource on the Forest The interrelationships are sometimes complementary, sometimes competitive, and sometimes mutually exclusive Rising demands for other resource uses are increasing the complexity of timber management

The management methods which would provide the largest amount of wood fiber to meet national demands would provide this wood fiber primarily in smaller-diameter, mixed conifer species Although the local and sub-regional timber industry is anticipating and planning for this shift in product, some industry members express concerns because their mills are currently set up to process larger-diameter trees and they have a more favorable market position with old-growth ponderosa pine Local residents, hunters, and Forest visitors desire the appearance of mature, ponderosa pine stands and express concerns about the appearance and success of clearcuts on the Forest County and State officials and private landowners emphasize the need for intensive management of the existing mixed conifer understory, particularly to reduce the losses related to spruce budworm and other insect damage

Competing demands for Forest resources are exemplified by the demand for wilderness and roadless areas which preclude timber management This is described in a separate issue

The relationship between big-game habitat and timber management is very complex This is also described in a separate issue

Additional Timber Issues Identified During the Public Comment

A large portion of the public expressed concern about the following items These issues were considered in the analysis and alternative development (Alternatives B-Modified, C-Modified and I) done between the issuance of the Proposed Forest Plan and the preparation of the final planning documents The process for the development and use of planning issues can be found in the Final Environmental Impact Statement (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final Environmental Impact Statement (Chapter V, Section C)

1. Uneven-aged management - The public expressed a dislike for even-aged management in general and clearcutting in particular They also expressed belief that uneven-aged management better protects all resources

2. Species mix - There was concern expressed about the shift in species mix over the next 80-100 years

3 Forest character - The public generally had support for the maintenance of the existing Forest character, including an emphasis on ponderosa pine.

Indicators of Response·

-Suitable timber land in thousands of acres
-Allowable sale quantity (1st and 5th decades)
-Suitable timber land under ponderosa pine management (thousands of acres)
-Percent ponderosa pine volume offered (1st and 5th decades)
-Acres clearcut (1st and 5th decades)
-Acres overstory removal (1st and 5th decades)
-Acres in uneven-aged management (1st and 5th decades)
-Size of average tree harvested (over the planning horizon)

BIG-GAME HABITAT MANAGEMENT What level of big-game habitat must be provided to meet the needs for desirable big-game herd levels?

Elk populations prior to 1970 were relatively stable but low. During the past decade, populations have steadily increased to a current summer population of about 6,600 elk; about one-third of these elk winter on the Forest Management of big-game herd levels is the responsibility of the State of Oregon, Department of Fish and Wildlife (ODF&W) while the USDA Forest Service manages the habitat occurring on the Forest Mule deer populations have fluctuated during the past 40 years and are currently on a downward trend in two of the seven game management units which include the Forest The limiting habitat factor on big-game populations is winter range Management of big-game winter range for elk is believed to provide for the wintering needs of mule deer as well since available mule deer winter range is minimal and overlaps with elk winter range.

Most of the winter ranges have adequate forage (grass and grass-like species) to carry both the present number of livestock and the present number of wintering elk. Ranchers on private land adjacent to the Forest are concerned about the movement of elk off of the Forest to winter and spring range on private land. The increased potential of the Forest to carry larger populations of elk will also increase the potential for more elk to winter on private land. The State management objective, for big-game populations in game management units which occur on the Malheur National Forest, is to supply winter habitat for approximately 2,865elk

The wildlife issue of most concern to the public deals with elk habitat for elk hunting opportunities Much of the Forest's recreation use occurs during the deer and elk hunting seasons. Most local, and many regional and statewide residents and hunter's groups, are concerned about Forest management activities and their effect on elk numbers and hunting opportunities.

To meet the needs of a given population of big game, habitat quality is determined by the appropriate mix of cover, forage, and open road density (security from disturbance) Timber management activities have at times improved, and can be designed to further improve, the balance and distribution of cover and forage–so, with adequate road management, the elk population is expected to increase

Oregon Department of Fish and Wildlife population objectives for the elk herds, hunter success rates, and the need to limit hunting opportunities in certain units, are related to the anticipated effects of Forest management of the habitat. For example, in addition to total population objectives, Oregon Department of Fish and Wildlife has objectives for bull-to-cow ratios for each herd at the end of the hunting season To ensure that not too many bulls get harvested, the Forest Service must limit access (by closing roads) or

Oregon Department of Fish and Wildlife must keep the success rates at a level that will meet their population objectives by limiting the number of hunters The Forest activity that most affects the management actions of Oregon Department of Fish and Wildlife to meet its population objectives, is the control of access for hunters using motorized vehicles

Additional Big-Game Issues Identified During the Public Comment

A large portion of the public expressed concern about the following items. These issues were considered in the analysis and alternative development carried forward between the issuance of the Proposed Forest Plan and the preparation of the final planning documents The process for the development and use of planning issues can be found in the Final Environmental Impact Statement (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final Environmental Impact Statement (Chapter V, Section C)

1. Winter range There was concern about winter range management, timber yields from winter range, and winter range improvement practices

2 Minimum cover requirements There was public concern that minimum cover requirements for summer and winter range may be too low and the definition of thermal cover may not be sufficient

3 Road closure policy The public expressed concern over the lack of a specific road closure policy in both summer and winter range

4 Habitat modeling process There was concern about the habitat modeling process in general, and the use of cover forage ratios in particular

5 Population goals There was a desire for population goals by winter range area

Indicators of Response

-Potential summer elk populations (1st and 5th decades)
-Potential winter elk populations (1st and 5th decades)
-Habitat Effectiveness Index (1st and 5th decades)
-Big game cover quality (1st and 5th decades)
-Fish and Wildlife User Days (WFUDs) (1st and 5th decades)
-Acres in winter range enhancement
-Acres in winter range maintenance
-Miles of road remaining open (1st and 5th decades)

RIPARIAN AREAS: What effect will Forest management activities have on riparian areas; what level of fisheries habitat productivity should be maintained; what level of timber harvest is compatible with riparian values; and what level of livestock grazing can be provided while managing for riparian dependent resources?

Riparian areas are ecosystems which are identified by vegetation requiring free or unbound water They include the stream and an adjacent area of varying width A critical portion of the total riparian area (the transition area and upland vegetation) is labeled the "riparian area of influence" The area of influence contains trees which may provide shade, contribute fine or large woody material to the stream channel, terrestrial insects to the stream, and habitat for the wildlife associated with the riparian management area Riparian areas create well-defined habitat zones within the much drier surrounding areas, they are more productive in terms of total numbers and variety of wildlife species and are rich in producing plant material Although they comprise a minor proportion of the overall area on the Forest, they are disproportionately important

Some people believe that overgrazing and unregulated livestock use of these areas result in a loss of streamside vegetation, increased water temperature, excessive bank erosion, and accelerated sedimentation of gravel fish-spawning areas These people have raised riparian management concerns to a national level, often calling for elimination of grazing They urge that these areas receive special attention in land management planning This is reflected in the special mention of riparian area management in the NFMA regulations.

Goals for riparian areas require a diverse and abundant riparian vegetation community and a stable stream channel to fully meet the objectives for riparian dependent resources Some of the riparian areas within the Forest are not in the desired condition to meet these many and varied management objectives A complete inventory of riparian conditions across the Forest does not yet exist; however, one is planned for completion within the next ten years The information currently available is based on a Watershed Improvement Needs (WIN) inventory and a variety of project level analyses Based on this information, about 235 stream miles have been identified as priority areas for rehabilitation (see Forest Plan, Appendix A). This list is dynamic, additional areas needing treatment to achieve desired riparian conditions will be added as the inventory work is completed and as additional problem areas are identified during project planning

Some of the characteristics of these streams are extensive areas of unstable eroding streambanks, lowering of the water table, and lack of adequate stream surface shading. Although uncontrolled logging practices, roads adjacent to streams, insect outbreak, and fire can influence shading and streambank stability, the largest impacts on stream temperature and stability on the Malheur National Forest appear to be due to a reduction of hardwoods caused by ungulate grazing With few exceptions, the majority of the gullies on the Forest also result from the loss of the stabilizing root system caused by a reduction in the hardwood community

There is generally a consensus that improving streams and watersheds, which are in a less than desirable condition, is beneficial for all resources and user groups, the cause of the decline, the specific methods and treatments used for improving the health of the stream systems, and the rate of improvement are some of the areas of contention and controversy There are opportunities for increasing the rate of improvement in riparian zones, however, these are perceived as reducing the amount of forage available for livestock grazing and reductions in removal of standing timber

Indicators of response

-Management strategies proposed for unsatisfactory riparian areas
-Animal-unit months of livestock grazing permitted
-Expected increases in anadromous fish production (pounds of fish)
-Smolt habitat capability index (1000s of steelhead smolts)

ROADLESS AREAS: Should some or all of the Forest's roadless areas remain roadless, be opened to roaded development, or be recommended to Congress for wilderness classification?

The Forest currently has 18 separate undeveloped areas comprising 180,948 acres Some people enjoy the recreation experience available in areas which have many characteristics of wilderness, but fewer restrictions Such areas can be characterized as providing semiprimitive, nonmotorized or motorized recreation opportunities Maintaining the undeveloped character would mean excluding such areas from regulated timber harvest and road construction In areas providing for motorized use, off-road vehicle use may continue, mineral exploration and extraction could continue in both types of area

Areas maintained in an undeveloped condition would also be eligible for future wilderness consideration National and regional environmental groups such as the Wilderness Society, Native Plant Society, and Oregon Natural Resources Council are philosophically

opposed to development of these areas, stating that in many cases there is no need for development and they should remain undeveloped rather than foreclose on future wilderness possibilities (One of these areas, Pine Creek, must be evaluated at this time for potential inclusion in the National Wilderness System as it was designated for further planning review by the RARE II Final Environmental Impact Statement) These same groups as well as local environmental groups, some hunters, and some local residents favor roadless management of these areas because they believe it protects sensitive plant species, wildlife habitat, and water quality better than management geared toward consumptive uses

Others, such as the mining and timber industry associations and businesses, many local residents, and local governments, state that the management of these areas has been in limbo long enough They want to access and develop the resources in these areas to end the uncertainty about their availability They state that the resources in these areas need to be managed so that they can contribute to local industrial and economic needs They believe that wildlife habitat can be improved and the vegetation will be in a more vigorous condition if the resources are managed for consumptive uses (primarily wood fiber production)

There are approximately 119,950 acres of tentatively suitable land in the RARE II areas These same acres provide 92,408 acres of old growth Timber management activities could occur on 107,658 acres Of these available acres, 101,205 acres would be considered suitable for timber harvest and would provide a first decade annual allowable sale quantity of 28 MMBF (4 9 MMCF) and a long term sustained yield capacity of 5 74 MMCF/yr

Indicators of response

-Acres retained in an unroaded condition (i e , semiprimitive motorized and nonmotorized management areas)
-Management of Pine Creek Further Planning Area

Additional Issues Identified During the Public Comment Period

Most of the issues identified during the public comment period were identical to or could be incorporated into the previously identified issues, as can be seen in in the previous paragraphs However, between the time that the preliminary issues were developed and the public comment period, road management became a key issue

ROAD MANAGEMENT: How can road management be used to make timber harvest, big-game habitat needs, and recreation opportunities more compatible?

Currently there are about 8,570 miles of Forest Service roads on the Forest Under Alternative F (the preferred alternative in the Draft Environmental Impact Statement), it was estimated that 870 miles of roads would be constructed and 1,360 miles of road would be reconstructed by timber purchasers during the first decade of the Forest Plan Of this total, approximately 400 miles would have been built in currently roadless areas that are assigned to specific road management policies in support of timber production Strong public response indicated that this was undesirable

The Malheur National Forest, in conjunction with the Oregon Department of Fish and Wildlife, has four cooperative travel management areas These seasonal road closures are designed to protect water quality and wildlife habitat, minimize harassment of wildlife, maintain adequate buck and bull escapement, and promote quality hunting During the hunting season, these management areas are under the "green dot system," enforced by the State Police and Game Commission Total National Forest land affected by these seasonal closures is approximately 172,000 acres

The Oregon Department of Fish and Wildlife and the public have expressed concerns about the lack of a specific policy for the Forest as a whole and for some resources in particular. General concerns included a belief that road densities are too high, that local roads should be closed and put back into resource production immediately following timber harvest, and that in many cases road construction and maintenance standards are too high

The greatest public concern is the road management policy in relation with big-game habitat and hunting Specifically, many expressed a desire to permanently or seasonally close roads to enhance big-game summer and winter range. Included in this was a desire to increase elk habitat effectiveness, provide elk escapement areas, and provide for a quality hunting experience (nonmotorized)

These issues were considered in the analysis and alternative development undertaken done between the issuance of the Proposed Forest Plan and the preparation of the final planning documents The process for developing and using of planning issues can be found in this Final Environmental Impact Statement (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final Environmental Impact Statement (Chapter V, Section C)

Indicators of Response

-Miles of timber purchaser road construction (1st and 5th decades)
-Miles of open road (1st and 5th decades)
-Total miles of system roads (1st and 5th decades)

D. Development of Alternatives

In order to resolve the identified issues, the Forest Interdisciplinary Team gathered current information about Forest resources, analyzed the management situation, and formulated a set of alternatives. Ten alternatives were developed encompassing a full range of resource outputs and environmental effects. Each alternative is a combination of management areas, each of which has a unique set of management practices and scheduled activities Several management areas emphasize protection of fish and wildlife habitat and naturally occurring ecosystems; others emphasize sustained timber yields or various types of recreation and research opportunities Each alternative distributes Forest lands to management areas in different ways. The goals of each management area are displayed in Table S-1 and the acres by alternative are displayed in Table S-2

Each alternative is made up of land uses, management practices, and activity schedules which result in a unique combination of resource outputs, land uses, and environmental conditions The preferred alternative is selected from all those formulated as the one which maximizes net public benefits while responding effectively to the issues. The preferred alternative, selected by the Regional Forester, is Alternative I

All alternatives, except the No Change Alternative, meet or exceed the management requirements established by the Regional Forester These requirements are intended to ensure that water quality will be maintained at an acceptable level, that the necessary habitat is maintained to sustain viable populations of fish and wildlife, and created openings from timber harvest are limited in size and distribution

A brief description of each alternative, including a summary of goals, output objectives, and constraints that determine how the Forest would be managed, follows the discussion of management areas

Summary of Changes from Draft to Final Environmental Impact Statement

The following is a summary of changes made to the alternatives for this Final Environmental Impact Statement. These changes result from a concerted Forest effort to respond to comments related to alternative development received from the public and interested organizations during the Draft Environmental Impact Statement review process

Major changes to the analysis process resulted in several new developments Several key analytical methods have been updated or changed, in addition to restructuring the FORest PLANning (FORPLAN) model A Habitat Effectiveness Index (HEI) model has been used to estimate elk habitat and potential elk population differences between alternatives This HEI model is based on cover quality, spacing, forage quality and quantity, and open road density. As the previous model employed only cover to forage ratios to estimate elk habitat, substantial changes to previous alternative rankings has resulted More information on the details of the analysis approach is included in Appendix B of this FEIS

Changes to the FORPLAN model structure have resulted in a planning model that includes geographic specificity for seven major watersheds and cover outputs tied to timber stand manipulation. Anadromous and non-anadromous fishery watershed identification is now possible with this expanded model

Through a review of the analysis process, updating the modeling techniques, and in response to public comments, one entirely new alternative (Alternative I - Preferred) has been developed and two alternatives have been modified (Alternatives B-Modified and C-Modified) These are included in alternative evaluations for this EIS. In addition, five alternatives included in the Draft EIS have been deleted as viable options due to lack of broad support and their similarities to other developed alternatives (see Alternatives Considered but Eliminated from Detailed Study in Chapter II of this Final EIS)

In addition to the Habitat Effectiveness Index model used to estimate elk habitat, recalculations of wildlife-and-fish-user-days (WFUDs), fuel treatments, old-growth stands, and energy and mineral production potential have been made for all alternatives

For all alternatives, the baseline 10-year period for economic indicators has been updated to 1980-1989 This period is used to display timber volume sell and harvest levels, value and cost information related to Forest budgets, and potential changes in jobs by alternative This updates economic indicators to include very recently experienced levels. Also, new economic values and costs have been included which change the present net value (PNV) for all alternatives

Utilizing the new FORPLAN model structure, several analytical tasks were performed and compared to previous model results for similarities and differences In particular, a review of manageable understory stands was updated to 1989, where the impacts of insect and disease agents on the health and vigor of Forest stands were reassessed This analysis has indicated that stands on the Malheur National Forest are generally less manageable than previously reported Geographic identifiers tied to this newer information have helped portray specific health and vigor relationships in more detail For more information see Appendix B, Description of the Analysis Process

Discussions of the issues, concerns, and opportunities have been updated to include the additional issues identified during the public comment period (Final Environmental Impact Statement, Chapter I, section K) Specifically, a discussion of the road management issue has been added Also, additional indicators of response for timber management have been included.

Management Areas

Management areas are the building blocks of alternatives. By assigning land to a particular management area, the on-the-ground management to result from that alternative becomes apparent The assignment of lands to management areas identifies types and amounts of management activities that can occur on specific areas of the Forest. Management area goals are shown in Table S-1 and information about the acres assigned to each management area by alternative is shown in Table S-2.

The acreages shown in Table S-2 are actual acreage of land assigned to each management area Each acre of Forest land is assigned to only one management area

TABLE S-1: Management Area Goals

GENERAL FOREST - Manage for timber production and other multiple uses on a sustained-yield basis

RANGELAND - Manage for livestock forage production and other multiple uses on a sustained-yield basis

RIPARIAN - Manage to protect or enhance riparian-dependent resources in watersheds supporting fish.

NON-ANADROMOUS RIPARIAN - Manage to protect or enhance riparian-dependent resources in watersheds supporting resident fish

ANADROMOUS RIPARIAN - Manage to protect or enhance riparian-dependent resources in watersheds supporting anadromous fish

BIG-GAME WINTER RANGE MAINTENANCE - Manage to maintain usable forage for elk and deer on potential winter range

BIG-GAME WINTER RANGE ENHANCEMENT - Manage to enhance usable forage for elk and deer on potential winter range

BALD EAGLE WINTER ROOSTS - Manage to maintain or enhance winter roost habitat for bald eagles

STRAWBERRY MOUNTAIN WILDERNESS - Manage the wilderness values as specified by the Wilderness Act of 1964 and the Oregon Wilderness Act of 1984

MONUMENT ROCK WILDERNESS - Manage the wilderness values as specified by the Wilderness Act of 1964 and the Oregon Wilderness Act of 1984

SCENIC AREA - Manage to preserve and protect the outstanding natural esthetics of the Vinegar Hill - Indian Rock Scenic Area

SPECIAL INTEREST AREAS - Manage to preserve areas of significant historical, geological, botanical, zoological, paleontological, or other special characteristics.

RESEARCH NATURAL AREAS - Manage areas for nonmanipulative research, observation, and study of undisturbed ecosystems

SEMI-PRIMITIVE NON-MOTORIZED RECREATION AREAS - Manage to provide a wide range of semiprimitive nonmotorized recreation opportunities while protecting existing environmental quality Exclude new road construction

SEMI-PRIMITIVE MOTORIZED RECREATION AREAS - Manage to provide a wide range of semiprimitive motorized recreation opportunities while protecting existing environmental quality Exclude new road construction

DEVELOPED RECREATION SITES - Manage for developed recreation opportunities

OLD GROWTH - Manage old-growth habitat for dependent species

VISUAL CORRIDORS - Manage viewshed corridors with primary consideration given to their scenic quality and the growth of large diameter trees Visual quality objectives of retention, partial retention, and modification will be applied while providing for other uses and resources

UNIT PLANS WILDLIFE EMPHASIS - Manage to maintain or improve the area to support fish and wildlife populations

MINIMUM LEVEL MANAGEMENT - Provide the minimum management necessary to provide for resource protection and to ensure public safety Additional road construction will be allowed to manage adjacent areas

BYRAM GULCH MUNICIPAL SUPPLY WATERSHED - Manage to ensure that Oregon water quality standards for community public supply water use are met Protect existing beneficial uses of the water Protect and, where needed, improve the quality and quantity of the water resource in a manner consistent with National, State, and Forest goals

LONG CREEK MUNICIPAL SUPPLY WATERSHED - Manage to ensure that Oregon water quality standards for community public supply water use are met Protect existing beneficial uses of the water Protect and, where needed, improve the quality and quantity of the water resource in a manner consistent with National, State, and Forest goals

ADMINISTRATIVE SITES - Provide and maintain sites for facilities necessary for the administration of Malheur National Forest lands

WILDLIFE EMPHASIS AREA WITH SCHEDULED TIMBER HARVEST - Manage to provide for high quality wildlife and fish habitat and water quality Manage elk habitat to provide at least 70 percent of elk habitat effectiveness while allowing for scheduled timber harvest Provide opportunities for high quality semiprimitive dispersed recreation

WILDLIFE EMPHASIS AREA WITH NON-SCHEDULED TIMBER HARVEST - Manage to provide for high quality wildlife and fish habitat and water quality Manage elk habitat to provide at least 70 percent of elk habitat effectiveness Timber harvest will be on a non-scheduled basis and will be used only to meet a wildlife and or fish habitat objective Provide opportunities for high quality semiprimitive dispersed recreation

WILD AND SCENIC RIVER - Manage to maintain the unique wild and scenic character of the river segment in accordance with the Omnibus Oregon Wild and Scenic Rivers Act of 1988

TABLE S-2: Management Areas by Alternatives
(Acres)

	Alternatives					
	NC[1/] (No Change)	B Modified	A (No Action)	F (DEIS Pref)	I Preferred	C Modified
1 General Forest	922,563	775,479	657,726	618,456	553,053	478,973
2 Rangeland	N/A	109,919	141,702	105,840	99,203	82,989
3 Riparian Areas	3,707					
3A Non-Anadromous Riparian	N/A	21,706	18,567	19,779	19,268	17,047
3B Anadromous Riparian	N/A	33,954	31,185	32,132	28,092	24,722
4A Big-Game Winter Range Maintenance	0	76,599	0	194,141	177,406	115,764
4B Big-Game Winter Range Enhancement	0	0	0	0	0	35,145
5 Bald Eagle Winter Roosts	4,326	4,580	4,326	4,040	4,040	4,064
6A Strawberry Mountain Wilderness	68,700	68,700	68,700	68,700	68,700	68,700
6B Monument Rock Wilderness	12,620	12,620	12,620	12,620	12,620	12,620
6C Pine Creek Proposed Wilderness	0	0	0	0	0	5,420
7 Scenic Area	13,322	13,322	13,322	13,322	13,322	13,322
8 Special Interest Areas	312	312	312	312	246	312
9 Research Natural Areas	0	1,310	1,310	1,310	750	1,310
10 Semiprimitive Nonmotorized Recreation Areas	40,845	0	38,848	36,687	48,888	96,015
11 Semiprimitive Motorized Recreation Areas	0	0	0	9,536	14,578	77,250
12 Developed Recreation Sites	N/A	427	427	427	484	427
13 Old-Growth Habitat	123,587[2/]	43,600	40,800	50,090	72,690[3/]	47,930
14 Visual Corridors	66,720	183,244	212,953	178,380	186,682	263,762
15 Unit Plan Wildlife Emphasis Areas	154,883	0	102,974	0	0	0

1/The Timber Management Plan upon which the No Change Alternative is based was developed in 1979. The plan was not an integrated plan and consequently did not address all resource uses and outputs in an integrated manner As a result, these acreages are not directly comparable to the other alternatives Overlap among management areas for the NC Alternative cannot be added to equal the total Forest acres.

2/Potential old growth acres managed on three tier system with 260 year rotation so that approximately 1/3 of area is old growth at any one point in time.

3/Includes 25,000 acres of old growth replacement

TABLE S-2: Management Areas by Alternatives (continued)
(Acres)

	Alternatives					
	NC1/ (No Change)	B Modified	A (No Action)	F (DEIS Pref)	I Preferred	C Modified
16 Minimum Level Management4/	76,600	74,668	74,668	74,668	74,668	74,668
17 Byram Gulch Municipal Supply Watershed	N/A	300	300	300	300	300
18 Long Creek Municipal Supply Watershed	N/A	224	224	224	224	224
19 Administrative Sites	N/A	1,369	1,369	1,369	1,369	1,369
20 Wildlife Emphasis with Scheduled Timber Harvest	N/A	N/A	N/A	N/A	23,674	N/A
21 Wildlife Emphasis with Non-Scheduled Timber Harvest	N/A	N/A	N/A	N/A	22,076	N/A
22 Wild and Scenic River	N/A	10,256	10,256	10,256	10,256	10,256
Roads, Water, etc	26,833	26,833	26,833	26,833	26,833	26,833
TOTAL	1,459,422	1,459,422	1,459,422	1,459,422	1,459,422	1,459,422

4/ Lands assigned to Management Areas 1 through 4B, 14, 15, 18, 20, and scenic portions of 22 had the option in FORPLAN of being assigned to that management area or to minimum level management (Management Area 16) Lands assigned to all other management areas were fixed (does not apply to the No Change Alternative)

Alternatives Described

A brief description of each alternative listed in this Final EIS follows

a Alternative NC (No Change)

The "No Change" alternative has been developed in response to direction by the Chief of the Forest Service and Deputy Assistant Secretary Douglas MacCleery regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986 The appeal centered on direction by Regional Forester James F Torrence to "require inclusion of (Minimum Management Requirements) in the Current Direction 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 the Forest Plan Environmental Impact Statements The No Change Alternative is designed to represent the existing timber management plans and, consequently, does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA The following provisions of NFMA or other laws or regulations are not partially or fully complied with in current management plans represented by the No Change Alternative

CFR 219.14 - Timber resource land suitability Requires identification of land not suited for timber production based on risk of irreversible resource damage, lack of assurance of reforestation within five years, or withdrawal by Act of Congress, Secretary of Agriculture, or Chief of the Forest Service

CFR 219 16 - Timber resource sale schedule Requires determination of the quantity of timber that may be sold during each decade Requires calculation of the long-term sustained yield capacity

CFR 219.27(c)(1) - Management Requirements, silvicultural practices Requires that no timber harvesting shall occur on lands classified as not suited for timber production pursuant to CFR 219 14, except for salvage sales, sales necessary to protect other multiple use values or activities that meet other objectives on such lands if the forest plan objectives establish that such actions are appropriate

The No Change Alternative could not be implemented or used in future management of the Forest under the Forest Plan without Congressional and/or Secretary of Agriculture action to change the law or regulations

Timber Management The timber management goal is to grow moderate size trees (19-inch diameter and larger) while emphasizing rapid fiber growth rates A full range of timber management intensities would be made available to 1,116,577 acres to meet this goal. 59 percent of this land would be managed for full yield and 41 percent for 50 to 90 percent of full yield First decade potential yield in Alternative NC would be 269 7 million board feet annually This is about 42 million board feet above 1980-89 average annual sell levels Potential yield is the sustainable output of wood fiber available after *the needs of other Forest uses have been deducted from the biological potential*

Range Management The range management goal is to provide sufficient forage to support 126,150 animal unit months annually Specific management direction regarding how to meet this goal is not available

Recreation· The recreation management goal is to emphasize dispersed, roaded recreation opportunities with sufficient recreation opportunities in both unroaded and developed settings *to meet expected demand Unroaded recreation opportunities outside* wilderness would be provided in five currently unroaded areas encompassing 54,167 acres Wilderness acres would remain at the level they are today, 81,320 acres These areas would be managed under provisions in the Wilderness Act of 1964 and subsequent legislation

Virtually all remaining Forest land is managed to provide opportunities for roaded recreation. Management activities are modified on 66,720 acres along visually sensitive travel routes, as described in the Timber Resource Management Plan

Riparian Area Management and Fisheries Habitat The riparian and fisheries management goal is to manage all riparian areas to meet State water quality standards, which will maintain viable populations of resident fish and maintain anadromous fish habitat at or above current capability

Wildlife Habitat The wildlife habitat management goal is to manage all wildlife emphasis areas to benefit associated wildlife species

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species in areas assigned to wildlife emphasis and 40 percent in timber and range emphasis areas Snag replacement trees were not a part of the design in the Timber Resource Management Plan, and hence would not be provided

Old-Growth Forest The old-growth management goal is to provide old-growth habitat for dependent species On those areas available for programmed timber harvest, 123,587 acres of potential old-growth habitat would be managed under a 260-year rotation using a three-tier system to maintain approximately one-third of this area in old growth An additional 64,027 acres of old growth would be provided in wilderness, roadless areas, and bald eagle winter roosts.

Management of Undeveloped Areas. The undeveloped area management goal is to maintain, in a roadless condition, key roadless areas identified during the unit planning process (McClellan Mountain, North Fork Malheur River, Malheur River, Glacier Mountain, and

Greenhorn Mountain) These areas would be managed using boundaries shown in unit plans. The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 54,167 acres The Pine Creek Further Planning Area would be assigned to timber and range management emphasis, however, timber management would be deferred

Mitigation Measures: Alternative NC provides management direction for wildlife, roadless areas, and scenic travel corridors

Within the acreage available for timber production, old-growth habitat areas will be managed for dependent wildlife species In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species which in turn provide habitat for other species, snags would be managed to provide habitat for at least 40 percent of the potential population in timber and range emphasis areas, and at least 60 percent in wildlife emphasis areas In addition, dead trees would be left to fall across streams to produce fish-rearing pools

Alternative NC includes 54,167 acres of roadless areas managed to provide a scenic or semiprimitive, nonmotorized recreational opportunity Timber harvesting, road construction, and motor vehicles of any kind would be prohibited in these areas These areas, along with the 81,320 acres of wilderness, would provide places for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing would be modified on 66,720 acres of land that occur along visually sensitive travel routes These foreground viewing areas would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

b. Alternative A (No Action)

Alternative A was developed to continue implementation of the management direction provided by the existing land management plans (John Day, Silvies-Malheur, and South Fork Unit Plans) and the Timber Resource Management Plan updated to meet current laws and regulations This includes compliance with Management Requirements (MRs) and National Forest Management Act provisions and regulations This alternative provides an estimate of the activities and outputs likely to occur if management were to continue under existing direction The goal of these plans is to intensively manage the timber resource coordinated with nonintensive management of recreation and wildlife

Alternative A serves as the No Action Alternative required by the National Environmental Policy Act of 1969

Timber Management The timber management goal of this alternative is to grow moderate size trees (17-inch diameter and larger) while emphasizing rapid fiber growth rates Ponderosa pine would be emphasized on approximately 311,111 acres, and mixed conifer species emphasized on approximately 531,177 acres A full range of timber management intensities would be made available to 967,327 acres Of these available acres, 898,424 acres are deemed suitable for timber harvest Of the suitable land, 86 percent would be managed for full yield, 4 percent for 50 to 90 percent of full yield, and 10 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative A would be 232.7 million board feet annually This is about 4 million board feet above 1980-89 average annual sell levels

Range Management The range management goal is to sustain permitted range use levels Full utilization of forage by livestock would be encouraged Seeding would be done on some forested land after timber harvest to increase existing livestock forage

production. Livestock and big game may consume 50 percent of the annual growth of forage on uplands in this alternative

Recreation: The recreation management goal is to emphasize dispersed, roaded recreation opportunities with sufficient recreation opportunities in both unroaded and developed settings to meet expected demand

Unroaded recreation opportunities outside wilderness would be provided in 6 currently unroaded areas encompassing 59,179 acres (including 3,066 acres of the wild portion of the Malheur River). Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use (sanitation facilities only would be provided) Management activities would be modified on 249,591 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat Improvement in resident trout habitat would generally be achieved through a gradual improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work would generally be for mitigation only This would be done on approximately 3 miles of stream per year

Livestock and big game would be allowed to consume 70 percent of the annual growth of grass forage and 67 percent of the annual shrub growth in riparian areas In addition to approximately 3 miles of lower intensity instream structural work done as mitigation, more intensive instream habitat improvements would be applied at a rate of about 2 miles per year in anadromous streams

Wildlife Habitat The big-game habitat management goal is to manage elk summer range and wildlife emphasis areas via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) A specific goal is to manage all elk winter range for an optimal mix and distribution of forage and cover in unit plan wildlife emphasis areas Satisfactory big-game cover would be retained at a minimum of approximately 10 percent in general forest allocations (where possible)

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species in areas assigned to wildlife emphasis and 40 percent in timber and range emphasis areas Replacement snag habitat would be provided

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur It would include burning, seeding and planting to improve forage conditions Also included would be snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands Habitat enhancement would occur at a low level

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at or above their minimum viable population levels Total old-growth habitat provided would be 104,661 acres, with 40,800 acres on timber producing lands outside wilderness, roadless areas, and bald eagle winter roosts

Management of Undeveloped Areas: The undeveloped area management goal is to maintain, in a roadless condition, key roadless areas identified during the unit planning process (McClellan Mountain, North Fork Malheur River, Malheur River, Glacier Mountain, Greenhorn Mountain, and Pine Creek) These areas would be managed using boundaries shown in unit plans The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 59,179 acres The Pine Creek Further Planning Area would not be recommended for wilderness designation, but would be retained as a roadless area

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing research natural area. Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures Alternative A provides management direction for wildlife, roadless areas, and scenic travel corridors

Within the acreage available for timber production, enough old-growth habitat areas would be dedicated to maintain the dependent wildlife species at or above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 40 percent of the potential population in timber and range emphasis areas, and at least 60 percent in wildlife emphasis areas In addition, dead trees along streamcourses would be left to fall across streams to produce fish-rearing pools

Alternative A includes 59,179 acres of roadless areas managed to provide a semiprimitive, nonmotorized recreational opportunity Timber harvesting, road construction, and motor vehicles of any kind would be prohibited in these areas These areas, along with the 81,320 acres of wilderness, would provide places for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing would be modified on 249,591 acres of land that occur along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

c Alternative B-Mod (DEIS Alternative B as modified to incorporate Preferred-Plus Alternative)

Alternative B-Modified emphasizes the production of resources such as timber, developed recreation, minerals, and most other resources which have the potential to return revenue to the U S Treasury and local counties Management of other resources is at economically and environmentally feasible levels that are consistent with the overall emphasis on market-oriented outputs

Alternative B-Modified also attempts to meet the 1980 Resources Planning Act program output targets assigned to the Forest for timber production through the Pacific Northwest Regional Guide

Timber Management The timber management goal of this alternative is to grow moderate size trees (17-inch diameter and larger) while meeting Resources Planning Act program targets for the first 50 years and emphasizing rapid fiber growth by utilizing later successional timber species Ponderosa pine would be emphasized on approximately 316,152 acres and mixed conifer species on approximately 580,632 acres. A full range

of timber management intensities would be made available to 987,088 acres to meet this goal. Of these available acres 956,783 acres are deemed suitable for timber harvest Of the suitable land, 91 percent would be managed for full yield, 4 percent for 50 to 90 percent of full yield, and 5 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative B-Modified would be 265.9 million board feet annually This is about 38 million board feet above 1980-89 average annual sell levels

Range Management The range management goal is to manage and utilize forage at historic use levels Utilization of forage by livestock would be encouraged Seeding would be done annually on both forested and nonforested rangeland to optimize forage for cattle Livestock and big game may consume 50 percent of the annual growth of forage on uplands in this alternative

Recreation. The recreation management goal is to emphasize recreation in a roaded modified setting

Unroaded recreation opportunities outside wilderness would be provided in the 13,322 acres of the Vinegar Hill-Indian Rock Scenic Area Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 61,830 acres managed for semiprimitive wilderness opportunities and 6,870 acres managed as primitive trailless Unroaded recreation opportunities would also be available in 3066 acres of the Malheur River designated as wild under the Oregon Omnibus Wild and Scenic Rivers bill

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 199,913 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat Improvement in resident trout habitat would generally be achieved through improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work on about 3 miles of stream per year would generally be for mitigation only

In riparian areas, livestock and big game may consume 45 percent of the annual growth of grass forage and 40 percent of the annual shrub growth in this alternative Livestock use would be limited on streamside forage along about 70 miles of anadromous streams with riparian areas in less than desired condition for a period of time to accelerate riparian improvement in these areas In addition to approximately 3 miles of lower intensity instream structural work as mitigation, more intensive instream habitat improvements in anadromous streams would be applied at a rate of about 3 miles per year

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) Winter range would be managed to provide a mix and distribution of forage and cover Three of the elk winter ranges would receive intensive timber management Satisfactory big-game cover would be retained at a minimum of 5 percent in both summer and winter ranges across the forest.

Snag habitat would be retained to support 40 percent of the potential population of cavity-dwelling species Forest-wide In riparian areas and areas immediately adjacent to riparian areas snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively Snag replacement habitat would also be provided at the same levels

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur It would include burning, seeding and planting to improve forage It will also include snag creation, leaving of dead and down woody material, and rehabilitating decadent aspen stands Habitat enhancement would occur at a low level

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at or above their minimum viable population levels Total old-growth habitat provided after decade 5 would be limited to 90,509 acres, with 43,600 acres on timber-producing lands outside wilderness, roadless areas, and bald eagle winter roosts

Management of Undeveloped Areas· The undeveloped area management goal is to maintain, in a roadless condition, the Vinegar Hill-Indian Rock Scenic Area and wild portion of Malheur River The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 13,322 acres The Pine Creek Further Planning Area would not be recommended for wilderness and is assigned to other resource emphases

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing research natural area Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures Alternative B-Modified provides management direction for wildlife, roadless areas, riparian areas, and scenic travel corridors

Within the acreage available for timber production, enough old-growth habitat areas would be dedicated to maintain the dependent wildlife species at or above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags· would be managed to provide habitat for 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas, with a Forest-wide objective of 40 percent In addition, dead trees along streamcourses would be left to fall across streams to produce fish-rearing pools

Alternative B-Modified includes the 13,322 acre Vinegar Hill-Indian Rock Scenic Area (part of the Greenhorn Mountain roadless area) that has been designated as semiprimitive Motorized Timber harvesting, road construction, and motor vehicles (other than snowmobiles) would be prohibited in this area This area, along with the 81,320 acres of wilderness, would provides a place for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing are modified on another 199,913 acres of land that occurs along visually sensitive travel routes These viewsheds will be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Alternative B-Modified mitigates the impacts of livestock grazing on riparian areas along anadromous streams that are in unsatisfactory condition Livestock grazing will be reduced or eliminated for a period of time to allow the riparian vegetation and streambanks to improve to an acceptable level Once recovered, the riparian areas will be managed to maintain an acceptable condition

d Alternative C-Mod (DEIS Alternative C modified to incorporate Grant County Conservationist and Citizens Multiple Use Alternatives)

Alternative C-Modified assigns all current roadless areas outside existing wilderness to a management prescription which will maintain their roadless status. It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values Management of other resources would be at economically and environmentally feasible levels consistent with the overall emphasis on amenity values

Timber Management The timber management goal is to grow large-size ponderosa pine trees (26-inch diameter and larger), utilizing both even-aged and uneven-aged management systems Timber management would favor perpetuation of ponderosa pine across the Forest where biologically possible. Ponderosa pine would be emphasized on approximately 481,783 acres, and mixed conifer species emphasized on approximately 245,470 acres. A range of timber management intensities emphasizing production of large-size ponderosa pine trees would be made available to 831,340 acres to meet this goal. Of these available acres, 770,387 acres are deemed suitable for timber harvest. Of the suitable land, 35 percent would be managed for full yield, 54 percent for 50 to 90 percent of full yield, and 11 percent for less than 50 percent of full yield. First decade annual timber harvest in Alternative C-Modified would be 154.0 million board feet annually This is about 74 million board feet below 1980-89 average annual sell levels.

Range Management The range management goal is to allow range use where it does not conflict with the amenity orientation of this alternative Grasses, forbs, and other forage would be managed to provide forage for both livestock and big game Livestock and big game would be allowed to consume 50 percent of the annual growth of forage on uplands.

Recreation The recreation management goal is to emphasize unroaded recreation opportunities

Unroaded recreation opportunities outside wilderness would be provided in all currently unroaded areas encompassing 175,416 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acreage would increase to 86,740 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 61,830 acres managed as primitive trailed wilderness and 6,870 acres managed as primitive trailless Pine Creek roadless area would be recommended for wilderness and managed for semiprimitive wilderness recreation opportunities In addition, roughly 17,100 acres would be added to the RARE II areas to make more manageable boundaries

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 307,819 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and improve anadromous and resident fish habitat No timber harvest would be scheduled for Class I, II and III stream riparian zones. Improvement in resident and anadromous fish habitat would be achieved through improved livestock management adjacent to streams and a moderate level of instream improvements

No scheduled timber harvest will occur in riparian areas. Livestock and big game may consume 45 percent of the annual growth of grass forage and 40 percent of the annual shrub growth in this alternative Livestock use would limited for a period of time on pastures adjacent to riparian areas in less than desired condition to allow improvement of these areas Instream improvements would be applied at a rate of about 5 miles per year

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range (maintenance and enhancement) via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) All elk winter range would be managed to enhance forage production and provide an optimum mix and distribution of forage and cover The carrying capacity of five of the elk winter ranges would be enhanced Livestock use would be limited to 25 percent of the forage available in these 5 winter range areas Satisfactory big-game cover would be retained at a minimum of 15 percent in both summer and winter ranges (where possible)

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species Forest-wide In riparian areas and areas immediately adjacent to riparian areas, snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively Snag replacement habitat would also be provided at these levels

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur Habitat enhancement would occur at moderate-to-high levels It would include burning, seeding and planting to improve forage It will also include snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands

This alternative would exceed Oregon State Fish and Wildlife management objectives

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at 50 percent or more above their minimum viable population levels After decade 5, total old-growth habitat provided would be limited to 178,761 acres, with 47,930 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas

Management of Undeveloped Areas The undeveloped area management goal is to maintain all existing roadless areas in a roadless condition

Unroaded recreation opportunities outside wilderness would be maintained at approximately 192,500 acres Boundaries would be those used in the RARE II process, with modifications in several areas The Pine Creek Further Planning Area would be recommended for wilderness designation

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing research natural area Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures: Alternative C-Modified provides management direction for wildlife, roadless areas, riparian area improvement, insect-resistant stands, and scenic travel corridors

Within the acreage available for timber production, old-growth habitat areas would be dedicated to maintain the dependent wildlife species at 50 percent or more above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas for a Forest-wide objective of 60 percent Dead trees which fall across streams would also be left to produce fish-rearing pools

The risk of a western spruce budworm epidemic in the mixed conifer stands is mitigated by silvicultural prescription These stands would receive a regeneration cut and would be planted with ponderosa pine

Livestock grazing would be mitigated on five of the inventoried elk winter ranges with an enhancement strategy. Of the available grass and grass-like forage, 75 percent would be allocated to big game. Other management activities which would enhance elk winter range, such as burning, seeding, or shrub restoration, would be implemented to maintain quality forage.

Effects of timber management activities such as logging and road construction would be mitigated in Alternative C-Modified with roughly 192,500 acres of roadless areas There are two kinds of roadless areas planned There would be about 119,479 acres of roadless areas that will provide semiprimitive, nonmotorized recreation Timber harvesting, road construction, and motorized vehicles of any kind would be prohibited in these areas These areas, along with 86,740 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human presence There would also be 73,037 acres which would provide semiprimitive motorized recreation Timber harvesting and road construction would be prohibited in these areas, while motorized vehicles would be permitted and trails can be constructed to provide for Forest visitors who enjoy motorized recreation in a semiprimitive setting

Logging activities, road construction, and grazing would be modified on 307,819 acres of land that occur along visually sensitive travel routes These visual zones would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Alternative C-Modified mitigates the impacts of livestock grazing on riparian areas in unsatisfactory condition. Livestock grazing would be reduced for a period of time to allow riparian vegetation and streambanks to improve to an acceptable level Once recovered, the riparian areas would be managed to maintain an acceptable condition

e Alternative F (Preferred Alternative in DEIS)

Alternative F emphasizes market-oriented outputs while providing for a moderate level of amenity features in land allocations To balance the economic effects of amenity features outside of unroaded areas, commodity production is featured on a majority of the currently unroaded areas tentatively suited for timber production

Timber Management The timber management goal is to grow moderate-size trees (17-inch diameter and larger) while emphasizing fiber production on a majority of the productive true fir sites Ponderosa pine would be emphasized on approximately 311,202 acres, and mixed conifer species emphasized on about 552,790 acres A full range of timber management intensities would be made available to 951,028 acres to meet this goal Of these available acres, 919,748 acres are deemed suitable for timber harvest. Of the suitable land, 88 percent would be managed for full yield, 4 percent for 50 to 90 percent of full yield, and 8 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative F would be 246 6 million board feet annually This is about 18 million board feet above 1980-89 average annual sell levels

Range Management The range management goal is to maintain permitted range use levels with some reduction to improve riparian areas in unsatisfactory condition. Full utilization of forage will be encouraged Livestock and big game would be allowed to consume 50 percent of the annual growth of forage on uplands

Recreation The recreation management goal is to emphasize dispersed, roaded recreation opportunities with a moderate level of unroaded and developed recreation opportunities.

Unroaded recreation opportunities outside wilderness would be provided in 7 currently unroaded areas encompassing 66,962 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 204,215 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat. The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat Improvement in resident trout habitat would generally be achieved through improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work on about 3 miles of stream per year would generally be for mitigation only

In riparian areas in good condition, livestock and big game would be targeted to consume 45 percent of the annual growth of grass forage and 40 percent of annual shrub growth In riparian areas in less than desired condition (approximately 60,000 acres of land containing approximately 2,000 acres of anadromous riparian areas), livestock would be targeted to consume 0-40 percent of the annual growth of grass forage. In addition to approximately 3 miles of lower intensity instream structural work as mitigation, more intensive instream habitat improvements would be applied at a rate of about 2 miles per year in anadromous streams

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range areas via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) Elk winter range would be managed to provide an optimum mix and distribution of forage and cover Satisfactory big-game cover would be retained at a minimum of 5 percent for both summer and winter ranges across the Forest

Snag habitat would be retained to support an average of at least 40 percent of the potential population of cavity-dwelling species Forest-wide In riparian areas, and areas immediately adjacent to riparian areas snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively Commercial forestlands outside riparian would be managed at the 40 percent level Snag replacement trees would be provided to maintain these levels of habitat through time

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur Habitat enhancement would occur at a low-to-moderate level It would include burning, seeding and planting to improve forage It will also include snag creation, leaving dead and down woody material, and rehabilitating decadent aspen stands

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at 30 percent or more above their minimum viable population levels Total old-growth habitat remaining after decade 5 would be 121,042 acres, with 50,090 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas

Management of Undeveloped Areas The undeveloped area management goal is to maintain in a roadless condition Aldrich, McClellan Mountain, Malheur River, North Fork Malheur River, Glacier Mountain, Myrtle-Silvies, and Greenhorn Mountain areas utiliz-

ing manageable boundaries The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 66,962 acres. The Pine Creek Further Planning Area would not be recommended for wilderness designation but is assigned to other resource emphases.

Research Natural Areas. The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing research natural area. Three candidate RNAs would be identified for the Forest one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures: Alternative F provides management directions for wildlife, roadless areas, riparian area improvement, and scenic travel corridors

Within the acreage available for timber production, sufficient old-growth habitat would be dedicated to maintain the dependent wildlife species at 30 percent or more above their minimum viable level. In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas for a Forest-wide objective of around 40 percent Dead trees along streamcourses which fall across streams would be left to produce fish-rearing pools.

Effects of timber management activities, such as logging and road construction, are mitigated in Alternative F with 66,962 acres of roadless areas Two kinds of roadless areas are planned. There would be 50,949 acres of roadless areas that would provide semiprimitive, nonmotorized recreation Timber harvesting, road construction, and motorized vehicles of any kind would be prohibited in these areas These areas, along with 81,320 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human presence There are 16,013 acres which would provide semiprimitive, motorized recreation. Timber harvesting and road construction would be prohibited in these areas while allowing for motorized vehicles and trail construction to provide for Forest visitors that enjoy motorized recreation in a semiprimitive setting

Logging activities, road construction, and grazing would be modified on 204,215 acres of land that occur along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing" to slightly altered" scenery

f. Alternative I (Preferred Alternative)

Alternative I features a range of land uses between amenity values and commodity production emphasis This alternative reduces harvest in riparian zones, features uneven-aged management on roughly 30 percent of the suitable timber lands, and intensifies regeneration harvests where severe insect and disease agents have recently occurred Approximately one-half of unroaded areas remain unroaded

Timber Management. The timber management goal is to grow a range of moderate-size trees (18-inch diameter and larger) while emphasizing the conversion of mixed conifer stands to ponderosa pine in order to produce harvest volumes of 60 to 70 percent ponderosa pine in future decades Ponderosa pine would be emphasized on approximately 454,388 acres, and mixed conifer species emphasized on approximately 330,829 acres A full range of timber management intensities would be made available to 905,151 acres to meet this goal Of these available acres 835,970 acres are deemed suitable for timber

production Of the suitable land, 56 percent would be managed for full yield, 39 percent for 50 to 90 percent of full yield, and 5 percent for less than 50 percent of full yield Heavily defoliated and slow-growing, diseased mixed conifer stands would be scheduled for regeneration harvest in the first decade In Alternative I, first decade timber sale program quantity and annual timber harvest would be 211 million board feet annually This is about 17 million board feet below the 1980-89 average annual sell levels.

Range Management The range management goal is to maintain permitted range-use levels with some reduction occurring to improve anadromous riparian areas in unsatisfactory condition Full utilization of forage would be encouraged Livestock and big game would be allowed to consume 50 percent of the annual growth of forage on uplands

Recreation The recreation management goal is to emphasize dispersed, roaded recreation opportunities with moderately high levels of unroaded and developed recreation opportunities.

Unroaded recreation opportunities outside wilderness would be provided in 8 currently unroaded areas encompassing 79,854 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities. Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 20 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 225,953 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve fish habitat Habitat improvement will be achieved with a combination of riparian area improvement and structural habitat improvement Improvement in the abundance and diversity of riparian vegetation, with the associated geomorphic recovery of the stream channel, will account for the larger part of the expected increase in fish habitat capability over time Structural work will be done to accelerate this riparian improvement as well as to provide direct habitat improvement Habitat improvement work will be applied at a rate of about four miles per year Forest-wide Priority for appropriated funds for this work will go to anadromous streams Fish habitat improvement will also be funded with K-V funds generated by timber sale receipts

In riparian areas in a condition to meet the needs of riparian-dependent resources, the forage utilization objective will generally be no more than 45 percent for grasses and 40 percent for shrubs (for livestock and big game combined) Utilization standards may vary based on site-specific standards in allotment management plans In riparian areas not in a condition to meet the needs of riparian-dependent resources, such as areas with unstable banks, lowered water table, or a lack of stream surface shade, forage utilization will generally be restricted to 0-35 percent of the annual growth of grass forage and 0-30 percent of annual growth on shrubs Again, standards may vary depending on the specific interdisciplinary objectives of the allotment management plan

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range, and wildlife emphasis areas, via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres). Satisfactory big-game cover would be retained at a minimum of 10 percent in winter ranges (where possible), 10 to 15 percent in summer ranges, and at 15% in Wildlife Emphasis areas

Snag habitat would be retained to support 40 percent of the potential of cavity dwelling species Forest-wide. In riparian areas, snag habitat would be retained to provide 60 percent of potential, 60-100 percent in wildlife emphasis areas, and at or near natural levels in wilderness areas, research natural areas, the Scenic Area, bald eagle winter roosts, and dedicated old-growth areas. Snag replacement habitat trees would also be provided to maintain these levels into the future

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur Habitat enhancement would occur at a moderate level It would include burning, seeding and planting to improve forage It will also include snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands

Old-Growth Forest: The old-growth management goal is to provide sufficient habitat to maintain dependent species at 30 percent or more above their minimum viable population levels Total old-growth habitat provided would be on approximately 121,042 acres, with 47,690 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas In addition, there would be approximately 25,000 acres of old-growth replacement stands that would help ensure old-growth conditions well into the future

Management of Undeveloped Areas The undeveloped area management goal is to maintain in a roadless condition Aldrich, McClellan Mountain, North Fork Malheur River (area outside of the Wild and Scenic River corridor which will be renamed Bear Creek), Malheur River, Glacier Mountain, Myrtle-Silvies, Greenhorn Mountain and Shaketable areas utilizing manageable boundaries The remaining roadless areas would be assigned to other resource emphases.

Unroaded recreation opportunities outside wilderness would be provided on 79,854 acres. The Pine Creek Further Planning Area would not be recommended for wilderness designation but would be assigned to other resource emphases

Research Natural Areas: The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing research natural area Four candidate Research Natural Areas would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are Shaketable Mountain, Dixie Butte, and Dugout Creek

Mitigation Measures: Alternative I provides management direction for wildlife, roadless areas, riparian area improvement, insect-resistant stands, and scenic travel corridors

Within the acreage available for timber production, old-growth habitat areas would be dedicated to maintain the dependent wildlife species at 30 percent or more above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 60 percent of the potential population in riparian areas and 40 percent of potential populations in other management areas for a Forest-wide objective of slightly greater than 40 percent Snag replacement trees would be provided across the managed forest and dead trees along streamcourses which fall across streams would generally be left to produce fish-rearing pools

Effects of timber management activities such as logging and road construction are mitigated in Alternative I with 79,854 acres of roadless areas Two kinds of roadless areas are planned. There would be 62,210 acres of roadless areas that would provide semiprimitive, nonmotorized recreation. Timber harvesting, road construction, and motorized vehicles

of any kind would be prohibited in these areas These areas, along with 81,320 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human activity There are 14,578 acres which would provide semiprimitive, motorized recreation Timber harvesting and road construction would be prohibited in these areas while allowing for motorized vehicles and trail construction to provide for Forest visitors who enjoy motorized recreation in a semiprimitive setting.

Logging activities, road construction, and grazing would be modified on 225,953 acres of land occurring along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing " to slightly altered" scenery

Alternatives Compared

In general, Alternative B-Modified emphasizes intensive commodity production, while Alternative C-Modified emphasizes a more natural system The remaining alternatives provide various mixes in emphases between these alternatives The management area mix of each alternative is shown in Table S-2

Indicators of response for each alternative are summarized in Table S-3. From these tables, alternatives can be compared according to the listed resource concerns The abbreviations used in the table follow

PNV = Present Net Value

MR = Management Requirement

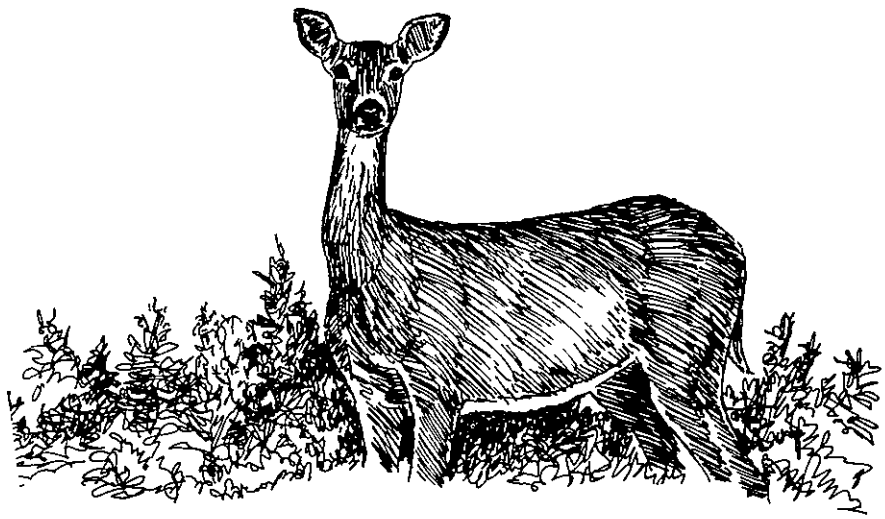


TABLE S-3 Indicators of Response of Alternatives to Planning Issues and National Concerns (Average Annual Outputs)

Indicators of Response	Alternatives (In order of decreasing present net value) Max PNV[1/] (W/MR)	No Change NC	B-Mod	F	A	Preferred I	C-Mod
Economics							
Present Net Value (Millions of Dollars)	472 6	381 7	350 5	328 3	300 2	256 6	126 4
Economic Stability[2/]							
Payments to Counties (Millions of Dollars)							
Decade 1	7 0	6 0	7 4	6 8	6 3	5 9	4 4
Decade 5	N/A	N/A	8 6	8 6	8 2	7 0	3 9
First Decade Change in Employment (Jobs)	+554	N/A	+235	+ 96	0	-161	-573
First Decade Change in Income (Million Dollars)	+14 0	N/A	+ 7 8	+ 3 2	0	-5 3	-18 9
Timber Management							
First Decade Annual Allowable Sale Quantity							
Millions of Cubic Feet	47 7	N/A	44 0	40 9	38 6	34 8	25 5
Millions of Board Feet	273 0	N/A	252 0	233 7	220 6	200 0	146 0
Fifth Decade Annual Allowable Sale Quantity							
Millions of Cubic Feet	47 7	N/A	44 0	40 9	39 0	34 8	25 5
Suitable Timber Lands (Thousand Acres)	996	1,117	957	920	898	836	770
Allowable Sale Quantity Offered as Ponderosa Pine (Millions of Board Feet)							
First Decade	*149 6*	*N/A*	*121 0*	*112 0*	*106 0*	*92 0*	*70 0*
(Millions of cubic feet)							
First Decade	26 2	N/A	21 2	19 6	18 5	16 0	12 2
Fifth Decade	N/A	N/A	18 0	18 8	17 9	15 2	9 4
Suitable Timber Lands under Ponderosa Pine Management (Thousand Acres)	N/A	N/A	316	311	311	454	482
Harvest Methods, Clearcut (1,000 Acres)							
1st Decade	3 0	N/A	4 3	2 8	2 7	3 3	2 2
5th Decade	10 3	N/A	8 0	5 3	5 5	4 5	4 1
Acres Overstory Removal (1,000 Acres)							
1st Decade	22 3	N/A	10 5	9 6	8 6	6 3	5 8
5th Decade	0 2	N/A	0	0	0	0	0
Acres Uneven-aged Mgmt (1,000 Acres)							
1st Decade	N/A	N/A	4 1	5 2	5 7	6 4	5 0
5th Decade	N/A	N/A	4 4	5 8	6 1	6 8	5 7
Size of Average Tree Harvested (dbh, inches)							
1st Decade	N/A	N/A	22	22	22	22	22
5th Decade	N/A	N/A	16	16	16	16	15
10th Decade	N/A	N/A	14	14	14	16	16
Average over 150 year planning horizon	N/A	N/A	16 9	17 1	17 0	17 5	17 8

1/The Max PNV benchmark (with Management Requirements) is not a viable alternative, so is not directly comparable to the detailed alternatives Benchmarks were not updated to current technical and legislative changes which would change most resource outputs slightly If the Max PNV (with MR) benchmark was updated to 1990 conditions, it is estimated that ASQ and PNV outputs would be reduced by approximately 3-4 percent However, this benchmark remains suitable for making generalized comparisons to other alternatives

2/Changes in jobs (+515) and income (+$13 0 MM) for the No Change Alternative were projected assuming the potential yield (269 7 MMBF) displayed in the 1979 Timber Resource Plan would be harvested Jobs and income estimates were calculated in a comparable fashion to the other alternatives The 1979 Timber Resource Plan projected an increase of 266 jobs and $5 9 million, these estimates were generated employing different economic assumptions and methodology, and are not comparable to the jobs and income estimates presented for all other alternatives

TABLE S-3 (continued) Indicators of Response of Alternatives to Planning Issues and National Concerns (Average Annual Outputs)

Indicators of Response	Alternatives (In order of decreasing present net value) Max PNV (W/MR)	No Change NC	B-Mod	F	A	Preferred I	C-Mod
Big-Game Habitat							
Big-Game Use (Thousands of Wildlife and Fish Users Days)							
1st Decade	N/A	N/A	121 7	119 8	117 9	121 7	115 3
5th Decade	N/A	N/A	121 7	128 7	128 7	139 6	137 0
Habitat Effectiveness Index (Elk)							
1st Decade	N/A	N/A	56	55	54	56	53
5th Decade	N/A	N/A	56	59	59	64	63
Summer Elk Populations (1,000 Elk)							
1st Decade	N/A	N/A	13 4	13 2	13 0	13 4	12 7
5th Decade	N/A	N/A	13 4	14 2	14 2	15 4	15 1
Winter Elk Populations (1,000 Elk)							
1st Decade	N/A	N/A	5 7	5 6	5 5	5 7	5 4
5th Decade	N/A	N/A	5 7	6 0	6 0	6 5	6 4
Big Game Cover Quality (Index 0 5 low, 1 0 high)							
1st Decade	N/A	N/A	62	62	62	64	64
2nd Decade	N/A	N/A	56	59	61	66	70
Winter Range Enhancement (1,000 Acres)	0	0	0	0	0	0	35 1
Winter Range Maintenance (1,000 Acres)	0	0	76 6	194 1	0	177 4	115 8
Road Management							
Miles of Timber Purchaser Road Construction							
Decade 1	N/A	74	81	80	81	62	49
Decade 5	N/A	N/A	9	4	5	9	7
Miles of Open Roads							
1st Decade	N/A	N/A	6,500	6,500	6,500	6,500	6,500
5th Decade	N/A	N/A	6,500	5,400	5,400	4,550	4,550
Total Mileage of System Roads							
Decade 1	N/A	N/A	9,381	9,370	9,380	9,188	9,059
Decade 5	N/A	N/A	10,111	10,002	9,953	9,729	9,413
Riparian Areas and Fisheries							
Permitted Grazing Use in Riparians (1000 AUMs)							
Decade 1	N/A	N/A	23	23	36	22	18
Decade 5	N/A	N/A	23	23	36	22	21
Grazing Strategies Proposed for Unsatisfactory Riparian Areas - Shrub Utilization	N/A	67% Entire Pasture	0-20% Within Stream Corridor	0-20% Within Riparian Pasture	67% Within Unsat Pasture	0-35% Within Riparian Pasture	0-40% Entire Pasture
Anadromous Fish Harvest in First Decade (Thousands of Pounds)	N/A	N/A	40 1	34 4	26 8	37 0	44 9
Smolt Habitat Capability Index (1000s of smolt)							
Decade 1	N/A	N/A	196	168	131	181	219
Decade 5			297	277	154	326	399
Roadless Area Management							
Unroaded Areas Assigned to Unroaded Management (Thousands of Acres)	0	54 2	13 3	67 0	59 2	79 9	193 1
Management of Pine Creek FPA	Developed	Roadless	Available for development	Available for development	Roadless	Available for development	Wilderness Recommendation

E. Affected Environment

The Malheur National Forest's zone of influence is an area of magnificent scenery, remote small communities, and a rural western lifestyle found in few parts of the country today

Summary of Changes Between Draft and Final Environmental Impact Statement

Several important changes concerning the affected environment on the Malheur National Forest have occurred since the Draft Environmental Impact Statement was released Below, is a summary of those changes

Management Indicator Species This section has been expanded to include several additional species as indicators of management practices In addition, three species have been dropped as management indicators for the Malheur National Forest

Habitat Effectiveness Index (HEI) The use of HEI modeling has replaced cover to forage ratio descriptions for describing the elk habitat conditions on the Forest HEI incorporates physical and biological indicators of cover quality and spacing, open road densities, and forage quantity and quality (winter range) into the big-game habitat affected environment Cover to opening ratios are still used to describe the amount of an area providing satisfactory, marginal, and total cover to non-cover areas.

Soils Update This section has been expanded to include in greater detail historical events that have impacted the soils resource on the Forest Grazing, logging, road construction and mining impacts are described and soil conditions on the Forest are given in greater detail.

Wild and Scenic Rivers The discussion of wild and scenic rivers has been updated to reflect a re-analysis of Forest river systems completed following public comments As a result of this river reassessment, two rivers on the Malheur National Forest have been found to meet the criteria for wild and scenic status eligibility

Water Resources Update Greater detailed discussion of the water resources, water quality monitoring, and the affected environment of the Malheur National Forest are given in this chapter. Climate, topography, and their interactions (including potential management implications) are discussed in more detail

Riparian Ecosystems Update This section has been developed more fully since the Draft Environmental Impact Statement Riparian zones are defined, their importance expanded upon, and management implications are highlighted

Social and Economic Setting

Over 60 percent of Grant County's population lives in the John Day Valley, within a 15-mile radius of John Day The major lumber mills are located in this area which is considered the trade center for the county Similarly, over 60 percent of Harney County's population resides within a 10-mile radius surrounding the county's largest community, Burns

Population growth has been generally slow but steady Severe fluctuations have occurred in the past These fluctuations often parallel the health and viability of the national timber market Population projections for the area indicate a future growth rate averaging less than two percent per year

The economy is heavily resource-based, with logging and ranching as the principal sustaining industries. Federal, State, and local government also are major employers in the area More than half the area under consideration is publicly owned, the majority of which is National Forest Thus, the Malheur National Forest resource use and management decisions can have a major effect on the economic well-being of the area.

Institutions and establishments normally associated with small western intermountain ranching and logging communities are in evidence Most of the towns have a post office, cafe, bar, grocery store, service station, equipment dealership, elementary school, and several churches Many have several of the above establishments

The people of the area retain many of the social values which characterized the early American West These values include an affinity for the outdoors, independence, and freedom from control and regulation These deep-rooted values were forged during an era of abundance and unrestricted use of natural resources and along with the economic history of the area have a strong bearing on local attitudes toward the use and management of public lands and natural resources

As the local majority and power structure, native residents tend to stress the concept that Forest activities should be primarily influenced by the needs and desires of the local majority The opposing view holds that management of the Forest should be more responsive to national needs and values These conflicting viewpoints tend to reflect the means of influence with which each group is familiar and successful

The principal private sector industries in Grant and Harney counties are timber, livestock, and retail trade These three sectors account for approximately 50 percent of total area employment The other major sector of the economy is government (local, state, and federal), accounting for about 35 percent of the area's employment

Timber Management

When people think of a forest, they think of trees Forested land is important for wildlife habitat and provides beautiful scenery Forests provide a setting for a variety of recreational activities Trees are also important to the economic well-being of local communities and play a role in regional and national economics as well

There are three major timber categories of commercial importance on the Forest ponderosa pine, mixed conifer, and lodgepole pine The typical stand of trees on the Forest today is a two-story stand The overstory consists of large, mature trees while the understory consists of a variety of tree species at various ages The Malheur National Forest produces wood products from a land base of 1,459,422 acres, 1,174,878 acres are forested of which 1,039,868 acres have been identified as tentatively suitable for timber production

Insect-caused tree mortality on the Forest has been heavy during the past five to ten years In particular, this has been due to an infestation of mountain pine beetle (*Dendroctonus ponderosae*) affecting over one million acres on the Malheur, Wallowa-Whitman, and Umatilla National Forests Annually, mortality on this Forest from this insect has been about 4 million board feet of timber, primarily in lodgepole pine

The Douglas-fir tussock moth and western spruce budworm will continue to pose the potential of cyclic epidemic infestations This potential increases as the species mix of trees on the Forest shifts from predominantly ponderosa pine to predominantly fir species under the current emphasis on removing pine overstories and managing the fir understories (until these stands are regenerated at which time a more natural mix of ponderosa pine and fir species will occur) This potential for future outbreaks will decrease as more fir stands are intensively managed with full stocking-level control (Brookes, 1985) The maintenance of insectivorous bird populations will also help prevent epidemic levels of destructive insects Surveys conducted by Forest pest management personnel in 1988 indicated that the spruce budworm population is now declining Using past epidemics as an indicator, it appears that the recent epidemic is declining

The principal projections used in developing 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 the long term (50 years) and do not necessarily recognize current short-term regional fluctuations A summary of those projected RPA trends (year 2030) for timber supplies follows

Total projected national softwood demand (represented as probable harvests) would rise 24 percent from 9 6 billion cubic feet in 1980 to 11.9 billion cubic feet in 2030 In the Douglas-fir subregion, projected annual demand from 1980 to 1990 was about 2 3 billion cubic feet per year Demand would then decline slightly to 2 billion cubic feet per year for the rest of the 50-year period (US Department of Agriculture, 1984)

Prices for National Forest timber are expected to increase over the next 50 years at an average annual rate (real) of 1 percent This price increase will result from several supply/demand forces in the national marketplace, including declining supplies of high-valued old growth and rising demand for raw material for manufacturing This is particularly true for the Malheur National Forest, where inventories have shown substantial amounts of mature ponderosa pine and mixed conifer timber

The supply potential under varying management strategies was presented in the Forest Analysis of the Management Situation (AMS) There are three major influences on the potential supply level the number of acres available for harvest, the intensity of management on those acres, and the harvest flow schedule (nondeclining flow or departure). Current management direction would result in a potential supply of about 260 million board feet (45 million cubic feet annually through 2018), if fully funded A high-investment strategy could generate an annual supply of 285 million board feet (50 million cubic feet through 2018)

In recent years (1980-87), approximately 248 million board feet of National Forest timber has been harvested annually (includes Umatilla and Ochoco National Forest harvests within Grant and Harney counties, based on Oregon State Department of Forestry Annual Harvest Reports) Six major sawmills are presently located within the Forest's zone of influence, and several sawmills in adjacent counties purchase Malheur National Forest timber (varying levels)

Presently, the potential supply of Malheur National Forest timber and other wood fiber exceeds recent harvest levels (1980-87 average) However, there have been pressures from local and outside sources to increase the amount of timber sold to a level approaching the Forest's potential supply level Therefore, it can be assumed that there will be an increase in demand for products from the Forest

Overall, the efficiency of the Malheur National Forest timber sale program is very good with a substantial net cash flow A review of the Forest's timber sale costs and receipts for the period 1979 through 1985 revealed that the Forest has had a positive cash flow in each of these years and over the total time period from the sale of National Forest timber.

Big-Game Habitat

The most abundant and popular big-game species occurring on the Forest include mule deer and Rocky Mountain elk During the past decade elk populations have steadily increased to a current summer population of about 6,600 elk (Greg Hattan, Oregon Department of Fish and Wildlife, personal communication, August 1986) Approximately 2,865 elk winter on the Malheur National Forest Current annual Rocky Mountain elk harvest is estimated at about 2,000 animals and for mule deer at 4,000 animals Demand for elk hunting experiences is expected to increase

Habitat Effectiveness modeling developed specifically for the Blue Mountains by Jack Ward Thomas and others will be used to estimate the effects of habitat manipulation on elk. Habitat effectiveness variables including cover spacing and quality, road density, and forage quantity and quality (winter range) are analyzed by the model Population levels

are not directly related to the Habitat Effectiveness Index (HEI) due to the influence of many factors, including hunting and the quality of winter range habitat from outside of the Forest

Presently, the Forest-wide estimated Habitat Effectiveness Index for elk is 51 The cover to opening (formerly cover forage) ratio is estimated at 56 44, with approximately 13 percent in satisfactory cover This Forest-wide assessment does not include the spatial distribution of the cover to openings In specific geographic areas, satisfactory cover exceeds 20 percent of the Forest land area In others, particularly the southern-most winter ranges, satisfactory cover is known to be less than 5 percent of the Forest landscape Conditions that either provide too much or too little cover may cause the Habitat Effectiveness Index to lower Size, spacing and quality of cover stands are important factors in the assessment of elk habitat quality Forage quantity and quality plays an equally important role in meeting elk habitat requirements, especially in winter ranges

Riparian Areas

Riparian areas are ecosystems identified by dominant vegetation that requires unbound water. They consist of lakes, perennial streams and seasonal streams, floodplains and wetlands, moist areas such as meadows, springs, seeps, bogs, and wallows, and quaking aspen stands A critical portion of the total riparian area is labeled the "riparian area of influence" (i e , the transition area within the riparian management area and the upland vegetation) The area of influence contains trees which may provide shade, contribute fine or large woody material to the stream channel, terrestrial insects to the stream, and habitat for the wildlife associated with the riparian management area Riparian areas create well-defined habitat zones within the much drier surrounding areas, they are more productive in terms of total numbers and variety of wildlife species, they are rich in producing plant material, and they are a critical source of diversity within the Forest While riparian areas are a minor proportion of the overall area of the Forest, they are disproportionately important

Stream margins frequently contain highly productive timber sites Cattle utilize the vegetation in riparian meadows more heavily than other areas The relatively gentle topography makes riparian zones attractive for road locations Recreationists concentrate their use in riparian areas and scenic values are often high In addition, wildlife use riparian zones more than any other habitat type Of the 365 species which occur in the Blue Mountains, 214 (per Table III-9) are either directly dependent on riparian zones or utilize them more than other habitats Riparian zones along rivers and streams are frequently used as migration routes by wildlife, particularly by deer and elk traveling between summer and winter ranges Normally, gold placer deposits are located in riparian areas which could conflict with riparian area management objectives

A comprehensive inventory of riparian areas is scheduled for the first ten years of the implementation period of the Forest Plan The inventory will be a coordinated effort between all the resource areas (watershed, fisheries, range, and wildlife) to insure that all riparian related resources and values are evaluated The inventory will be conducted according to the publication *Managing Riparian Ecosystem (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington* An inventory of what has been called unsatisfactory riparian areas was prepared for this Forest planning effort It was based primarily on the Watershed Improvement Needs (WIN) Inventory and some professional judgement of streams lacking adequate shade It is a first attempt to recognize riparian areas needing attention in order to determine the necessary funding to correct the problems The WIN inventory is not a "riparian area" inventory although it is a part of a riparian area inventory. It is the watershed portion that documents unstable streambanks and gullies It does not include the shrub, fish habitat, or shade portion of a complete riparian area inventory From the WIN Inventory and professional judgement on several streams, 235 stream miles were determined to be in less than satisfactory riparian condition This is a conservative estimate The total number of miles is expected to increase as the more complete riparian area inventory is completed in the next ten years The

Malheur has an aggressive watershed improvement needs program Each District utilizes both appropriated and KV funds to complete projects. Many of the inventoried problem areas that exist today will be corrected through the watershed improvement needs program WIN projects are prioritized and presented in Appendix A of the Forest Plan Logging practices, roads adjacent to streams, insect outbreaks, and fire can influence shading and streambank stability The largest impact on stream temperature and stability on the Malheur National Forest appears to be the reduction of hardwoods caused by ungulate grazing With few exceptions, the majority of the gullies on the Forest are also the result of the loss of the stabilizing root system caused by a reduction in the hardwood community

Roadless Areas

Under the Roadless Area Review and Evaluation (RARE) process, completed in 1973, roadless areas were identified on the Malheur National Forest A second evaluation of the roadless areas (RARE II) was initiated in 1976 and completed in 1979 This process identified roadless areas on the Malheur National Forest that are being considered for roadless area management in this planning process

With the conclusion of RARE II in January 1979, one area within the Forest boundary did not receive full public review This area, Pine Creek, was recommended for further evaluation.

The majority of two of these areas were added to the wilderness system by the Oregon Wilderness Act of 1984 Monument Rock (6240) and Strawberry Addition (6238)

The Oregon Wilderness Act of 1984 specified that the remaining 18 areas not be reviewed for wilderness designation during this planning process, except for Pine Creek These areas may be managed for the purpose of providing semiprimitive recreation opportunities, which would maintain their suitability for future wilderness review

F Net Public Benefits and Resource Tradeoffs

Maximizing net public benefits while responding effectively to the issues, concerns, and opportunities and meeting environmental standards is a goal of the Forest planning process Net public benefits is the overall value to the Nation of all receipts and positive effects (benefits) minus all expenditures and negative effects (costs)

Present net value, a dollar measure of economic efficiency, is one method of measuring the quantifiable economic aspects of net public benefits In general, an alternative with the highest present net value generates more price benefits relative to total costs than other alternatives

The goal of each alternative is to respond effectively to one or more issues while maximizing cost efficiency or present net value Achieving the goals of varying alternatives requires "tradeoffs" among resource outputs Some alternatives are similar in terms of the benefits and tradeoffs involved This is because the management emphases for some resources (e g., timber management and the retention of old growth) are strongly competitive. On the other hand, management emphases for wilderness, visual quality, and undeveloped recreation opportunities are strongly complementary

The developed alternatives reflect a wide range of resource emphases and, as a result, produced a wide range of present net values and resource tradeoffs. The wide range is needed to obtain a basis for identifying the effectiveness of responses to issues while, at the some time, trying to maximize present net value which is the quantifiable indicator of the level of public net benefits

Present net value of all alternatives is displayed in Table S-4. Alternative NC would have the highest present net value of all alternatives considered in detail, however, this alternative is not strictly comparable to the other alternatives because of different methods

of formulation Alternatives B-Modified, F, and A (listed in order of decreasing present net value) are all alternatives which have comparatively high timber harvest levels, these harvest levels result in higher present net value than alternatives which would manage the timber resource for lower yields (i e , Alternative C-Modified) Alternative I has a moderate level of timber harvest and a corresponding moderate level of present net value. The differences in present net value among Alternatives B-Modified, F, A, and I are generally due to the effects of different mixes of management strategies for resources such as range, wildlife and fish, visual, and roadless areas while maintaining a fairly similar timber management strategy As timber management strategies are constrained to satisfy other resource considerations, present net value reductions occur For Alternative C-Modified, the timber harvest level is lower than Alternatives B-Modified, F, A, and I which generally accounts for the low present net value of this alternative (primarily due to the goal in this alternative of growing a larger ponderosa pine product)



TABLE S-4: Present Net Value and Discounted Benefits and Costs of Alternatives
(Million Dollars - 1982)

Alternative (Ranked in order of decreasing PNV)	Discounted PNV	Change	Discounted Benefits	Change	Costs	Change
Max PNV (w/MRs)	472.6		774 3		301 7	
		- 90 9		- 144 7		- 53 8
NC (No Change)1/	381.7		629 6		247 9	
		- 31 2		+24 4		+55 6
B-Mod	350.5		654 0		303 5	
		- 22.2		- 42 3		- 20 1
F	328 3		611.7		283 4	
		- 28.1		- 34 4		- 6.3
A	300 2		577.3		277.1	
		- 43 6		- 58 8		- 15 2
I (Preferred)	256 6		518.5		261 9	
		- 130 2		- 150 6		- 20 4
C-Mod	126.4		367 9		241 5	

1/The No Change Alternative is based on the 1979 Timber Resource Management Plan This was not an integrated resource management plan and not all resource uses and outputs were valued Consequently, there are differences between the economic assumptions underlying the present net value calculations of the No Change Alternative and of all other alternatives which makes comparisons unreliable

G Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented

Implementation of the preferred alternative would result in some adverse environmental effects. The severity of the adverse effects can be minimized by adhering to the direction in Forest-wide and management area standards in Chapter IV of the Forest Plan

Some adverse impacts will unavoidably occur to soils, mature and old-growth-dependent wildlife species, riparian vegetation, fish habitat, cavity-nesting species habitat, some recreation experiences, and some cultural resources

Some temporary impacts will occur to insect-dependent birds and air quality Most impacts will be within acceptable limits

H Relationship Between Short-Term Uses of the Human Environment and Enhancement of Long-Term Productivity

The long-term productive capability of all resources depends on maintaining soil stability and fertility, including keeping the soil in a non-compacted condition that is conducive to plant growth The long-term effect on soil productivity of activities such as prescribed burning, whole-tree utilization, and soil compaction are not fully understood

I. Irreversible and Irretrievable Commitments of Resources

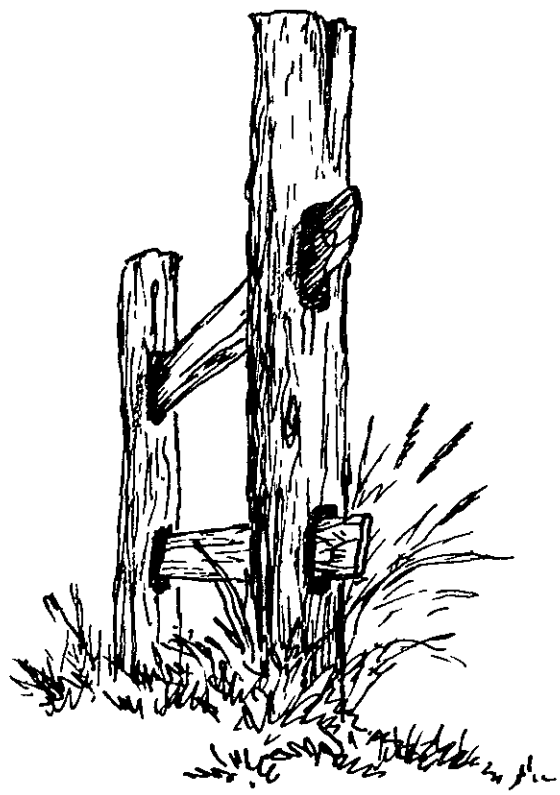
Some irreversible and irretrievable commitments of resources would occur in all alternatives

To varying degrees, roadless and wilderness characteristics will be altered, land will be lost to timber production, and some loss of wildlife habitat will occur Additionally, mineral wealth will be removed from the Forest and some loss of cultural resource sites will occur.

J Significant Cumulative Effects Which Cannot be Avoided

Implementation of any of these alternatives will result in unavoidable significant cumulative effects. These effects include 1) limited loss of site productivity on some acres, 2) changes in stand composition and seral stage, 3) reduction in areas suitable for semiprimitive recreation experiences, 4) reduction in areas suitable for future designation as wilderness, 5) fewer areas which provide a natural-appearing landscape, 6) reduction in diversity of the vegetation available as forage in riparian areas, and 7) alteration to cultural resource settings, spatial relationships, and the sites and objects themselves

The environmental impacts discussed above are explained in greater detail in Chapter IV (Section E 19) of this Environmental Impact Statement





Chapter I

Purpose and Need for Action

Chapter I Purpose Of and Need For Action

A Why an Environmental Impact Statement (EIS)?

There are many reasons why the future management of the Malheur National Forest may be of interest to you Perhaps you live in a community nearby, you may even work in the Forest daily Perhaps you travel for a day or more to hunt, fish, or hike here You may never have visited this National Forest, but are vitally interested in the future management of the unroaded areas located here. You may represent a company interested in the minerals beneath the earth's surface

These may be just some of the possible reasons why you are reading this document These and other activities will all be affected in some way by the decisions made about management of the Forest's resources This document is an important part of making those decisions. Since much of the information is technical, it will not always be easy or entertaining reading

This Final Environmental Impact Statement (FEIS) describes the proposed course of action (the preferred alternative) and alternative courses of action for managing the land and resources of the Malheur National Forest It also describes the environment affected and the anticipated environmental effects of implementing each of these alternatives.

Each of these alternatives reflects a different way of addressing local, regional, and national issues They provide for different combinations of uses, goods, and services from the Malheur National Forest Each alternative was evaluated to determine its potential to provide long-term, sustained yields of these goods and services in an environmentally sound manner The design and analysis of the alternatives are displayed in this document.

The preferred alternative is the alternative which, in the opinion of the Forest Service, provides the level and mixture of uses, goods, and services which best resolves the issues while maximizing net public benefits (Net public benefits are discussed on the next page) The preferred alternative identified in this Final Environmental Impact Statement is the basis for the accompanying Malheur National Forest Land and Resource Management Plan (Forest Plan)

B Legal Basis

The preparation of an Environmental Impact Statement, disclosing a preferred alternative and alternatives to it, is required by the National Forest Management Act (NFMA) (36 CFR 219) including the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality NEPA Regulations (40 CFR 1500) For purposes of NEPA disclosure, the Environmental Impact Statement and Forest Plan are treated as combined documents

The Environmental Impact Statement is required because the Forest Plan is a major Federal action with a significant effect on the quality of the human environment Its purpose is to describe effects on the environment in enough detail to aid in the selection of management direction for the Forest Equally important, its purpose is to make this same information available to the public, and to encourage public participation in the development and refinement of that information

C The Forest Plan

The Forest Plan presents (1) a summary of the management situation, (2) a summary of the issues and concerns, (3) resource outputs, (4) standards, (5) management area goals and objectives, and (6) monitoring and evaluation requirements for the preferred alternative This information will guide all natural resource management activities on the Malheur National Forest

The purpose of the Forest Plan is to provide management direction for multiple use and the sustained yield of goods and services from National Forest System lands. The overall goal is to provide the greatest long-term net public benefits while responding effectively to public issues

Net public benefits are the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs). Net public benefits measure both quantity and quality Whether the Forest Plan provides for greater net public benefits than do other alternatives is, ultimately, a matter of judgment

D. Relationship to Resources Planning Act

The Forest planning process occurs within the overall framework of both national and regional planning As required by the laws cited above and related planning regulations, the Forest Service has a three-level planning process.

- National Level Resources Planning Act (RPA) Assessment and Program
- Regional Level Regional Guide
- Forest Level Land and Resource Management Plan (Forest Plan)

This three-level process involves a continuous flow of information and management direction among the three Forest Service administrative levels. Information from Forest planning flows to the national level for use in planning and assessment as required by the Forest and Rangeland Renewable Resources Planning Act (RPA). In turn, the Resources Planning Act program information flows back to the Forest level. In this structure, regional planning conveys information between the Forest and national levels.

The Resources Planning Act (RPA) Program establishes long-range resource objectives based on an assessment of resource demand and supply over a 50-year planning period. The program objectives are submitted to Congress to help them determine appropriation and authorization of the Forest Service annual budget Since allocations in the annual budget have a major effect on forest management activities, many of the Forest's actual outputs and environmental effects are ultimately determined in large part by the annual budget.

The 1980 National Resources Planning Act Assessment set output goals for various resources which were then divided into Regional goals Within each Forest Service region, these goals were further divided into forest goals The "Regional Guide for the Pacific Northwest Region," May 1984, amended December 1988, is the source of the Malheur National Forest's goals and some of the management standards contained in the Forest Plan

These Resources Planning Act objectives represent the benefits that are sought by society at the national level The assignment of these objectives in the Regional Guide is not binding on individual forests, but at least one alternative considered must respond to the RPA objectives. Regional standards incorporated into forest planning assure response to concerns at the regional level

The Resources Planning Act Program objectives (and often the Regional Guide) are updated every 5 years The Forest Plan is reviewed every 5 years and is ordinarily revised on a 10-year cycle or when changes in the Resources Planning Act program significantly affect forest programs. The Forest Plan will be revised at least every 15 years. It also may be revised when conditions or demands in the area covered by the Forest Plan change significantly. This process ensures that the Forest Plan is responsive to changing conditions

E Forest Planning Process

The Forest planning process is based on land and resource capabilities and determines the Forest's ability to respond to the national demands identified in the Resources Planning Act assessment and to public issues This determination is based on evaluation of a wide range of alternatives representing outputs both above and below the 1980 RPA Program. These alternatives were developed and evaluated in compliance with the National Forest Management Act, and forest planning process The steps in this process are listed below

1. Identification of issues, concerns, and opportunities,
2 Development of planning criteria,
3 Inventory data and information collection,
4 Analysis of the management situation,
5 Formulation of alternatives,
6 Estimated effects of alternatives,
7 Evaluation of alternatives,
8. Selection of an alternative,
9 Implementation, and
10 Monitoring and evaluation

The result of these planning steps is the environmental analysis described in this Final Environmental Impact Statement (FEIS) These criteria used to guide the process are part of the planning records All documents and files that chronicle the Forest planning process of the Malheur National Forest are available for review at the Supervisor's Office, 139 NE Dayton Street, John Day, Oregon 97845 These documents and files, or "planning records," contain the detailed information and decisions used in developing this FEIS and the Forest Plan The planning records are referenced at appropriate points in the text and appendices of this FEIS and the Forest Plan

This FEIS and the Forest Plan have been developed following the issuance of the Draft Environmental Impact Statement and Proposed Forest Plan and an involved public participation process These documents have been developed in response to public comments received during the public review period A detailed account of the comments received and the activities held can be found in Chapter V, of this document

F What Happens Now?

As a result of the planning process outlined above, the Forest Supervisor has recommended a preferred alternative (Alternative I). The preferred alternative is identified in this FEIS and displayed as the Forest Plan This recommendation has been made to the Regional Forester The accompanying Record of Decision (ROD) is a statement of the Regional Forester's decision and the rationale behind it

The final step in the planning process is the actual implementation of the Forest Plan. Implementation requires moving from an existing management program, with a budget, and "targets" for accomplishment, to a new management program with a budget, goals, and objectives that provide a different way of addressing the issues The Forest Plan establishes the direction for the Malheur National Forest for the next 10 to 15 years, in conjunction with Forest Service Manuals and Handbooks and the Pacific Northwest Regional Guide

G Relationship to Other Plans

This Forest Plan supersedes all present land management plans for the Malheur National Forest Land management plans superseded are for the following planning units John Day, Silvies-Malheur, and South Fork Also superseded is the 1979 Timber Resource Management Plan for the Malheur National Forest

Direction in the following documents is incorporated into and becomes a part of this Forest Plan Canyon Creek Research Natural Area Establishment Report and Forest Transportation Development Plan

Several documents designed to give further guidance to management activities have been or will be developed under the direction of this Forest Plan See Chapter V of the Forest Plan for a comprehensive list of documents to be developed or revised.

All subsequent activities affecting the Forest, including budget proposals, must be based on the Forest Plan In addition, (subject to valid existing rights) all permits, contracts, cooperative agreements, and other instruments for the use and occupancy of these National Forest System lands must be consistent with the Forest Plan

This Final EIS will be used as a tiered environmental impact statement This means that the environmental analyses and documents prepared for future projects will refer to this EIS, Forest Plan, and associated documents rather than repeating information Environmental analyses for specific projects will therefore concentrate on issues unique to those projects

H What If I need Help With All This?

A glossary defining terms, units, abbreviations, and a list of references cited is provided after Chapter V. You may find it useful to consult the alternative maps when reviewing this FEIS The Forest Plan provides additional detail about how the proposed alternative would be carried out on the ground

I. The Malheur National Forest

The Forest is 1 of 19 National Forests that make up the Pacific Northwest Region, Region 6, of the National Forest System This Region includes the states of Oregon and Washington and has its headquarters in Portland, Oregon.

The Forest's 1,459,422 acres are located in eastern Oregon, approximately equidistant from the borders of Washington, Idaho, and Nevada The Strawberry Mountain Range, part of the Blue Mountains, extends east to west through the center of the Forest The elevation of the Forest varies from approximately 4,000 feet near the southwest boundary to 9,038 feet on Strawberry Mountain The result is a diverse landscape of grasslands, sage, and juniper, forests of pine, fir, and other tree species; and subalpine lakes and meadows

The northern part of the Forest is drained by the John Day River System into the Columbia River Basin These rivers and their tributaries support populations of ocean-going salmon and steelhead as well as resident trout. The southern part of the Forest is drained by the Silvies River System into the Great Basin and by the Malheur River System into the Snake River These drainages support populations of resident trout.

These lands are in Grant, Harney, Baker, and Malheur counties The Forest is within a day's drive from Portland, Oregon Principal access routes are U.S. 26 and U S 395, winding, two-lane, rural routes There are two main population centers the John Day Valley from Dayville to Prairie City, and a 5-mile radius around Burns The total population is about 15,000

From the time of the first settlements, the Forest has played an important role in the development of local communities This role continues today. The Forest lands are managed to provide a sustained yield of lumber and wood products Local ranchers graze about 25,000 cows with their calves on the meadows and forested range Mineral deposits exist beneath the surface of land used for other activities. These same lands provide year-round recreational opportunities Big game hunting is the largest recreational use of the Forest, attracting many hunters to the area each year.

The Malheur National Forest consists of complex natural systems that can be managed for different mixes of resource outputs, land uses, and environmental conditions A more complete description of the Forest and its natural resources can be found in Chapter III, Affected Environment.

J. Issues, Concerns, and Opportunities (ICOs)

Different people and groups prefer to see the Forest managed to emphasize different outputs, uses, and conditions Because all the resources, uses, and conditions of a forest are interconnected, management decisions to emphasize some resources result in changes in others There are practical and natural limits to what the Forest can provide

These different preferences of individuals and groups and the physical, biological, and legal limits of forest management are identified in the issues which guided the Forest planning process. A public issue is a subject or question of widespread public interest relating to management of the National Forest system

Public issues were identified through citizen participation including public meetings, requests for comments, and personal contacts with individual members of the public, owners of adjacent private land, other agencies, local industry and conservation groups, and Indian tribes

During the early planning stages, over 30 possible issues were identified Some issues were beyond the jurisdiction of the Forest Service, resolved by existing laws, or best handled on a specific case-by-case basis These issues are not addressed in this document The remaining issues were then grouped based on common elements and similarities The five issues that remained became the key issues that guided the planning process

In reviewing the public comments, additional key issues were identified as having significant importance to the planning process In particular, road management is noted to have become of special concern to a great number of our publics Additional issues which are categorized under timber management and big-game management were also specified These additional issues, as well as other public concerns, were addressed between the issuance of the Draft Environmental Impact Statement and this Final Environmental Impact Statement through analysis and alternative development These issues played a valuable role in the development and identification of Alternative I as the preferred alternative The summary of changes between Draft and Final for each chapter throughout this FEIS displays the effect these additional changes have had on alternative development These additional key issues can be found in the pages following, titled "Additional Issues Identified During the Public Comment "

In addition, the process used for identifying these issues is more fully discussed in the FEIS, Appendix A Also, the summarized issues and the Forest Service response can be found in the FEIS, Chapter V

K. How Are The Issues Used?

A central task in forest planning is analyzing the alternative ways of managing the National Forest The different emphases in goods, services, uses, and environmental conditions that people want (the basis of the issues) are used to help identify the alternative mixtures of management practices While one alternative may provide the best response to a single issue, another alternative may address several of them more effectively The difference between one response and that provided by some other alternative illustrates a tradeoff A comparison of the tradeoffs is necessary to determine overall public benefits and to determine the alternative which best responds to the issues while maximizing net public benefits

The issues that guided the Forest planning process are described below and on the following pages

ECONOMIC STABILITY: *How will management of forest resources affect* local communities?

The Malheur National Forest comprises about 39 percent of Grant County's acreage and 5 percent of Harney County's acreage, as well as small acreages in Baker and Malheur Counties Because of the substantial acreages, distinct economic ties, and the people's use patterns, the Forest's primary zone of influence has been determined to be Grant and northern Harney counties Industries and communities in adjacent counties are also affected by resource management policies on the Forest.

Malheur National Forest policies have a direct impact on local, dependent industries which, in turn, affect business income, wages, employment, and revenues to the counties The principal industries in the Forest's zone of influence are wood manufacturing, agriculture (i e , ranching), and retail trade These three industries account for about half of all employment in the area. Another large part of the economy is government employment, and much of that is also based on timber and livestock management

Forest management activities and the resulting outputs influence job opportunities, incomes, and the way of life of the approximately 15,000 residents in local communities It follows that changes in Forest outputs and activities will affect the social and economic life of the local population

Economic and community stability is acknowledged to be very important, and social stability is strongest when the local industries are healthy Many people (e g., mill employees, government officials, business owners) equate stability with a sustained supply of Malheur National Forest timber adequate to meet the demands of local industry. Some individuals or groups (e g , preservationists, conservationists, the Chambers of Commerce, retailers) also think that the counties have been too dependent on timber manufacturing, and that a more diversified economy should be cultivated, including growth in tourism Currently, most tourism occurs during the fall hunting season.

The Malheur National Forest also plays a role in county finances through payment of 25 percent of its revenues to the counties This money, of which 99 percent is from timber-generated receipts, has a significant effect on the finances of county schools and roads In 1989, Grant County received $8 7 million and Harney County received $2 3 million from Malheur National Forest receipts

Indicators of Response·
— Changes in jobs and income (first decade and long-term change)
— Payments to counties (first decade)

TIMBER MANAGEMENT: What level of sustained annual yield of timber products should the Forest provide while still maintaining forest productivity and meeting local, regional, and national needs? How much timber land should be managed for wood fiber production; what species should be favored; and what management methods should be used to achieve the desired harvest level and species mix?

The Forest has been providing timber products to the local and national markets for over 70 years The average annual total sale program quantity of timber sold over the last 10 years (1980-1989) has been 228 million board feet (MMBF) per year The Malheur National Forest 1979 Timber Resource Plan called for an average net sell volume of 230 MMBF per year over the same decade An analysis of the Forest's ability to produce timber indicated that the Forest could supply up to 59 2 MMCF (326 MMBF) per year on a nondeclining harvest schedule

This could have future implications for the local timber industry which is almost totally dependent on the Forest for its supply of raw material, especially in view of the Forest

and Rangeland Renewable Resources Planning Act (RPA), and national and regional projections for rising demands and prices in future decades Local mills are maintaining a competitive market position currently by producing a quality ponderosa pine product.

The primary timber-producing species are ponderosa pine, Douglas-fir, western larch, true firs, and lodgepole pine In the past, the majority of the volume sold has been from mature, open ponderosa pine stands (approximately 70 percent of the total volume sold); especially those found in fairly level, easily roaded areas Available areas for timber harvest are increasingly found in steeper areas forested predominantly with Douglas-fir, western larch, white fir, and grand fir. As timber stands are brought under management, trees of all species would be harvested at ages ranging from 50-150 years to maximize the utilization of the wood fiber production potential of the Forest Many trees are currently harvested at ages of 200 years and older

Management of the timber resource interacts with every other resource on the Forest The interrelationships are sometimes complementary, sometimes competitive, and sometimes mutually exclusive Rising demands for other resource uses are increasing the complexity of timber management. The desire for old-growth habitat–by groups such as Izaak Walton League, Audubon Society, Oregon Department of Fish and Wildlife, Oregon Natural Resources Council, and Grant County Conservationists to meet the needs of specific plants and/or animal species or for other reasons–would reduce the timber volume available to respond to national and regional demands and to maintain or expand the local wood products industry

The management methods which would provide the largest amount of wood fiber to meet national demands would provide this wood fiber primarily in smaller-diameter, mixed conifer species Although the local and sub-regional timber industry is anticipating and planning for this shift in product, some industry members express concerns because their mills are currently set up to process larger-diameter trees and they have a more favorable market position with ponderosa pine Local residents, hunters, and forest visitors desire the appearance of mature, ponderosa pine stands and express concerns about the appearance and success of clearcuts on the Forest County and state officials and private landowners emphasize the need for intensive management of the existing mixed conifer understory, particularly to reduce the losses related to spruce budworm and other insect damage

Competing demands for forest resources are exemplified by the demand for wilderness and roadless areas which preclude timber management This is described in a separate issue

Additional Timber Issues Identified During the Public Comment

The items below are those mentioned by a large portion of the public These issues were considered in the analysis and alternative development (Alternative I) done between the issuance of the Draft EIS and the preparation of the final documents The process for the development and use of planning issues can be found in the Final EIS (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final EIS (Chapter V, Section C)

1. Uneven-aged management - The public expressed a dislike for even-aged management in general and clearcutting in particular They also expressed belief that uneven-aged management better protects all resources

2 Species mix - There was concern expressed about the shift in species mix over the next 80-100 years

3. Forest character - The public generally had support for the maintenance of the existing forest character, including an emphasis on ponderosa pine.

Indicators of Response.

— *Suitable timber land (thousands of acres)*
— Allowable sale quantity (1st and 5th decades)
— Suitable timber land under ponderosa pine management (thousand of acres)
— Percent ponderosa pine volume offered (1st and 5th decades)
— Acres clearcut (1st and 5th decades)
— Acres overstory removal (1st and 5th decades)
— Acres in uneven-aged management (1st and 5th decades)
— Size of average tree harvested (1st and 5th decades)

BIG-GAME HABITAT MANAGEMENT: What level of big-game habitat must be provided to meet the needs for desirable big-game herd levels?

Elk populations prior to 1970 were relatively stable but low During the past decade populations have steadily increased to a current summer population of about 6,600 elk, about one-third of these elk winter on the Forest Management of big-game herd levels is the responsibility of the State of Oregon, Department of Fish and Wildlife while the USDA Forest Service manages habitat occurring on the Forest. Ultimately the cooperation of both agencies will assure quality habitat that supports viable populations. Mule deer populations have fluctuated during the past 40 years and are currently on a downward trend in two of the seven game management units which include the Forest Management of big-game winter range for elk will provide for the wintering needs of mule deer as well since available mule deer winter range is minimal and overlaps with elk winter range Primarily mule deer winter ranges are on private lands below the Forest

Most of the winter ranges have adequate forage to carry both the present number of livestock and the present number of wintering elk Ranchers on private land adjacent to the Forest are concerned about the movement of elk off of the Forest to private land. The increased potential of the Forest to carry larger populations of elk will also increase the potential for more elk to winter on private land. The State management objective, for big-game populations for game management units which occur on the Malheur National Forest, is to supply winter habitat for approximately 2,800 elk

The wildlife issue of most concern to the public deals with elk habitat for elk hunting opportunities Most of the dispersed recreation use occurs during the deer and elk hunting seasons Most local, and many regional and statewide residents and hunter's groups, are concerned about forest management activities and their effect on elk numbers and hunting opportunities Most hunters are not only concerned about population numbers but are also concerned about the length of the hunting season, opportunities for success, and whether hunting will be on a limited entry basis that would reduce their hunting freedom

Big-game management and timber management are interrelated Habitat quality for big-game populations is determined by cover quality, size and spacing, and by forage and road density (disturbance) factors Timber management activities have improved, and can further improve, the balance and distribution of cover and forage Elk population numbers have increased, probably responding to available forage and controlled hunts

Oregon Department of Fish and Wildlife (ODF&W) population objectives for the elk herds, hunter success rates, and the need to limit hunting opportunities in certain units are related to the anticipated effects of forest management of the habitat For example, in addition to total population objectives, ODF&W has objectives for bull-to-cow ratios for each herd at the end of the hunting season To ensure that not too many bulls get harvested, the Forest Service must limit access (by closing roads) or ODF&W must limit the number of hunters The Forest activity that most affects the management actions of ODF&W to meet its population objectives, is the control of access for hunters using motorized vehicles.

Additional Big-Game Issues Identified During the Public Comment

The items below are those mentioned by a large portion of the public These issues were considered in the analysis and alternative development (Alternative I) done between the issuance of the Draft EIS and the preparation of the final documents The process for the development and use of planning issues can be found in the Final EIS (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final EIS (Chapter V, Section C)

1 Winter range There was concern about winter range management, timber yields from winter range, and winter range improvement practices

2 Minimum cover requirements· There was public concern that minimum cover requirements for summer and winter range may be too low and the definition of thermal cover may not be sufficient to identify actual quality of habitat

3 Road closure policy The public expressed concern over the lack of a specific road closure policy in both summer and winter range

4 Habitat modeling process There was concern about the habitat modeling process in general

5 Population goals There was a desire for population goals by winter range area

Indicators of Response

— Habitat Effectiveness Index (1st and 5th decades)
— Potential summer elk populations (1st and 5th decades)
— Potential winter elk populations (1st and 5th decades)
— Big-game cover quality (1st and 5th decades)
— Fish and Wildlife User Days (WFUDs) (1st and 5th decades)
— Acres in winter range enhancement
— Acres in winter range maintenance
— Miles of road remaining open (1st and 5th decades)

RIPARIAN AREAS: What effect will forest management activities have on riparian areas; what level of fisheries habitat productivity should be maintained; what level of timber harvest is compatible with riparian values; and what level of livestock grazing can be provided while managing for riparian dependent resources?

Although they occupy only four percent of the Forest's land base, riparian areas are the most productive and biologically diverse areas on the Forest These areas provide important fish and wildlife habitat and often contain very productive timber stands and productive, lush forage in grazing allotments Their gentle topography makes riparian areas attractive for road location and, in the semiarid west, the combination of water and riparian vegetation attracts recreationists Because of the variety and sometimes conflicting nature of these concentrated uses, riparian areas have the greatest potential for resource use conflicts on the Forest

National environmental groups (Izaak Walton League, Audubon Society, Sierra Club, etc) believe that overgrazing and unregulated livestock use of these areas result in a loss of streamside vegetation, increased water temperature, excessive bank erosion, and accelerated sedimentation of gravel fish-spawning areas These groups have raised riparian management concerns to a national level, often calling for elimination of grazing They urge that these areas receive special attention in land management planning This is reflected in the special mention of riparian area management in the NFMA regulations.

Locally, environmental groups, Indian tribes and the Columbia River Inter-tribal Fish Commission, and other agencies such as Oregon Department of Fish and Wildlife and the Environmental Protection Agency share these concerns to varying degrees

Riparian area forage production and livestock access to water are critical to the grazing allotments on the Forest and degraded riparian areas do not benefit the permittees On the other hand, local ranching operations would be adversely affected by significant reductions in permitted grazing levels The Grant County Resource Council and the Oregon Watershed Improvement Coalition also recognize the importance of healthy riparian areas and advocate coordinated uses of these areas which include grazing

Current inventories of Class I-IV streams on the Forest indicate 4,580 miles in all stream classes. The majority of these streams are in a condition which will meet the needs of the riparian dependent resources. However, approximately 235 stream miles have been inventoried as being in an undesirable condition Some of the characteristics of these streams are extensive areas of unstable eroding streambanks, lowering of the water table, and lack of adequate stream surface shading Although uncontrolled logging practices, roads adjacent to streams, insect outbreak, and fire can influence shading and streambank stability, the largest impacts on stream temperature and stability on the Malheur National Forest appear to be due to a reduction of hardwoods caused by ungulate grazing With few exceptions, the majority of the gullies on the Forest also result from the loss of the stabilizing root system caused by a reduction in the hardwood community

There is generally a consensus that improving streams and watersheds, which are in an undesirable condition, is beneficial for all resources and user groups The issue centers around the cause of the decline, the specific methods and treatments used for improving the health of the stream systems, and the rate of improvement. There are opportunities for increasing the rate of improvement in riparian zones; however, these would reduce the amount of forage available for livestock grazing and timber outputs

Indicators of response.

— Management strategies proposed for unsatisfactory riparian areas
— Animal-unit months of livestock grazing permitted
— Expected increases in anadromous fish production (pounds of fish)
— Smolt habitat capability index (1000s of steelhead smolts)

ROADLESS AREAS: Should some or all of the Forest's roadless areas remain roadless, be opened to roaded development, or be recommended to Congress for wilderness classification?

The Forest currently has 18 separate undeveloped areas comprising 180,948 acres Some people enjoy the recreation experience available in areas which have many characteristics of wilderness but fewer restrictions Such areas can be characterized as providing semiprimitive nonmotorized or motorized recreation opportunities Maintaining the undeveloped character would mean excluding such areas from regulated timber harvest and road construction. In areas providing for motorized use, off-road vehicle use may continue, mineral exploration and extraction could continue in both types of area

Areas maintained in an undeveloped condition would also be eligible for future wilderness consideration National and regional environmental groups such as the Wilderness Society, Native Plant Society, and Oregon Natural Resources Council are philosophically opposed to development of these areas, stating that in many cases there is no need for development and they should remain undeveloped rather than foreclose on future wilderness possibilities. (One of these areas, Pine Creek, was analyzed in this planning process for potential inclusion in the National Wilderness System as it was designated for further planning review by the RARE II Final Environmental Impact Statement.) These same

groups, as well as local environmental groups, some hunters, and some local residents favor roadless management of these areas because they believe it protects sensitive plant species, wildlife habitat, water quality, and other amenity values better than management geared toward consumptive uses

Others, such as the mining and timber industry associations and businesses, many local residents, and local governments, state that the management of these areas has been in limbo long enough. They want to develop access and the resources in these areas to end the uncertainty about their availability They state that the resources in these areas need to be managed so that they can contribute to local industrial and economic needs They believe that wildlife habitat can be improved and the vegetation will be in a more vigorous condition if the resources are managed for consumptive uses (primarily wood fiber production)

There are approximately 119,950 acres of tentatively suitable land in the RARE II areas. These same acres provide 92,408 acres of old growth Timber management activities could occur on 107,658 acres Of these available acres, 101,205 acres would be considered suitable for timber harvest and would provide a first decade annual allowable sale quantity of 28 MMBF (4 9 MMCF) and a long term sustained yield capacity of 5 74 MMCF/yr

Indicators of response

— Acres retained in an unroaded condition
(i e , semiprimitive motorized and nonmotorized management areas)
— Management of Pine Creek Further Planning Area

L. Additional Issues Identified During the Public Comment Period

Most of the issues identified during the public comment period were identical to or could be incorporated into the previously identified issues, as can be seen in in the previous paragraphs However, between the time that the preliminary issues were developed and the public comment period, road management became a key issue

ROAD MANAGEMENT: How can road management be used to make timber harvest, big-game habitat needs, and recreation opportunities more compatible?

Currently there are over 8,570 miles of Forest Service roads on the Forest Under Alternative F (the preferred alternative in the Draft Environmental Impact Statement), approximately 870 miles of roads would have been constructed and 1,360 miles of road would be reconstructed by timber purchasers during the first decade of the Forest Plan Of this total, 400 miles would be built in roadless areas that are assigned to timber production Public comments indicated that this was not desirable

The Malheur National Forest, in conjunction with the Oregon Department of Fish and Wildlife, has four cooperative travel management areas These seasonal road closures are designed to protect wildlife habitat, minimize harassment of wildlife, maintain adequate buck and bull escapement, and promote nonmotorized hunting During the hunting seasons, these management areas are under the "green dot system" enforced by the State Police and ODF&W Total National Forest land affected by these seasonal closures is approximately 172,000 acres

The Oregon Department of Fish and Wildlife and the public have expressed concerns about the lack of a specific policy for the Forest as a whole and for some resources in particular General concerns include a belief that road densities are too high, that local roads should be closed and put back into resource production immediately following timber harvest, and that in many cases road construction and maintenance standards are too high

The greatest concern is the road management policy in relation with big-game habitat and hunting. Specifically, many expressed a desire to permanently or seasonally close roads to enhance big-game summer and winter range Included in this was a desire to increase elk habitat effectiveness, provide elk escapement areas, and provide for a nonmotorized hunting experience

These issues were considered in the analysis and alternative development (Alternative I) done between the issuance of the Draft EIS and the preparation of the final documents The process for developing and using planning issues can be found in this Final EIS (Appendix A, Section C) In addition, public comment summaries and Forest Service responses for each issue can be found in this Final EIS (Chapter V, Section C)

Indicators of Response

— Miles of timber purchaser road construction (1st and 5th decades)
— Miles of open road (1st and 5th decades)
— Total miles of system roads (1st and 5th decades)



Chapter II

Alternatives Including the Proposed Alternative

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Chapter II Alternatives, Including the Proposed Action

A. Introduction

An alternative is a unique set of goals, objectives, and activity schedules centered around a theme that guides the management of Forest resources from the current condition to a desired future state Alternatives display different ways of managing the lands and resources of the Forest As a result, each alternative would generate a different mix of resource outputs, land uses, and environmental effects, thereby responding to the issues in different ways

The primary goal in formulating alternatives is to "provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits while responding effectively to the public issues" (36 CFR 219.12(f))

Net public benefits are 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 includes both priced and nonpriced benefits Priced benefits are those which are sold or could be sold in a market place These include outputs such as timber, forage, and recreation opportunities Nonpriced benefits are those for which there is no reasonable market evidence for estimating a dollar value for them. These include outputs such as Threatened and Endangered Species

Priced benefits are further divided into market and nonmarket outputs. Market outputs are routinely traded in an established market or return dollars to the United States Treasury These outputs include timber, livestock grazing, commercial harvest of anadromous fish, and developed recreation opportunities

Nonmarket outputs are generally not sold in an established market and do not return dollars to the United States Treasury However, these outputs *could* be sold in a market, and can be assigned a dollar value representing what a user would be willing to pay These outputs include hunting, fishing, and other dispersed recreation opportunities

A major component of net public benefits is present net value, which is defined as 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 associated with an alternative

In order to identify the alternative that comes nearest to maximizing net public benefits while responding effectively to the public issues a broad range of alternatives was developed to explore a variety of ways to respond to the issues, concerns, and opportunities

Some alternatives would manage the Forest to maximize the production of priced outputs such as timber and forage, while other alternatives would emphasize nonpriced outputs such as Threatened and Endangered Species and scenic quality. One alternative (the No Action Alternative) reflects current management direction From this broad range of alternatives, the Regional Forester had a basis for identifying the alternative (the Preferred Alternative) which comes nearest to maximizing net public benefits

The alternatives presented in this Final Environmental Impact Statement contain management direction for the plan period (10-15 years) Management activities, outputs, and environmental effects for several decades beyond the plan period are also discussed The purpose of these discussions is twofold (1) To present a long-term analysis, for decision

makers and the public, of the management necessary for each alternative to achieve and maintain a high level of regular periodic outputs of various resources, without impairment to land productivity (16 USC 531), and (2) to provide estimates of the level of long-term outputs for each alternative for program development for the Forest and Rangeland Renewable Resources Planning Act. For the analysis of alternatives for a Resource Planning Act program to link with actual conditions and local issues at the Forest level, a complete estimate of outputs, costs, and effects for five decades is necessary

The projection of effects and attributes of the alternatives beyond the 10 to 15 year plan period, although required by law, does not legally bind the Forest to action beyond the plan period The Forest Plan will ordinarily be revised every 10 years and must be revised at least every 15 years.

1. Summary of Changes from Draft to Final Environmental Impact Statement

As a result of responding to comments received from the public and interested organizations following the release of the Draft Environmental Impact Statement, the following listing is a summary of changes made to the alternatives for this Final Environmental Impact Statement These changes are the result of a concerted Forest effort to respond to comments related to alternative development that were received during the Draft Environmental Impact Statement review process.

Major changes to the analysis process have resulted in several new developments In addition to restructuring the FORest PLANning (FORPLAN) model, several key analytical methods have been updated or changed. A Habitat Effectiveness Index (HEI) model has been used to estimate elk habitat and potential elk population differences between alternatives. This HEI model is based on cover quality, spacing, forage quantity and quality and open road density. As the previous model relied on cover to forage ratios to estimate elk habitat, this has resulted in substantial changes to previous alternative rankings More information on the details of the analysis approach is included in Appendix B of this FEIS.

Changes to the FORPLAN model structure have resulted in a planning model that includes geographic specificity for seven major watersheds and cover outputs tied to timber stand manipulation Anadromous and non-anadromous fishery watershed identification is now possible with this expanded model

Through a review of the analysis process, updating the modeling techniques, and response to public comments, one new alternative (Alternative I - Preferred) has been developed and is included in alternative evaluations for this EIS In addition, five alternatives have been deleted from this EIS due to lack of interest from public commentors or similarities with other alternative designs (see Alternatives Considered but Eliminated from Detailed Study in this chapter)

Additionally, recalculations of Wildlife-and-Fish-User-Days (WFUDs), fuel treatments, old-growth stands, and energy and mineral production potential have been made for all alternatives.

All alternatives are updated for currency with analytical techniques and data, and thus are comparable. The reader may note that outputs appear slightly different than previously reported (Draft EIS). Differences due to improvements in data and model formulations are reflective of the best information available

For all alternatives, the baseline 10-year period for economic indicators has been updated to 1980-1989. This period is used to display timber volume sell and harvest levels, value and cost information related to Forest budgets, and potential changes in jobs by alternative. This updates economic indicators to include very recently experienced levels. Also, new economic values and costs have been included which change the present net value (PNV) for all alternatives.

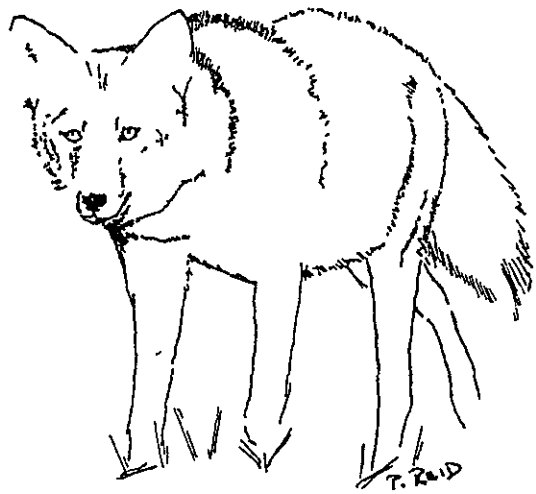
Utilizing the new FORPLAN model structure, several analytical tasks were performed and compared to previous model results for similarities and differences In particular, a review of manageable understory stands was updated to 1989, where the impacts of insect and disease agents on the health and vigor of Forest stands were reaccessed. This analysis has indicated that stands on the Malheur National Forest are somewhat less manageable than previously reported (Draft Environmental Impact Statement, 1987). For greater detail see Appendix B, Description of the Analysis Process.

Discussions of the issues, concerns, and opportunities have been updated to include additional issues identified during the public comment period (Final Environmental Impact Statement, Chapter I, section K) Specifically, a discussion of the road management issue has been added Also, additional indicators of response for timber management have been included

2. Overview of this Chapter

There are two main parts to this chapter First, Section B describes the process used to develop and analyze the alternatives It includes a summary of the supply and demand situation for goods, services, and outputs of the Forest, the range of possibilities or "decision space" *in which alternatives could be developed, and descriptions of the* alternatives developed This analysis process is described in more detail in Appendix B, Description of the Analysis Process

Second, Section C describes the resultsof analyzing the alternatives The alternatives are compared to each other in a variety of ways This comparison shows how they respond to issues, land uses emphasized, and economic costs and public benefits resulting from each alternative These comparisons are primarily in tabular format with some narrative. The comparisons of the alternatives are summarized based on the information in the tables and narratives of this chapter as well as the environmental effects described in Chapter IV, Environmental Consequences The purpose of these comparisons is to provide a basis for selection of an alternative to implement as the Forest Plan The adopted plan will provide management direction for the Malheur National Forest.



B. Alternative Development

1. Basis for Alternative Development

The alternative development process used by the Malheur National Forest was based on a number of requirements in the regulations implementing the National Environmental Policy Act (NEPA) and the National Forest Management Act (NFMA)

NEPA regulations (40 CFR 1502 14) direct that agencies

a. Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study briefly discuss the reasons for their having been eliminated

b Devote substantial treatment to each alternative considered in detail, including the Proposed Action, so that reviewers may evaluate their comparative merits.

c. Include reasonable alternatives not within the jurisdiction of the lead agency

d. Include a No Action Alternative

e. Identify the agency's Preferred Alternative as the Proposed Action

f Include appropriate mitigation measures not already included in the Proposed Action or other alternatives

In addition, the implementing regulations (36 CFR 219 12(f)) for the National Forest Management Act (NFMA) contain the following requirements for alternative formulation

a Alternatives shall be distributed between the minimum resource potential and the maximum resource potential to reflect to the extent practicable the full range of major commodity and environmental resource uses and values that could be produced from the Forest. Alternatives shall reflect a range of resource outputs and expenditure levels.

b. Alternatives shall be formulated to facilitate analysis of opportunity costs and of resource uses and environmental trade-offs among alternatives, and between benchmarks and alternatives

c Alternatives shall be formulated to facilitate evaluation of the effects on present net value, benefits, and costs of achieving various outputs and values that are not assigned monetary values, but are provided at specified levels

d Alternatives shall provide different ways to address and respond to the major public issues, management concerns, and resource opportunities identified during the planning process.

e Reasonable alternatives which may require a change in existing law or policy to implement shall be formulated, if necessary, to address a major public issue, management concern, or resource opportunity identified during the planning process (40 CFR 1501.7, 1502 14(c)).

f At least one alternative shall be developed which responds to and incorporates the Resources Planning Act Program tentative resource objectives for each Forest displayed in the Pacific Northwest Regional Guide

g. At least one alternative shall reflect the current level of goods and services provided by the unit and the most likely amount of goods and services expected to be provided

in the future if there is a continuation of current management direction Pursuant to NEPA procedures, this alternative Shall be deemed the "No Action" Alternative

h 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

i Each alternative shall state at least the condition and uses that will result from long-term application of the alternative, the goods and services to be produced, the timing and flow of these resource outputs together with associated costs and benefits, the resource management standards, and the purposes of the management direction proposed

2. Analysis Process

a *Introduction*

Forest planning is a complex process which requires the evaluation of an enormous amount of information This evaluation occurs in a series of steps which utilize specific tools and techniques to facilitate the analysis of data

The planning regulations and agency direction emphasize the use of economic efficiency criteria in the major analytical phases of the planning process The development of management prescriptions and the analysis of benchmarks, management constraints and alternatives are steps which focus on cost-efficiency and the calculation of economic and resource trade-offs

The amount of data needed for these analyses and the complexity of analyzing the important economic and resource relationships on the Malheur National Forest requires the use of computer models The central tool used to conduct these analyses was a linear programming model called FORPLAN (an acronym for FORest PLANning, Johnson and Crim, 1986) Other models were used to develop input data for FORPLAN and to conduct additional analyses after FORPLAN solutions were obtained

The following sections briefly describe the analytical process and tools used by the Malheur National Forest during the planning process, and the analysis performed Reviewers are encouraged to refer to Appendix B for a more complete and technical discussion of *the analysis process*

b *The FORPLAN Model*

The Malheur National Forest used FORPLAN Version 1, to conduct the required analysis in the land management planning process The FORPLAN model is a comprehensive, computerized, mathematical optimization model capable of analyzing the economic and resource relationships associated with management of the Forest. It is a linear programming model designed to assist in the identification of the particular combination of land assignment, management prescriptions, and activity schedules that best meet the objectives of each benchmark or alternative

FORPLAN is composed of a matrix generator, a linear programming solution system, and a report writer. Within the bounds of the matrix generator and the Functional Mathematical Programming System, the user is allowed a great deal of latitude in formulating the mathematical representation of the Forest planning problem to be analyzed The FORPLAN model was specifically designed to assist the interdisciplinary planning team analyze the economic and production trade-offs associated with recreation, timber, scenery, old growth, water, roadless, and wildlife resources, and to evaluate the extent to which various alternative management scenarios were able to address and resolve the identified planning issues

c. *Analysis Areas*

The basic building blocks of the FORPLAN model are the 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 significant social, biological, and economic differences in the way the land responds to alternative management strategies A total of 168 analysis areas were identified on the Forest. These represent combinations of slope class, timber type (i.e., species group), resource condition class, roading level, riparian status, major watershed, and range attribute (ie., winter range versus spring-summer-fall range).

d. *Changes from Draft to Final Environmental Impact Statement*

For all EIS alternatives, the analysis area scheme was reworked to include seven major watersheds in order to make the FORPLAN model more geographically specific In order to keep the number of analysis areas within the FORPLAN maximum limit of 800, some of the other parameters were simplified. Details of the revised structure are given in Appendix B.

e *Prescriptions*

Two major categories of prescriptions were used in the analysis A management prescription is a set of management practices and their schedule for application to a specific analysis area to achieve a particular objective The prescriptions describe the available choices which can be made in managing the analysis areas The selection of a prescription for a particular analysis area is based on the objectives of a particular alternative, the production potentials of that analysis area, and the benefits and costs of implementing the prescription on the analysis area.

Prescriptions were developed to represent the range of management opportunities to respond to the issues, concerns, and opportunities.

The second category of prescriptions, called FORPLAN prescriptions, contain the details necessary to model the management prescriptions in FORPLAN, and to schedule activities in a cost-efficient manner.

FORPLAN prescriptions are combinations of scheduled activities and practices, and their associated outputs and effects These prescriptions and their range of timing choices are represented as decision variables in FORPLAN The outputs and effects associated with the prescription choices are represented as mathematical coefficients in the respective decision variables.

FORPLAN prescriptions are represented at three levels within FORPLAN. At the first level, a set of management emphases parallel the management prescriptions. Within many management emphases a set of management intensities are represented as choices in the FORPLAN model These intensities depict different combinations of activities such as timber harvesting, planting, commercial thinning, etc At the third level, dozens of different timing patterns and rotation ages were provided for most management emphasis/management intensity combinations on timbered lands.

Mathematical estimates of the economic costs and benefits and resource outputs (yields) were developed for use in the FORPLAN model Some yields were developed through use of other computer models Timber yields came from a yield simulator (STAND PROGNOSIS model - Wykoff et al 1982) A rigorous analysis of timber prescriptions ensured that the most cost-efficient, and those that produced the most timber volume on a per acre basis, were included in the Forest-wide analysis in FORPLAN.

Operation of the FORPLAN model was designed to ensure that prescriptions and timber management options were selected in a cost-efficient manner (see Appendix B, Section III.D and Section III E for more information on the Stage II analysis of FORPLAN timber management prescriptions). The prescriptions FORPLAN selected depended upon the objective function and the set of constraints used to represent a particular benchmark or land management alternative. The objective function is a mathematical equation which

shows how the Forest's objective (maximum present net value, for example) is affected by the variable values explicitly portrayed in alternative management prescriptions. Constraints are mathematical equations which require that a given amount of an input or output variable be achieved The given amount is also termed the right-hand side due to its location within typical matrix representations. All constraints must be satisfied before an optimal solution to the objective function is reached

The objective function was usually to maximize present net value, production of timber, production of cover, or production of forage. These were subject to first satisfying all the specified constraints. Constraints were designed to guarantee the spatial and temporal feasibility of land assignment and harvest scheduling choices in order to achieve the multiple use objectives of a benchmark or alternative Once the model determined that a feasible solution existed by satisfying all of the constraints, it searched for the set of prescriptions and timing choices which permitted it to optimize the solution according to the specified objective function.

f *Management Areas*

A management area is a grouping of analysis areas to be managed with similar management goals, objectives, and standards; i e , assigned the same management prescription. Management areas are identified to display the management emphasis for identifiable areas of the Forest

Management areas are the building blocks of alternatives By assigning land to a particular management area, the on-the-ground management to result from that alternative becomes apparent The assignment of lands to management areas identifies the types and amounts of management activities that can occur on specific areas of the Forest.

A total of 22 management areas have been identified to portray the different ways of managing the Forest The management goals for the management areas range from managing for timber production and other multiple uses on a sustained yield basis (Management Area 1), to managing to protect or enhance riparian-dependent resources (Management Area 3), to managing for developed recreation opportunities (Management Area 12). These management areas are described in Section B.5 of this chapter

g. *Using FORPLAN to Analyze Alternatives*

The base data used in applying FORPLAN analysis to optimize efficiency while meeting objectives of each alternative were the analysis areas, alternative prescriptions, time periods, resource constraints, estimates of resource output objectives in quantitative terms from applying prescriptions within analysis areas, estimates of the unit costs required to implement prescriptions on analysis areas, and unit benefit estimates for the outputs produced Based on this information and the objectives of an alternative, FORPLAN analysis determines which prescriptions to apply to which analysis areas and when to schedule them for application. However, the management area assignments, which are for the most part fixed for each alternative, determine which prescriptions are available for each analysis area The assignment of land to management areas essentially constrains selection of prescriptions within analysis areas The management area assignments do vary from alternative to alternative, however (See Table II-4 following the management area descriptions for acres by alternative)

In the Forest's FORPLAN model, the outputs which are modeled as a function of applying prescriptions to analysis areas include timber, forage, cover, sediment, road construction, road reconstruction, acres of precommercial thinning, and volume of ponderosa pine harvested. These outputs were chosen because of their relationship to the issues Other outputs and effects are estimated outside of the FORPLAN model or by interpreting the results of the FORPLAN solution.

Because of model and computer limitations it was not practical to include all resource interactions in the FORPLAN model In addition, many of the resource interactions

related to the alternatives do not fit well into a linear programming format. Thus, many of the elements of the alternatives are handled outside of the FORPLAN model or used to develop constraints applied for particular alternative formulation For more discussion of the Forest's FORPLAN model see Appendix B

An initial major, step in formulating an alternative with FORPLAN is the assignment of all Forest lands, by analysis area, to the various management areas This decision is critical because the management area determines what range of prescriptions or management choices are available for that piece of land

Present Net Worth on a per acre basis, referred to as Financial Analysis (Stage II–required by 36 CFR 219.14 [b]) was done in the analysis process for all analysis areas and associated management prescriptions prior to the Draft Environmental Impact Statement. See Appendix B, Section III.E for a detailed description.

The prescription choices that are available for each management area are shown in Table II-1. As shown, a full range of timber prescriptions are available for Management Areas 1, 4A, 4B, 18 and 20. For Management Areas 3 and 14, a more limited number of prescriptions are available with reduced timber yields to meet other resource objectives Management Area 2 is used for primary grazing lands, so no timber prescriptions are available there.

For practical purposes, the management area assignments for each alternative are fixed as part of the design of the alternative. That is, the management area assignments are not assigned by FORPLAN but are constrained into each alternative FORPLAN formulation to achieve the particular objectives of each alternative There is a minor exception to this however. Whenever an analysis area, or piece of analysis area, is assigned to a management area that involves scheduled timber harvest, the FORPLAN model is given the choice of assigning that land to a minimum level management area prescription (Management Area 16)

The management areas for which the assignments are absolutely fixed include Management Areas 5 through 13, 17, 19, and 21 Analysis areas which are assigned to Management Areas 1 through 4B, 14, 18, 20 and portions of 22 always have the option of assignment to minimum level management

In addition to the management area prescription assignments there are other fixed prescription assignments that are significant in determining outputs and effects within an alternative and its management areas These are shown below

a. Management strategies of range allotments,

b. Riparian area management strategies,

c Amount of fish habitat improvements,

d Amount of developed recreation facilities constructed,

e Amount of forage seeding following timber harvest;

f Snag and snag replacement levels,

g. Amount of wildlife habitat improvements,

h. Amount of trail construction and reconstruction, and

i Acres of each wilderness assigned to each wilderness recreation opportunity spectrum

The target levels of each of the resource objectives and related outputs, with the exception of some timber and range outputs, are not "chosen" by the FORPLAN model for each alternative but are the prescribed design elements of each alternative. These are modeled as constraints in each alternative FORPLAN formulation or are calculated and estimated outside of FORPLAN

While the management area assignments and other resource design elements are essentially fixed for each alternative, they do vary across the range of alternatives In this way the outputs, effects, and trade-offs associated with each alternative can be analyzed and evaluated comparatively with all other alternatives to identify the alternative that comes nearest to maximizing net public benefits while responding to public issues.

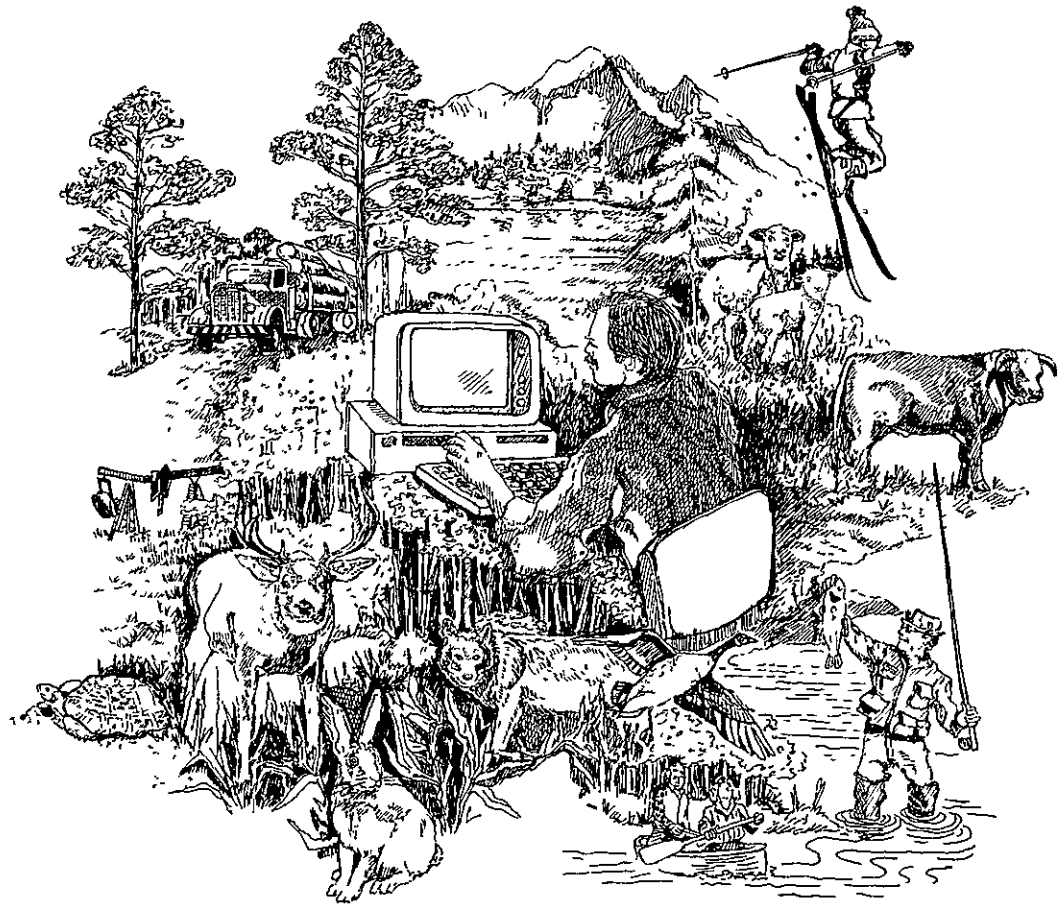


TABLE II-1: Summary of Prescription Choices Available for Each Management Area

Management Area	PRESCRIPTION CHOICE							
	Clearcut		Shelterwood		Overstory Removal		Uneven-aged	Min Level (No Sched
	With Thinning	Without Thinning	With Thinning	Without Thinning	With Thinning	Without Thinning	Selection Harvest	Timber Harvest)
1. General Forest	X	X	X	X	X	X	X	X
2 Rangeland								X
3A. Non-Anadromous Riparian Areas[a/]	X[1/]	X[1/]					X	X
3B Anadromous Riparian Areas[a/]	X[1/]	X[1/]					X	X
4A. Big-Game Winter Range Maintenance	X	X	X	X	X	X	X	X
4B. Big-Game Winter Range Enhancement	X	X	X	X	X	X	X	X
5. Bald Eagle Winter Roosts[b/]								X
6A. Strawberry Mtn Wilderness[b/]								X
6B. Monument Rock Wilderness[b/]								X
6C. Pine Creek Wilderness[b/]								X
7. Scenic Area[b/]								X
8. Special Interest Areas[b/]								X
9. Research Natural Areas[b/]								X
10. Semi-Primitive Non-Motorized Recreation Areas[b/]								X
11. Semi-Primitive Motorized Recreation Areas[b/]								X
12. Developed Recreation[b/]								X
13 Old Growth[b/]	X[2/]	X[2/]	X[2/]	X[2/]			X[2/]	X
14. Visual Corridors[a/]	X[3/]	X[3/]			X[3/]	X[3/]	X	X
15. Unit Plan Wildlife Emphasis Areas	X	X	X	X	X	X		X
16. Minimum Level Management								X

1/Prescriptions are available only in lodgepole pine stands in riparian areas

2/Prescriptions for timber harvest options applicable only for old-growth replacement stands

3/Prescriptions are available only in lodgepole pine stands in visual corridors

a/Scheduled timber harvest allowed varies by alternative design to meet other resource objectives

b/The acres assigned to this management area are fixed in each alternative (i e there is no choice in the FORPLAN model), but do vary by alternative

TABLE II-1: Summary of Prescription Choices Available for Each Management Area (continued)

Management Area	PRESCRIPTION CHOICE							
	Clearcut		Shelterwood		Overstory Removal		Uneven-aged	Min Level (No Sched
	With Thinning	Without Thinning	With Thinning	Without Thinning	With Thinning	Without Thinning	Selection Harvest	Timber Harvest)
17 Byram Gulch Municipal Supply Watershed								X
18. Long Creek Municipal Supply Watershed	X	X	X	X	X	X	X	X
19 Administrative Sites								X
20 Wildlife Emphasis With Scheduled Timber Harvest[a/]	X	X	X	X	X	X	X	X
21 Wildlife Emphasis With Non-Scheduled Timber Harvest								X
22 Wild and Scenic River [c/]	X[4/]	X[4/]					X	X

4/ Prescriptions are available only in lodgepole pine stands in scenic corridors

c/ Scheduled timber harvest allowed only within scenic portion of designated river corridors Wild designations limited to Minimum Level prescriptions only

h. *Additional Analysis Tools*

Although FORPLAN was the central model in the analysis process, several other models were essential to either prepare data for FORPLAN, or help interpret FORPLAN results Construction of managed timber yield tables for use in FORPLAN required use of a computerized growth model (PROGNOSIS model).

IMPLAN is a Forest Service designed computer model that estimated the expected economic effects of implementing one or more alternatives IMPLAN contains national economic data that have been organized into a single predictive model. The basis for prediction can be any single U S county or group of counties, any state, or the entire nation Regardless of how the model is constructed (county or multiples of counties), IMPLAN provides a detailed description of the economy in question. The model then provides analytical information about the industries that are present and their relationship to other industries. Thus, changes in any of the industries, as caused by the alternatives, result in measurable changes in the socioeconomic area of influence.

The economic effects estimated with IMPLAN are described by parameters typical of input/output studies They are structural in nature, permitting multiplier effects to be traced throughout the various regional sectors Direct, indirect, and induced changes in gross outputs, employment, income, and value-added are the most representative account of potential regional economic impacts This information was used to portray the Forest Service's relationship to the area economy and to help assess the effects on that economy of alternative management programs

The Forest Service ADVENT program and mimic spreadsheet was used to fully calculate present net value, costs, benefits, and other information such as net cash flow Additional models were built locally to analyze the effects of FORPLAN solutions.

The Forest Service ADVENT program and mimic spreadsheet was used to fully calculate present net value, costs, benefits, and other information such as net cash flow. Additional models were built locally to analyze the effects of FORPLAN solutions

Big-game habitat capability and population trends were computed based on an elk winter range Habitat Effectiveness Index (HEI) model devised by Thomas et al. (1988), and the model was applied to both summer and winter ranges See Appendix B, Section III G, for further discussion of the model

3 The Analysis of the Management Situation (AMS) and Benchmark Analysis

The first step in developing alternatives was to look at current information about the various market and nonmarket outputs which the Forest could provide; the range within which multiple use alternatives could be developed was defined These limits are called benchmarks because they define this "decision space "

The resource and economic potential of the Forest was identified by a set of eight management scenarios called benchmarks, as required by 36 CFR 219.12(e) These benchmarks identified potentials under current management direction, as well as under present legal requirements (i e , Management Requirements - MRs) and regulations on timber harvest (e g , culmination of mean annual increment). In addition, present net value is maximized because it is such an important part of defining net public benefits.

The benchmarks summarized are described in detail in the Benchmark Formulation section of Appendix B, and the outputs and effects associated with these eight benchmarks are also displayed in Appendix B Following the summary of each benchmark, Figure II-1 displays the decision space for five major indicators–timber sale program quantity, present net value (PNV), big-game use, anadromous fish commercial harvest, and permitted grazing.

The benchmarks considered in this analysis were

Minimum Level Management - Determines the minimum costs (with resultant outputs and effects) necessary to retain the National Forest lands in federal ownership, subject to certain environmental constraints and protection of life, health, and safety of incidental users.

Present Net Value (PNV Assigned) - Estimates the Maximum Present Net Value (Max PNV) that might be attained by maximizing the net value of market resources under a nondeclining evenflow policy, and assigning values to the production and output of all nonmarket resources (see Glossary for market and nonmarket resources) This benchmark serves as a basis for an economic comparison between benchmarks and alternatives, as well as a basis for determining the effects of various constraints on outputs and costs.

Present Net Value (PNV Market) - Estimates the Maximum Present Net Value that might be attained by maximizing the net value of market resources under a nondeclining evenflow policy The difference between this benchmark and the present net value (assigned) benchmark is that this benchmark does not assign values to the nonmarket resources such as wildlife habitat, visuals and other resources that are not sold in a market.

Current Direction - Estimates the outputs and effects of maintaining direction and policy found in existing unit plans, timber and other resource plans, special area management plans, and Malheur National Forest policy This benchmark provides the basis for the No Change and No Action Alternatives. (Outputs are reported for the No Action Alternative in Figure II-1 and Table II-1)

Max Timber - Defines the highest sustainable timber harvest levels for the Forest, subject to legal requirements for other resources and nondeclining evenflow policy. The

objective was to maximize timber production on the Forest

Max Big Game - Estimates the maximum capability of the Forest to produce and sustain habitat for big game.

Max Anadromous Fish - Estimates the maximum capability of the Forest to produce anadromous fish habitat, and corresponding potential fish populations with the habitat provided

Max Range - Estimates the highest sustainable grazing levels for the Forest, subject to legal requirements for other resources. The objective was to maximize forage production for cattle grazing on the Forest

a *Supply and Demand*

In Table II-2, the demand and supply projections for various market and nonmarket outputs are displayed to present supply-demand relationships for the various benchmarks. The demand estimates shown reflect the future output/effect levels anticipated by several public agencies, including the Forest Service These projections are discussed in Chapters III and IV, and in the Forest Analysis of The Management Situation (on file at the Supervisor's Office in John Day, Oregon) A brief discussion of the projected demand and probable supply for some resources follows

The projected demand for timber from the Malheur National Forest displayed in Table II-2 is derived from the discussion in Chapter III The demand figures presented in the table reflect the midpoint of the range of projected demand for Malheur National Forest timber Demand projections in Tables III-7 and IV-2 include projected demand for *all* sources of timber in Grant and Harney counties, this cumulative demand would be partially supplied by private ownership and other National Forests (Ochoco, Umatilla) in Grant and Harney counties

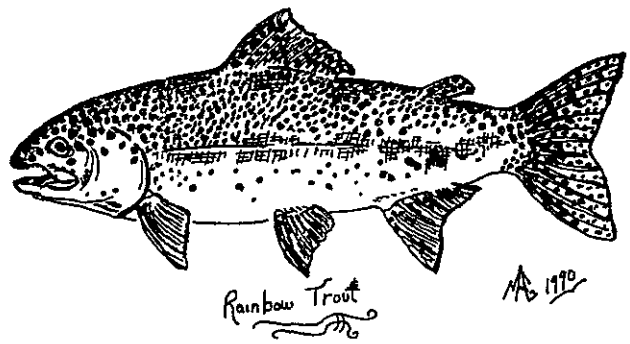
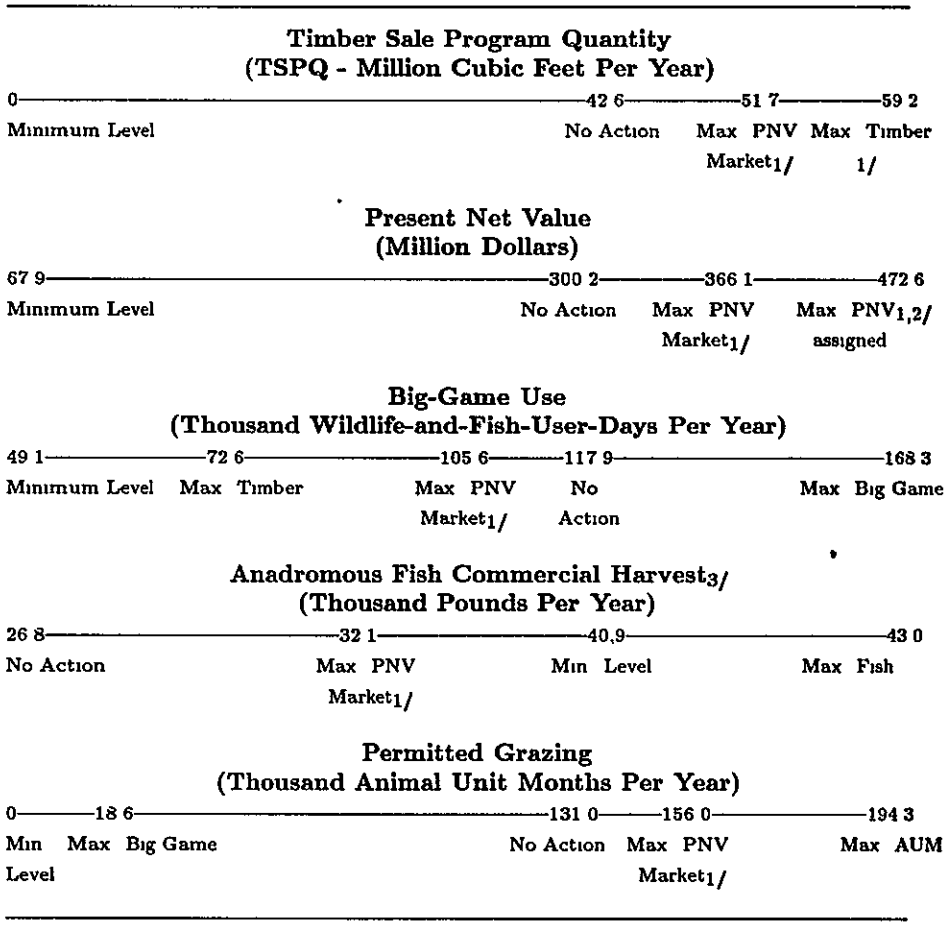


FIGURE II-1: Benchmark Decision Space for Five Major Resource Indicators (First Decade Outputs)



1/Max PNV Market includes Management Requirements and is Benchmark 11 in EIS, Appendix B Due to the time period involved between benchmark preparation and Final EIS distribution, benchmarks were not updated to 1990 conditions for legislative or technical changes using FORPLAN If they were, it is estimated that timber (TSPQ) and economic outputs (PNV) would be reduced by approximately 3-4 percent Other listed resource outputs are not expected to be sensitive to these changes

2/Max PNV assigned includes Management Requirements and is Benchmark 7 in the EIS, Appendix B

3/Revisions in estimating outputs have resulted in non-comparability in outputs between benchmark analyses and development of the Final Environmental Impact Statement alternatives See Appendix B, Section III G for a more detailed discussion

As displayed by the results of the Maximum Timber Benchmark, the Forest has the physical capability to fully meet demand in the Forest zone of influence (Grant and Harney counties) through the year 2030. Changes in demand for the Malheur National Forest timber supply could result from increases or decreases in supply from adjacent sources of timber (e g., other National Forests).

Projected demand for big-game use on the Malheur National Forest includes elk and mule deer hunter-days, as estimated in the Forest Analysis of The Management Situation. An increase of about 10-15 percent per decade is projected over time. The proportion of mule deer to elk hunter-days is about 2 to 1; the increase over time is in about the same proportion. Projections were derived from regression curves based on Oregon Department of Fish and Wildlife hunter-days data.

The supply of and demand for wildlife on the Malheur National Forest has been presented in terms of Wildlife-and-Fish-User-Days (WFUDs), i e., primarily wildlife-oriented recreation The demand for wildlife-oriented recreation (primarily consumptive use and of substantial economic value to the local economy) is contingent upon the quality and/or quantity of the animals being sought Consequently, as deer and elk herds on the Forest increase in quality and/or quantity, the demand (exhibited in hunting pressure) would increase also.

TABLE II-2 Summary of Projected Supply and Demand for Key Resource Elements (Average Annual Outputs)

	Decade 1	Decade 2	Decade 5
Timber Sale Program Quantity (Million Cubic Feet Per Year)			
Projected Supply			
Minimum Level Management	0	0	0
No Action	42.6	42.6	43 0
Max PNV (with MRs)	51 7	52 0	52 3
Maximum Timber Benchmark	59 2	59.4	60 1
Projected Demand[1/]	36 9	39 2	41.5
Big-Game Use (Thousand Wildlife-and-Fish-User-Days)			
Projected Supply			
Minimum Level Management	49.1	49.1	49 1
No Action	117 9	126 2	128.7
Max PNV (with MRs)	105 6	70 4	109 2
Maximum Big-Game Benchmark	168.3	162 4	194 7
Projected Demand[2/]	95 1	110 6	157 0
Anadromous Fish Commercial Harvest[3/] (Thousand Pounds Per Year)			
Projected Supply			
Minimum Level Management	40 9	61 6	70 6
No Action	26 8	28 0	31 6
Max PNV (with MRs)	32 1	32 1	32.1
Maximum Anadromous Fish Benchmark	43 0	68.6	77 6
Projected Demand[4/]	Numerical Data Not Available		
Livestock Grazing (Thousand Animal Unit Months Per Year)			
Projected Supply			
Minimum Level Management	0	0	0
No Action	131	135	131
Max PNV (with MRs)	156	200	189
Maximum AUM Benchmark	194	247	274
Projected Demand[5/]	120	120	120

1/Projected demand for timber is discussed in Chapter III A constant board foot per cubic foot conversion ratio of 5 72 was assumed in projecting decadal demand

2/Projected demand in the Forest Analysis of the Management Situation (March 1985)

3/Revisions in technical data have resulted in slight changes to comparisons of outputs between benchmark analyses and of the Final Environmental Impact Statement alternatives See Appendix B, Section 3 G for more detailed discussion

4/Quantitative demand projections not currently available Refer to the following discussion, and the Forest Analysis of The Management Situation for qualitative projections of probable demand

5/Projected demand displayed here is based on historic permitted grazing levels See the Forest Analysis of The Management Situation and the following discussion for more information

Quantified projections of the demand for anadromous fish from the Malheur National Forest have not been performed at this time. As stated in the Forest Analysis of The Management Situation, however, the demand for Chinook salmon and steelhead trout in the Columbia Basin exceeds the current supply Indications of demand exceeding supply include court cases involving allocation of fish stock between Indian and non-Indian harvest groups, reduced or canceled sport-fishing seasons, and legislation designed to protect depleted stocks of fish for commercial fishery operations Consequently, the assumption was made that all anadromous fish produced from waters within the Malheur National Forest would be demanded (i e , utilized) However, the production potential of the Forest is a very small percentage of the total increase necessary in the entire Columbia River Basin to meet demand

The demand for forage, primarily for domestic livestock, from the Forest is affected by the price that permittees have to pay In past years, the price of National Forest forage has been relatively low, i.e., below the pasture rents private landowners receive Consequently, despite declines in the beef-producing industry, the demand for National Forest permitted grazing remains high because of the price permittees pay. Expectations are that the demand for National Forest forage will remain strong until the price of National Forest forage approximates the price received by private landowners. As displayed by the Maximum AUM Benchmark, the Forest has the capability to fully meet or exceed demand in the Forest zone of influence throughout the planning period.

The demand for dispersed and developed recreation on the Malheur National Forest is expected to increase over time (from 200,000 Recreation Visitor Days of annual dispersed use currently to about 300,000 Recreation Visitor Days by 2030) The demand for wilderness use on this Forest is expected to increase slowly, and the benchmarks and alternatives do not vary significantly in the supply of wilderness Demand projections generated were derived from historical use patterns, and National and Regional trends applied to the local situation The supply of recreation opportunities available on the Malheur National Forest currently exceeds the demand for all types of recreation

b *Opportunity Costs*

The analysis of benchmarks provided information regarding output potential, resource interactions, and the decision space within which the Forest could operate This information was important in the formulation of alternatives, and provided understanding of both the opportunities for and limitations on resolution of public issues and management concerns.

The output potentials determined through benchmark analysis represent the maximum obtainable level of each resource While each individual output level can be reached, it would be impossible to produce all of the maximum levels simultaneously Production of one output generally involves the tradeoff of other resource outputs The following discussion summarizes significant tradeoffs involved in maximizing each of the Forest's principal outputs, as identified in the analysis of benchmarks (Further detail may be found in Appendix B.)

Maximizing timber production results in some sacrifice among most other resource outputs. Present net value declines because timber management activities occur in stands which are economically unviable (i e , costs in excess of revenues). Some wildlife populations would decline, fish production would be lower, and some types of recreation opportunities would be foregone. Visual quality would be lowered, and soil and watershed condition would be adversely affected.

Maximizing wildlife production (measured in recreational use of wildlife) results in reductions in some resource areas Present net value declines primarily because of less timber production. Livestock grazing would be extensively reduced, resulting in major disturbance to the local ranching community.

Maximizing anadromous fish production results in a small reduction in present net value, primarily because riparian zones account for only about four percent of the Forest landbase In addition, costs for stream protection are necessarily incurred in other resource areas to generate their respective output levels Timber and livestock grazing outputs decline in order to achieve riparian improvement Most other resource outputs would be near the output levels in the Maximum present net value Benchmark

Maximizing livestock production results in reductions in most amenity resources (fish and wildlife, recreation, visual resources) Present net value reductions would occur due to reductions in timber harvests and inefficient expenditures to maximize forage production

Other resource outputs which result in substantial tradeoffs on this Forest include old growth retention and unroaded area retention Retaining old growth or unroaded areas results in substantial present net value losses due to reductions in timber harvest

Analysis of the resource relationships which interact to form the Forest's decision space identified tradeoff patterns that proved useful in the formulation of alternatives and, subsequently, the interpretation of alternative outputs and effects The benchmark results indicate that the tradeoffs in timber outputs and present net value when making small increases in old growth or unroaded area retention, and to a lesser degree wildlife production, are generally substantial Tradeoffs in range outputs are evident when wildlife production is emphasized Employing timber management strategies which emphasize the production of large-diameter ponderosa pine stands, rather than small-diameter mixed conifer stands, results in highly significant timber volume and present net value reductions Visual quality and recreation opportunities can be provided with slight reductions in timber harvests, although the present net value tradeoffs (due to increased management costs) are significant Understanding these tradeoff relationships was instrumental in the process of formulating alternatives It served to identify both the areas in which a wide range of opportunities to resolve issues was available, and those in which such opportunities would be limited

c *Management Requirements*

All alternatives, except Alternative NC must comply with applicable laws and regulations To assure consistency in applying the laws and regulations to planning, Forest Service national and regional direction (dated October 14, 1981 and February 9, 1983, respectively) established those requirements which must be met in all alternatives, except Alternative NC These requirements, called Management Requirements (MRs), were included in the design and development of each alternative, except Alternative NC considered in detail in order to accomplish the goals and objectives of the National Forest Management Act regulations (36 CFR 219)

While the benchmarks established various maximum management levels, the Management Requirements established various minimum levels of management. They were not designed to establish an appropriate level of management Thus, the alternatives generally adopt management levels and standards at or above the Management Requirement levels consistent with the goals of the particular alternative The Management Requirement analysis was one step in the process of determining the decision space available to alternatives

These Management Requirements are applied in the planning process in one of two ways:

1 They are incorporated into the analysis process as constraints in FORPLAN, which simulates on-the-ground compliance and allows analysis of tradeoffs associated with meeting them, or

2 They are addressed in standards and set the bounds for conducting management activities to assure on-the-ground compliance

The specific ways the Forest incorporated the Management Requirements into the analysis process are outlined in Appendix B and are addressed more fully in Appendix G; the standards for assuring compliance with Management Requirements are described in the Forest Plan.

Table II-3 below displays the economic and timber production tradeoffs due to each individual Management Requirement. The total effect is displayed by the Max present net value Benchmark with all Management Requirements. The following constraint analysis was developed for the Draft Environmental Impact Statement, published in 1987. Since then, costs have been updated and the present net value of some benchmarks has changed. Although present net value may have changed for some benchmarks, the constraint analysis is still valid; consequently, the analysis presented in Table II-3 uses information from the Draft Environmental Impact Statement.

TABLE II-3: Summary of Management Requirements Constraint Analysis

Benchmark/ MR	Present Net Value[1/]	Change	Long-Term Sustained Yield Capacity	Change	First Decade Allowable Sale Quantity	Change
	Millions of Dollars	2/	Millions of Cubic Feet Per Decade	3/	Millions of Cubic Feet Per Decade	3/
Max PNV (w/o MRs)	638 6		593 9		532.6	
Harvest Dispersion	583 4	-55 2	616 2	+22 3	508 1	-24.5
Old Growth	617.7	-20.9	586.5	-7 4	506 5	-26.1
Riparian	624.1	-14.5	594 6	+0.7	526.4	-6.2
Max PNV (with all MRs)	549 7	-88 9	572.3	-21.6	477.2	-55.4

1/Discount rate equals four percent Present net value calculated in 1982 dollars

2/Change from the Maximum Present Net Value (without MRs) Benchmark Also can be interpreted as opportunity costs of the MRs

3/Change from the Max present net value (without MRs) Benchmark

A comparison of the Maximum Present Net Value Benchmark (with all Management Requirements) to the Maximum Present Net Value Benchmark (without Management Requirements) shows that the total effect of all significant Management Requirements taken together reduces present net value by 14 percent, long-term sustained yield capacity by 4 percent, and first decade Allowable Sale Quantity by 11 percent Further analysis shows the effects of each Management Requirement individually when compared to the Max Present Net Value (without Management Requirements) Benchmark.

The harvest dispersion Management Requirement establishes a maximum amount of acres that can be regenerated in any decade. This Management Requirement limits openings created by clearcutting to 40 acres or less with logical cutting units surrounding; shelterwood and overstory removals are limited to 80 acres or less to address watershed, wildlife diversity, and visual management concerns. In the Final Environmental Impact Statement, all created openings are limited to 40 acres with few exceptions (see Forest-wide

Standards in the Forest Plan for exceptions) The 80 acre unit size was eliminated in favor of meeting natural conditions and all resource objectives. This Management Requirement results in a substantial reduction in present net value (9 percent); first decade Allowable Sale Quantity decreases about 5 percent. Present net value reductions are primarily due to timber harvests foregone in valuable, mature timber in the first decade, and the implementation of more costly timber management practices over time However, long-term sustained yield capacity is higher because of the mix of timber management practices

The old-growth Management Requirement results in the dedication of acres of suitable timber land for wildlife habitat for old-growth dependent wildlife. Indicator species considered are pileated woodpeckers and pine marten This Management Requirement results in a three percent decrease in present net value and a five percent decrease in first decade Allowable Sale Quantity. The reduction in long-term sustained yield capacity is due to the reduction in suitable forestland because of old-growth dedication.

The riparian Management Requirement was designed to minimally protect riparian zones on the Forest Present net value and first decade Allowable Sale Quantity tradeoffs are small (present net value - less than three percent; ASQ - one percent) This MR has smaller tradeoffs because it is identified with specific areas which make up only four percent of the Forest, the harvest dispersion and old-growth Management Requirements have Forest-wide effects

The Management Requirements for the Forest were designed to protect specific qualities of the Forest Consequently, there is very little overlap in effect on present net value and Allowable Sale Quantity between Management Requirements, and the Management Requirements are mostly additive Slight overlap between the riparian Management Requirement and the harvest dispersion Management Requirement accounts for the difference in total effect

Snag and snag replacements are additional Management Requirements that have been established outside of FORPLAN analysis A test for significance indicated that these do not exhibit significant effects upon indicators, and are not listed in Appendix G (Information Regarding Management Requirements) The snag MR is designed to provide minimum snag levels, uniformly across the forest For a more detailed analysis of the significant Management Requirements (including extensive sensitivity analysis), refer to Appendix G

4. Alternative Formulation Process

a *Development of Preliminary Alternatives*

The alternative formulation process began with a review of Forest issues, concerns, and *opportunities, resource inventories and resource production capabilities identified in the* Analysis of the Management Situation, and applicable planning direction

Based on a review of these items, the Forest leadership team developed management options, ranging from lower to higher intensity, for three resource areas recreation, wildlife, and timber Each option was comprised of management direction statements for the factors important for that particular resource The resource management options were designed to incorporate issues, reflect a particular level of management intensity, and serve as a building block for Forest management alternatives

Since timber, recreation, and wildlife are largely dependent on the assignment of land areas, to some degree each is in competition with the other The options for these resources were, therefore, compared to each other to determine their compatibility. This comparison resulted in 58 combinations of these three resources that could be compatible within an integrated alternative

Since the management options for the resources included output levels close to the minimum and maximum benchmark levels, the preliminary alternatives formulated were by design within the benchmark levels, and spread throughout the entire range.

From these 58 possible alternatives, 9 preliminary alternatives were identified, based on the following objectives

a. Minimizing the number of alternatives in a range that would still include all of the resource management options;

b. Minimizing the duplication of resource options in the range, and,

c Maximizing diversity in the mix of resource option combinations

These alternatives were further developed with information about other Forest resources and they were analyzed in detail

An additional alternative was added in May 1987, in response to an appeal by the Northwest Forest Resources Council. This alternative, labeled NC, No Change, represents the potential outputs and effects of continuing implementation of the Forest's 1979 Timber Resource Management Plan without incorporating management changes to meet NFMA requirements and without consideration of more recent inventories and yield estimation.

In developing alternatives, a budget constraint was placed on Alternative A, the No Action Alternative No other alternatives have budget allocation constraints, so were allowed to reach the full economic potential of the alternative theme

As a change from Draft to Final Environmental Impact Statement, Alternative I has been added to the array of alternatives fully developed Alternative B has been modified by the Forest, in conjunction with timber industry representatives, to reflect timber production emphasis for the FEIS This alternative is carried forward as Alternative B-Modified in this FEIS Additionally, Alternative C reflects modifications made in conjunction with environmental community representatives, to incorporate amenity concerns in an alternative in the FEIS. This is carried forward as Alternative C-Modified in this FEIS. Alternatives D, E, F-departure, G and H have been eliminated in this final Environmental Impact Statement due to a lack of public support for these specific alternative designs.

b. *Alternative Development Comments Received Prior to Release of Draft Environmental Impact Statement*

During development of the alternatives, comments were received from interested groups and individuals Disposition of these comments are displayed in Appendix A Three organizations–Grant County Conservationists, Confederated Tribes of the Umatilla, and Oregon Department of Fish and Wildlife–submitted their own alternatives and suggested numerous changes to the Forest-wide and Management Area Standards After in-depth consideration by the interdisciplinary team and the Forest Supervisor, including comparison with the other Forest Plan alternatives, the groups' alternatives were not developed to be considered in detail This does not mean that the information was not used or that the substantial effort made by the groups in developing the alternatives was wasted. Many of the facets of the submitted alternatives had already been considered in the planning process and some were integrated with other alternatives being considered in detail. The major points of the alternatives submitted by the three organizations are described on the following pages.

Grant County Conservationist Alternative

a *Comment* Retain 16 currently unroaded areas as unroaded

Forest Response Alternative C-Modified retains all currently unroaded areas

b *Comment* Exclude livestock from wilderness, perennial campsites, and popular recreation areas Grazeable vegetation will be maintained at 80 percent of biological potential

Forest Response Currently permitted-use continues grazing in both wilderness areas by law Grazing is discouraged in developed campgrounds Many of these areas are fenced to exclude livestock Livestock use is also mitigated through management standards Generally livestock use is targeted at 50 percent of available annual growth on uplands and 55 percent or less of grass and grasslands in riparian areas in all alternatives except Alternative A. (Due to the lack of information the utilization level of Alternative No Change is not known) In riparian areas, grazing is targeted at 50 percent of annual growth on shrubs This level is considered acceptable use and generally meets other resource objectives Restricting use to 20 percent would have severe economic impacts without any significant additional benefits

c *Comment* No catastrophic timber salvage harvest in roadless areas, except to benefit the resources in the area No roads will be built

Forest Response No scheduled timber harvest is permitted in semiprimitive areas Harvest may be used to meet other resource objectives, mitigate catastrophic events, build trails, provide scenic vistas, or provide for public safety provided it meets the goal of providing a semiprimitive setting New road construction is not permitted

d *Comment* Manage big-game winter range for big game Big game should have first priority for winter forage Remove all livestock by November 1 Achieve 90 percent Habitat Effectiveness Index (HEI) on winter range Maintain 50 percent, "plus or minus" 10 percent of an area in well-distributed thermal cover An average of no more than 75 mile of open road per square mile Provide additional cover stands as needed Provide total closure of winter range to all motorized vehicles during winter season Add Indian Creek - Pine Creek along north side of Strawberry Mountains to elk winter range

Forest Response Alternatives C-Modified, F, and I all manage existing winter ranges for maintenance or enhancement Priority for forage on winter range will be made to big game on some areas in two alternatives Alternative C-Modified allocates 75 percent of the available forage to elk on those areas managed under Management Area 4B In Alternative I, timber management on winter range will be conducted to retain a Habitat Effectiveness Index of 6, and target 25 percent total cover and reduce open road density per square mile Activities may be restricted from December 1 through March 31 Transportation systems are to be managed to limit big-game winter stress-related factors Current winter range boundaries reflect those agreed upon by the Forest Service and Oregon Department of Fish and Wildlife based on geographic considerations and big-game use

e. *Comment*: Big game should have first priority for summer forage, then livestock Provide year-round closure of temporary roads Achieve 90 percent Habitat Effectiveness Index on summer range Provide a total of 40 percent cover well distributed over the summer range. Use Oregon Department of Fish and Wildlife definitions of thermal and hiding cover

Forest Response Adequate forage is expected on summer range to meet the needs of both livestock and big game Much of the area above 35 percent slope is not heavily used by cattle and is available for big-game use Elk summer habitat will be managed by

applying the Habitat Effectiveness Model. For example, Alternative I, would maintain a minimum HEI of 5, in the General Forest allocation and 0 7 HEI in the wildlife emphasis allocation.

f. *Comment* Protect special wildlife-use areas such as springs, wallows, calving and fawning areas, migration routes, breeding areas, meadows, mineral licks, caves, cliffs, and talus

Forest Response: Forest-wide standards provide for evaluation of special habitats during project planning to ensure timely protection and/or proper management

g. *Comment*: Dedicate a minimum of 120,000 acres to old-growth habitat with all ecoclasses represented.

Forest Response: Alternatives C-Modified, F, and I provide this level of old growth or more

h. *Comment*: Manage all Class I, II, and III streams for maximum productivity of native trout and anadromous fish populations No timber harvest or road construction in riparian areas, springs, bogs, and wet meadows, unless specified by wildlife biologists. Obliterate existing roads in these areas. Meet Oregon Department of Fish and Wildlife requirements for shade, water temperature, and vegetative cover where naturally possible. Strictly control domestic livestock grazing. Maintain buffer strips for all wetland areas as follows·

Class I	—	100-200 feet each side or greater
Class II	—	75-100 feet each side or greater
Class III	—	50-100 feet each side or greater
Class IV	—	50 feet each side or greater
Meadows	—	100-200 feet outside perimeters or greater
Springs, Bogs, and Floodplains	—	50-100 feet outside perimeters or greater
Aspen Areas	—	75-100 feet outside perimeters or greater

Forest Response: Forest-wide standards require meeting State water quality standards through the application of'Best Management Practices These standards are designed to maintain productivity of these waters for resident and anadromous fish. Alternative C-Modified would afford the greatest protection on these areas Riparian ecosystems management would generally protect to an average width of 100 feet on each side in Management Area 3 (A &B). Alternatives A, B-Modified and F would provide the least additional protection Management of these areas is intended to maintain or enhance the riparian character of these areas For all alternatives except C-Modified and portions of I, timber harvest is permitted with harvest generally being in the form of selection and group selection methods.

Sufficient canopy is to be left to provide shade needed to meet water quality standards for temperature. No-cut buffer strips were not considered necessary to always meet riparian management objectives, although it would better ensure these standards were met. Road construction is also permitted with location, construction, and maintenance designed so sediment and woody debris would not enter the channels of Class I and II streams. Except for occasional crossings, stream channels of Class I-IV streams are to be left essentially undisturbed

Quantified projections of the demand for anadromous fish from the Malheur National Forest have not been performed at this time As stated in the Forest Analysis of The Management Situation, however, the demand for Chinook salmon and steelhead trout in the Columbia Basin exceeds the current supply. Indications of demand exceeding

supply include court cases involving allocation of fish stock between Indian and non-Indian harvest groups, reduced or canceled sport-fishing seasons, and legislation designed to protect depleted stocks of fish for commercial fishery operations. Consequently, the assumption was made that all anadromous fish produced from waters within the Malheur National Forest would be demanded (i e , utilized). However, the production potential of the Forest is a very small percentage of the total increase necessary in the entire Columbia River Basin to meet demand

Road closure or obliteration may be considered in riparian areas to improve habitat for riparian dependent species This will be addressed on a site-specific basis in project analysis by interdisciplinary teams and in the Forest Travel Management Plan

Grazing is to be conducted in such a way that State water quality standards and fish populations are maintained at current levels or are in an upward trend. Each alternative provides for varying strategies to recover those riparian areas which are not currently in a satisfactory condition

i. *Comment* Treat all visually sensitive areas to meet management strategies for Visual Resources plus high standards of visual management on all trails Maintain 65 percent or more of the visual area in large, old trees (greater than 24 inches diameter at breast height) Provide corridors of 100 feet or greater each side of trails. Treat all Forest acres to maintain visual integrity regardless of whether areas are identified as being visually sensitive or not Require and enforce proper cleanup of sale areas by operators

Forest Response. Alternatives A, C-Modified, and NC emphasize visual management on all or most of the visual corridors on the Forest Foreground areas are managed to maintain 40 percent of the retention area in trees larger than 26 inches, and 20 percent of the partial retention areas in trees larger than 26 inches Middleground areas are managed to maintain a natural-appearing landscape Areas identified in the Forest planning process as not being visually sensitive will be managed under the guidelines of the indicated management strategy Slash treatment method will also be dependent on the resource objectives of the area under consideration

j *Comment* Increase the acreage of aspen stands occurring on the Forest

Forest Response Forest-wide standards provide for evaluation of special habitats during project planning to ensure timely protection and/or proper management Enhancing aspen stands will be considered when appropriate under the management strategy designated for the area

k *Comment* Maintain soil productivity and minimize soil loss

Forest Response Forest-wide standards specify numerous operational considerations to be followed to meet the objective of maintaining site productivity and minimizing soil loss

l. *Comment* Minimize the impacts of roads on other Forest resources

Forest Response Forest-wide standards and management strategies are designed to consider resource management objectives when designing, locating, and maintaining roads

m *Comment* Maintain production of high-quality ponderosa pine Emphasize large, high-quality sawlogs (26-30 inches diameter at breast height) in ponderosa pine stands using 240-year rotations. Emphasize board foot production in roaded, mixed conifer stands with easy access and easy operation Harvest at 16-18 inch diameter at breast height with 130-year rotations Emphasize species diversity

Forest Response. Alternative C-Modified provides for maintaining ponderosa pine species on pine climax and subclimax sites, with rotations based on growing 26-inch or larger diameter at breast height ponderosa pine. Alternative I proposes to grow moderate diameter ponderosa pine on pine climax and a majority of the pine subclimax sites. All alternatives emphasize growing 18-inch or larger diameter at breast height trees on mixed conifer sites The alternatives provide a range of harvest on roaded and unroaded sites Regeneration methods provide for a mix of naturally regenerated and planted sites Sites which are planted will be stocked with species according to the site conditions and alternative design. This combination of regeneration methods will result in a diversity of species.

n *Comment* Use dispersion factor of no more than 25 percent.

Forest Response No specific dispersion factor is specified for on-the-ground implementation Actual dispersion of harvest units will depend on resource management objectives with a minimum requirement of meeting created opening requirements described in the discussion on Management Requirements for harvest unit dispersion. Harvest unit dispersion factors used in FORPLAN for modeling purposes ranged from 10 to 38 percent, depending on the site and the resource management objective.

Confederated Tribes of the Umatilla·

a *Comment*: In all streams that produce both spring Chinook and steelhead, habitat protection and enhancement should be practiced to achieve full potential Smolt Habitat Capability Index (SHCI). Management to protect and enhance natural fish habitat should have top priority Enhancement and restoration measures are appropriate for use in degraded habitat.

Forest Response. All streams are to be managed to meet Oregon State water quality standards Stream habitat will also be managed to support desired fish populations in coordination with Oregon Department of Fish and Wildlife and Federal agencies Each alternative provides for varying investment levels to recover those riparian areas not currently in a satisfactory condition

b *Comment·* A sufficient amount of snags should be provided to maintain cavity-dwelling species at 100 percent of the population potential in areas dedicated or managed for old growth Snag management objectives should also be defined for other areas of the Forest.

Forest Response. Areas managed for old growth will generally be managed to maintain naturally occurring snags, and 100 percent potential population levels are estimated All other forested areas are to be managed for minimum potential population levels of 40 percent Snag management objectives above these management requirements have been established for other management strategies by alternative.

c. *Comment* The Confederated Tribes would view with concern any alternative that resulted in less than optimum habitat conditions for wildlife population levels as identified in the Oregon Department of Fish and Wildlife management objectives The Forest Plan should provide protection for big-game winter range areas identified jointly by the ODF&W and the Forest Service

Forest Response All alternatives are designed to meet habitat capabilities for State big-game wildlife management objectives Alternatives C-Modified, F, and I all manage identified winter ranges for maintenance or enhancement. Alternative A manages wildlife emphasis areas for maintenance of optimal big-game habitat.

d. *Comment.* Manage streamside vegetation to maintain 80 percent shade along full length of all streams used by anadromous fish Along anadromous fish streams having

less than 80 percent natural shade, revegetate to enhance shading Leave a no-cut buffer strip of a minimum of 200 feet, to include all identifiable riparian habitat, bordering all perennial streams and intermittent streams used by anadromous fish, and around wetlands and ponds Livestock grazing in riparian habitat must be under stringent control

Forest Response Alternative C-Modified provides management protection of anadromous riparian zones at the highest level of all alternatives Forest-wide Standards require meeting Oregon State water quality standards through the application of Best Management Practices These standards will maintain productivity of these waters for resident and anadromous fish Riparian ecosystems are generally protected to an average width of 100 feet on each side in Management Area 3 Management of these areas will maintain or enhance the riparian character of these areas Timber harvest is permitted with harvest generally being in the form of selection and group selection methods Sufficient canopy will be left to provide shading to meet water quality standards for temperature. Creating no-cut buffer strips was not considered necessary to meet riparian management objectives. Road construction is also permitted with location, construction, and maintenance designed so sediment and woody debris would not enter the channels of Class I and II streams Except for crossings, stream channels of Class I-IV streams should be left essentially undisturbed Grazing is to be conducted in such a way that State water quality standards and fish populations are maintained at current levels or are in an upward trend Each alternative provides for varying strategies to recover those riparian areas not currently in a satisfactory condition

e. *Comment* Forest plans should emphasize land uses and management practices which reduce watershed runoff during the winter/spring high-flow periods and increase discharge during the summer/fall drought period Emphasis should also be placed on maintaining or increasing annual groundwater recharge and on maintaining or improving water quality

Forest Response Water yield is expected to increase from larger watersheds because timber harvest activity reduces transpiration and evaporation losses. This results in gains which are available for streamflow On the Malheur National Forest, the majority of the stands are treated by overstory removal or partial cuts and not clearcuts Dispersion is also practiced so harvest units are not planned adjacent to each other until the created openings have trees well-established and growing in them. Due to the relatively low elevation of the Forest, there is little opportunity to affect runoff and groundwater recharge because only a small percentage of the Forest is in a high snow-deposition zone All these factors reduce the potential to significantly affect early spring runoff.

Forest-wide Standards require meeting State water quality standards through the application of Best Management Practices

f *Comment* Roots, berries, and medicinal plants are important to Tribal members

Forest Response Site-specific activities which may impact these areas will be addressed during project planning to ensure timely protection and/or proper management.

g *Comment* Management should provide for preservation of cultural and historic sites

Forest Response A professionally supervised cultural resource inventory survey program is conducted on a project-specific level for all undertakings in compliance with applicable legislation

h. *Comment* Road management and design must protect fish and wildlife habitat and minimize disturbance of fish and wildlife

Forest Response Forest-wide standards and management strategies are designed to consider resource management objectives when designing, locating, and maintaining roads. Transportation systems will be managed to limit big-game winter stress-related factors.

Oregon Department of Fish and Wildlife:

The Southeast District Office of the Oregon Department of Fish and Wildlife submitted suggestions for alternative development. In addition, the State Office developed criteria for evaluating Forest Plan alternatives The following discussion is a compilation of the concerns expressed by these two offices

a *Comment* All winter range areas should be allocated to a winter range management strategy. Additional areas recently identified should be managed as winter range.

Forest Response: Alternatives C-Modified, F, and I all manage identified winter ranges for maintenance or enhancement. The winter range areas used in the planning effort are those identified and agreed upon by Oregon Department of Fish and Wildlife and Forest Service officials at the beginning of the planning process

b. *Comment*: A minimum of 5-15 percent of each major plant community in the commercial forest should be dedicated for old growth

Forest Response All alternatives maintain at least five percent of the suitable land base in old growth Only Alternative C-Modified exceeds 15 percent. All alternatives maintain sufficient habitat to maintain viable populations of old-growth dependent species

c. *Comment*· Sufficient snag habitat should be retained in designated old growth to maintain cavity-dwelling species at 100 percent of their population potential Snag habitat should be provided in riparian areas to maintain 60-100 percent of potential populations On the remainder of the Forest, habitat should be provided to maintain these species at a minimum of 60 percent of population potentials

Forest Response Snag habitat will be managed at or near natural levels in designated old-growth areas This is estimated to provide approximately 100 percent potential population levels Riparian areas are managed to maintain sufficient habitat to maintain these species at from 60 to 80 percent of their populations General Forest areas vary by alternative, and range from 40 to 60 percent of potential populations, all with provisions for snag replacements

d *Comment*: All known winter bald eagle roosts should be allocated to a bald eagle winter roost management strategy

Forest Response All alternatives manage identified bald eagle winter roost areas for bald eagles

e *Comment*: All riparian habitat on the Forest should be managed to maintain at least 80 percent of potential for streambank stability, riparian vegetation, and shade. Retain all trees within 50 feet of Class I and II streams for future instream fish habitat.

Forest Response The riparian management area standards in all alternatives provide for meeting or exceeding Oregon State water quality standards. A key element of these standards is maintaining a 68° F water temperature where possible. Water temperature is a key indicator of the factors specified by the State in their recommendation Sufficient live trees are left in riparian zones in some alternatives to provide for future instream structural improvements Creating no-cut buffer strips was not considered necessary to meet riparian management objectives, although it would afford the greatest resource protection

f *Comment* Enhancement, maintenance, and restoration should be practiced on all anadromous fish habitat at 90 percent of the potential Smolt Habitat Capability Index

Forest Response: All streams are to be managed to meet Oregon State water quality standards Stream habitat will also be managed to support desired fish populations in coordination with Oregon Department of Fish and Wildlife and Federal agencies Each alternative provides for varying investment levels to recover those riparian areas not currently in satisfactory condition

g *Comment*: Nine areas are recommended to be allocated to a semiprimitive, nonmotorized management strategy

Forest Response Alternative C-Modified allocates the suggested roadless areas to this strategy.

5. Overview of All Alternatives

The alternatives developed for management of the Malheur National Forest are designed for full implementation and focus on the resolution of the planning issues. The limits and reference points identified in the benchmark analyses were used in constructing these alternatives Several of the alternatives are required by regulation or Regional and National direction The required alternatives and others developed for display in the Final Environmental Impact Statement are summarized in Section B 5 of this chapter.

a *Alternatives Considered but Eliminated from Detailed Study*

Several alternatives were considered but eliminated from detailed study in this EIS. Some of the alternatives were originally considered for full development, but were not developed in detail for this EIS as they either closely resembled other developed alternatives or were determined to be less than sufficient for implementation

Alternatives D, E, F-departure, G, and H have been deleted from the array of viable alternatives that were considered in the Draft Environmental Impact Statement. Resulting from an analysis of comments, the lack of broad public support and close similarities with other alternative designs render these unnecessary for inclusion as alternatives to be considered in this Final Environmental Impact Statement. Their further analysis was not considered necessary at this point, although they have contributed to the consideration of a reasonable range of alternatives. In many cases, specific attributes of these alternatives are brought forward into the remaining alternatives that are fully considered in this final Environmental Impact Statement

Disposition of Fully-Developed Alternatives Considered in Final EIS

Treatment in EIS	Alternatives A	B	B Mod 1/	C	C Mod 2/	D	E	F	F Dep	G	H	I Pre 3/	NC	Current Direction Bnchmk4/
Alternative listed in Draft EIS	X	X		X		X	X	X	X	X	X		X	X
Alternative listed in Final EIS	X		X		X			X				X	X	X
DEIS Alternatives eliminated in FEIS		X		X		X	X		X	X	X			
New Alternatives brought into FEIS			X		X							X		

1/ Alternative B-Modified represents a change in Alternative B (RPA) related to proposals by timber industry representatives following release of the draft EIS Alternative B-Mod is a new commodity-oriented alternative

2/ Alternative C-Modified represents changes made to Alternative C, in response to comments from environmental community representatives following release of the draft EIS Alternative C-Mod is a new amenity-oriented alternative

3/ Preferred Alternative I

4/ Current Direction Benchmark with incorporation of National Forest Management Act (NFMA) requirements, which is Alternative A in this FEIS

Following release of the Draft Environmental Impact Statement, two additional alternative designs were submitted that emphasized specific management strategies and land use alternatives These alternatives, known as the Preferred Plus Alternative (commodity oriented) and Citizen's Multiple Use Alternative (CMUA - amenity oriented with historic commodity production) have been added to the Grant County Conservationist Alternative (GCC - amenity oriented) as alternatives considered, but eliminated from detailed study

Meetings throughout the spring and early summer of 1988 with advocates of the GCC, CMUA, and Preferred Plus alternatives have provided the information necessary to portray these different management approaches FORPLAN analysis was used to model potential resource outputs A summary of the organization-designed alternatives is given and is compared to a fully-developed alternative carried forward into this Final EIS. Alternatives eliminated from this FEIS are described below

Alternative D: This alternative was originally designed to provide a moderate level of amenity land uses, while emphasizing commodity-oriented production The goal of this alternative was to provide a mix of amenity and commodity land uses by emphasizing dispersed recreation opportunities, wildlife habitat, and intensive timber and forage production.

Alternative E The goal of Alternative E was to emphasize the production of moderate-size ponderosa pine trees while providing a mix of other resources This alternative was originally designed to perpetuate ponderosa pine, while reducing the mixed conifer occurrence across the Forest.

Alternative F-Dep This alternative was originally designed to allow a harvest departure during the first decade from the base harvest schedule identified in Alternative F Alternative F-Dep has the same land use goals as Alternative F, but intensified harvests in mixed conifer stands experiencing severe defoliation due to western spruce budworm infestations and other stand-damaging agents

Alternative G The goal of this alternative was to provide a high level of roadless recreation opportunities, while increasing commodity production on those areas open to development. The emphasis of Alternative G was to provide for increased levels of commodity production, from reduced available lands

Alternative H This alternative was designed to portray the maximum economically efficient timber harvest level, while emphasizing the production of large diameter ponderosa pine trees The land management assignments in Alternative H are similar to Alternative B-Modified

GCC alternative This alternative is to be developed with no programmed timber harvest level All roadless areas are retained as roadless, with no scheduled timber harvests Alternative C-Modified is a fully-developed alternative that has similar resource outputs as those described under the GCC Alternative

a Riparian zones have no scheduled harvests,

b Foreground visual prescriptions are applied to a maximum of acres;

c Old growth set at 120,000 acres excluding roadless or wilderness areas, and

d Uneven-aged timber management featured on a majority of acres

CMUA alternative This alternative is developed with similar resource allocations as the GCC alternative (above), but with an allowable timber sale quantity set at roughly 203 million board feet per year (average timber sale level from 1977-86) Alternative C-Modified is a fully-developed alternative that comes very close to capturing the themes of many of these alternative designs in land allocations

a Roadless areas are all retained, with no scheduled harvests,

b Riparian zones are to have scheduled timber harvests, but very low ones,

c Old growth set at 75,000 acres excluding roadless and wilderness areas, and

d Uneven-aged timber management featured on at least 30 percent of acres.

Preferred Plus alternative. This alternative sets an allowable timber sale quantity of 260 million board feet per year, as more acres are allocated to timber management For the Final EIS, Alternative B-Modified is a fully-developed alternative that comes very close to expressing this proposal for both land allocations and resource outputs

a Roadless areas scheduled for harvest, except for Vinegar Hill - Indian Rock

b Old growth set at 45,000 acres outside of wilderness and roadless areas;

c Visual corridors reduced in both width and size of target trees,

d Even-aged timber management featured on most acres, and

e Uneven-aged management retained in riparian and foreground visual zones

Summary of Trade-offs Between Proposed and Fully-Developed Alternatives

Alternative Attributes	Proposed Alternative design by Management Emphasis			Detailed Alternative	
	Preferred-Plus	CMUA	GCC	B-Mod	C-Mod
Allowable Sale Quantity		(Decade 1)			
ASQ (MMCF/year)	45 3	34 1	23 8	44.0	25 5
ASQ (MMBF/year)	259 1	197 9	136 1	252 0	146 0
Land Allocation (acres, in 1000s)					
Even-Aged Timber Management Prescriptions	867 944	571 981	344 321	866 977	568.304
Uneven-Aged Timber Management Prescriptions	N/A	158 364	267.400	89.806	202 083
Visual Foreground Rx	64 247	65 776	136 828	57.335	133.990
Riparian Zone Harvest Rx	45 604	36 660	0	44.607	0
Roadless Area Retained	13 322	180 948	192 476	13 322	192 476
Total Old Growth Outside of Roadless/Wilderness	44 860	75 000	120 000	43 600	47.930

Benchmarks were developed to estimate resource and economic potentials (see discussion in Appendix B) with little or no consideration given to multiple use objectives or resolution of Forest issues While the benchmarks provided much useful information for the development of detailed alternatives, the formulation of the benchmarks themselves often precluded their consideration as alternatives The outputs and activities associated with the benchmarks were portrayed in Table II-2 and Figure II-1 earlier in this chapter.

The minimum level benchmark was eliminated from detailed study because it did not sufficiently address a wide enough range of uses in an acceptable fashion.

Maximum resource supply benchmarks (i.e., timber, range, big-game, anadromous fish) were eliminated from further study because they are not within the legal jurisdiction of the Forest Service Reaching the levels of biological potential of a single resource would violate the management standards in National Forest Management Act regulations (36 CFR 219 13) Furthermore, these single-resource benchmarks represent responses to single issues and do not achieve the greatest net public benefits over the long term.

The maximum present net value benchmarks were eliminated because nonpriced benefits were disregarded These benchmarks do not address the issues, nor do they satisfy the National Forest Management Act and the Multiple Use Sustained Yield Act. However, these benchmarks do provide a valuable comparison point of the present net value of the Forest.

b *Alternatives Considered in Detail*

The rest of this chapter describes the alternatives considered for the future management of the Malheur National Forest and compares those alternatives to each other. Each of these alternatives (except the No Change Alternative) is a technically and legally possible strategy for managing the Forest and provides a different way of addressing the planning topics The No Change Alternative does not meet some legal requirements. When considered in total, they provide a wide range of outputs, benefits, costs, and land management assignments

The alternatives presented in these documents contain specific management actions for the plan period The plan period is comprised of the next 10 to 15 years only (The plan period is defined by the NFMA regulations as one decade (36 CFR 219 3 1982), while the law permits a 15-year maximum (16 U S C 1604(f)(5)) Within the plan period, conditions on the Forest will be reanalyzed and a revised plan developed if conditions warrant it (36 CFR 219 10(g) 1982 and (16 U S C 1604(f)(5))

The projection of alternative effects and attributes beyond the 10- to 15-year plan period, although required by law, does not legally bind the Forest to action beyond the plan period The Forest is required to revise the plan within 15 years of its development and this revision may establish different long-term goals with different future projections

Management actions, outputs, and environmental and socioeconomic effects for several decades beyond the plan period are discussed for the alternatives The purpose of these discussions is twofold (1) To present a long-term analysis of the management necessary for each alternative to maintain a high level of periodic output of the various resources without impairment of land productivity (16 U S.C 531), and (2) to provide an estimate of long-term outputs by alternative and corresponding program development for the Forest and Rangeland Renewable Resources Act (Resources Planning Act) A complete estimate of outputs, costs, and effects for five decades is necessary for a Resources Planning Act program to link with actual conditions and local issues at the Forest level

c *Mitigation Common to All Alternatives*

Mitigating measures are the constraints, limitations, practices, and land-use assignments that serve to reduce, avoid, minimize, rectify, or compensate for adverse impacts of other management activities on the basic resources They also provide for different kinds of recreational opportunities. They range from the land assignments made in an alternative to special provisions which can be included in specific contracts or use permits This section describes the mitigating measures that are common to all alternatives

Each alternative includes measures to mitigate potentially adverse environmental effects Included are most of the Forest-wide standards and direction found in individual management areas Measures vary from specific to general Many mitigation measures will be implemented by incorporating them in permits and contracts for timber harvesting, construction, and other activities occurring on the Forest

Additional mitigating measures are found in various laws, regulations, and policy statements governing management of National Forest lands

Mitigation is an integral part of all management activities and is assumed when estimating environmental consequences The Forest-wide standards are an example of mitigating measures that apply to all activities on the Forest

Cultural resources are another resource for which management practices must be mitigated. Federal law requires that the National Register of Historic Places (significant cultural resource properties) be managed to protect their values Federal law also requires concurrence consultation with the Advisory Council on Historic Preservation and/or the State Historic Preservation Officer prior to executing a project or undertaking

There are several areas on the Forest that are excluded from all logging activity by a special land-use assignment They are the Cedar Grove, Tex Bridge, and Magone Lake Special Interest Areas, the Canyon Creek Research Natural Area, and the wildernesses

Other mitigating measures common to all alternatives include the Management Requirements (MRs), Best Management Practices (BMPs), and the use of timber sale contract provisions such as requiring that all skid trail locations be approved prior to any timber falling. See the Forest-wide standards for a more complete list of mitigating measures that apply to all alternatives.

Project-level monitoring (formal and informal, intensive and extensive) is the means used to ensure that mitigation is completed as prescribed and that it is effective.

d *Management Direction Common to all Alternatives*

This section describes the management direction common to all alternatives

Forage will be reserved for 100 head of wild horses on the Murderers Creek Wild Horse Territory in the South Fork John Day River area

The habitat on Aldrich Mountain, McClellan Mountain, and in the Strawberry Mountain Wilderness will be maintained for California bighorn sheep

Wintering habitat for bald eagles will be provided according to the Threatened and Endangered Species Act and the Pacific Northwest Bald Eagle Recovery Plan The American peregrine falcon will be introduced to the Strawberry Mountain Wilderness in accordance with the recovery plan, unless naturally occurring birds occupy the site in the next 3-5 years. Sensitive species and special habitats (such as cliffs, talus slopes, caves, raptor nest sites, bear dens, etc) will be protected under current management direction Areas of importance to native American Indians will be identified through consultation with native tribes, and roots, berries, and medicinal plants of importance will be maintained in these areas

Special areas on the Forest which will be maintained are Magone Lake Geological Area, Cedar Grove Botanical Area, Tex Bridge Geologic Site, Vinegar Hill - Indian Rock Scenic Area, and Canyon Creek Research Natural Area In addition, the Baldy Mountain candidate Research Natural Area would be recommended for designation in all alternatives except Alternative No Change McClellan Mountain and Antelope Valley would also be recommended as Research Natural Areas in all alternatives except Alternative NC and Alternative I

The Forest will provide for resource protection and the use of prescribed fire to protect, maintain, and enhance resource values in all alternatives All wildfires will receive an appropriate suppression response and will be suppressed at a minimum cost, consistent with land and resource management objectives Prescribed fire may be used to meet management objectives Normally, prescribed fire will be from planned human ignitions sources However, prescribed natural fire from unplanned ignitions (lightning) may be used in Wilderness and Roadless Areas when appropriate to let fire play its natural ecological role in these areas.

Future electronic communication facilities may be located on the following sites as needed. Aldrich, Antelope, Black Butte, Devine Ridge, Dixie Butte, Fall Mountain, Utley Mountain, Lake Butte, Long Creek Mountain, Pogue, Snow Mountain, and Thompson Butte

e *RequiredAlternatives*

Among the alternatives formulated are several that are required by regulation and National and Regional direction These alternatives were reviewed against public comments to the draft EIS and were thus carried forward as originally described, or modified to conform to regulation and direction, or they were eliminated from further consideration These alternatives are listed and briefly described here

No Action (Current Direction) This is the No Action Alternative required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502 14) and by the National Forest Management Act planning regulations (36 CFR 219 12(f)) This alternative would continue the management of the Malheur National Forest as defined by existing direction Alternative A is the No Action Alternative in this Environmental Impact Statement

No Change The "No Change" alternative has been developed in response to direction by the Chief of the Forest Service and Deputy Assistant Secretary Douglas MacCleery

regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The No Change Alternative is designed to represent the existing timber management plans and, consequently, does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA

Emphasis on Market Opportunities Alternative B-Modified is the alternative in this Environmental Impact Statement which emphasizes timber market opportunities for the Malheur National Forest. This alternative has an emphasis on timber outputs that have an established market price It does not greatly emphasize expenditures for other commodity or amenity outputs other than timber Management for other resources is at economically and environmentally feasible levels consistent with the emphasis on timber market-oriented outputs

Emphasis on Nonmarket Opportunities Alternative C-Modified is the alternative in this Environmental Impact Statement which emphasizes nonmarket opportunities This alternative places an emphasis on water, fish and wildlife, recreation, and other amenity values Management for other resources is at economically and environmentally feasible levels consistent with the emphasis on amenity values

Emphasis on Nondevelopment and Intensified Management (DEIS Alternative G) This alternative emphasizes retention of roadless areas, while using intensified management on those areas already roaded The purpose of this alternative is to retain many of the roadless areas on the Forest as undeveloped while increasing commodity production elsewhere Its purpose is to strive for high market value outputs in order to balance the economic effects of non-commodity emphasis in roadless areas This alternative was considered in the DEIS, but is not carried forward in this Final EIS

Emphasis on Current Resources Planning Act Program This alternative determines how the current (1980) Resources Planning Act Program, distributed to the Forests in the Pacific Northwest Regional Guide, can best be implemented Alternative B places emphasis on outputs that have an established market price (timber, livestock, forage, commercial fish and minerals) This alternative was considered in the DEIS, but is not carried forward as the RPA Alternative in this Final EIS Alternative B-Modified is the alternative which displays the emphasis on the timber production portion for the current Resources Planning Act program

Additional alternatives were formulated to reflect a broad range of public issues, management concerns, and resource use and development opportunities These alternatives respond to 36 CFR 219 12(f)(1) which requires alternatives to be distributed between the minimum resource potential and the maximum resource potential to display the full range that a Forest could produce In this fashion, Alternatives F and I were formulated to meet these criteria

The selection of the Preferred Alternative was made only after receiving and analyzing public and organization comments regarding the resource outputs, environmental effects, implementation costs, and the mix of uses among them The Preferred Alternative is that alternative which was selected from all those formulated as the one which best maximized the net public benefits in an environmentally sound manner After the Forest Supervisor reviewed the interdisciplinary team's evaluation, and after the Regional Forester and his staff reviewed the alternatives, the Preferred Alternative was selected as the alternative that would produce the greatest net public benefits to society, while responding effectively to the issues

Alternative I is the Preferred Alternative in this Final Environmental Impact Statement Following public review and comment on the Draft Environmental Impact Statement, it became apparent that a new alternative would better maximize net public benefits With this in mind, Alternative I (Preferred) has been developed

Information in the following description of alternatives is intended to highlight the most significant features of each alternative. A more-comprehensive understanding of alternatives requires study of other portions of this chapter and Chapter IV, particularly where the outputs and effects related to environmental consequences are described

As you review these alternatives, it may be helpful to refer to the accompanying maps of the alternatives These maps display the location of the management areas and a brief description of each management area The acreage assigned to each management area in the alternatives is displayed in Table II-4 (p. 93), which displays a hierarchical means for acre allocations with no acre overlap

6. Alternative Descriptions

a *Alternative NC (No Change)*

The "No Change" alternative has been developed in response to direction by the Chief of the Forest Service and Deputy Assistant Secretary Douglas MacCleery regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on direction by Regional Forester James F Torrence to "require inclusion of (Minimum Management Requirements) in the Current Direction 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 the Forest Plan Environmental Impact Statements. The No Change Alternative is designed to represent the existing timber management plans and, consequently, does not comply with all provisions of the National Forest Management Act (NFMA) and regulations promulgated by the Secretary of Agriculture to implement NFMA. The following provisions of NFMA or other laws or regulations are not partially or fully complied with in current management plans represented by the No Change Alternative.

CFR 219 14 - Timber resource land suitability Requires identification of land not suited for timber production based on risk of irreversible resource damage, lack of assurance of reforestation within five years, or withdrawal by Act of Congress, Secretary of Agriculture, or Chief of the Forest Service

CFR 219 16 - Timber resource sale schedule Requires determination of the quantity of timber that may be sold during each decade Requires calculation of the long-term sustained yield capacity

CFR 219.27(c)(1) - Management Requirements, silvicultural practices Requires that no timber harvesting shall occur on lands classified as not suited for timber production pursuant to CFR 219.14, except for salvage sales, sales necessary to protect other multiple use values or activities that meet other objectives on such lands if the forest plan objectives establish that such actions are appropriate

The No Change Alternative could not be implemented or used in future management of the Forest under the Forest Plan without Congressional and/or Secretary of Agriculture action to change the law or regulations

Timber Management The timber management goal is to grow moderate size trees 19-inch diameter and larger) while emphasizing rapid fiber growth rates. A full range of timber management intensities would be made available to 1,116,577 acres to meet this goal. 59 percent of this land would be managed for full yield and 41 percent for 50 to 90 percent of full yield. First decade potential yield in Alternative NC would be 269 7 million board feet annually. This is about 42 million board feet above 1980-89 average annual sell levels Potential yield is the sustainable output of wood fiber available after the needs of other Forest uses have been deducted from the biological potential

Range Management The range management goal is to provide sufficient forage to support 126,150 animal unit months annually Specific management direction regarding how to meet this goal is not available.

Recreation The recreation management goal is to emphasize dispersed, roaded recreation opportunities with sufficient recreation opportunities in both unroaded and developed settings to meet expected demand Unroaded recreation opportunities outside wilderness would be provided in five currently unroaded areas encompassing 54,167 acres Wilderness acres would remain at the level they are today, 81,320 acres These areas would be managed under provisions in the Wilderness Act of 1964 and subsequent legislation

Virtually all remaining Forest land is managed to provide opportunities for roaded recreation. Management activities are modified on 66,720 acres along visually sensitive travel routes, as described in the Timber Resource Management Plan.

Riparian Area Management and Fisheries Habitat The riparian and fisheries management goal is to manage all riparian areas to meet State water quality standards, which will maintain viable populations of resident fish and maintain anadromous fish habitat at or above current capability

Wildlife Habitat The wildlife habitat management goal is to manage all wildlife emphasis areas to benefit associated wildlife species.

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species in areas assigned to wildlife emphasis and 40 percent in timber and range emphasis areas Snag replacement trees were not a part of the design in the Timber Resource Management Plan, and hence would not be provided

Old-Growth Forest The old-growth management goal is to provide old-growth habitat for dependent species On those areas available for programmed timber harvest, 123,587 acres of potential old-growth habitat would be managed under a 260-year rotation using a three-tier system to maintain approximately one-third of this area in old growth An additional 64,027 acres of old growth would be provided in wilderness, roadless areas, and bald eagle winter roosts

Management of Undeveloped Areas The undeveloped area management goal is to maintain, in a roadless condition, key roadless areas identified during the unit planning process (McClellan Mountain, North Fork Malheur River, Malheur River, Glacier Mountain, and Greenhorn Mountain) These areas would be managed using boundaries shown in unit plans The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 54,167 acres. The Pine Creek Further Planning Area would be assigned to timber and range management emphasis, however, timber management would be deferred

Mitigation Measures Alternative NC provides management direction for wildlife, roadless areas, and scenic travel corridors

Within the acreage available for timber production, old-growth habitat areas will be managed for dependent wildlife species In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

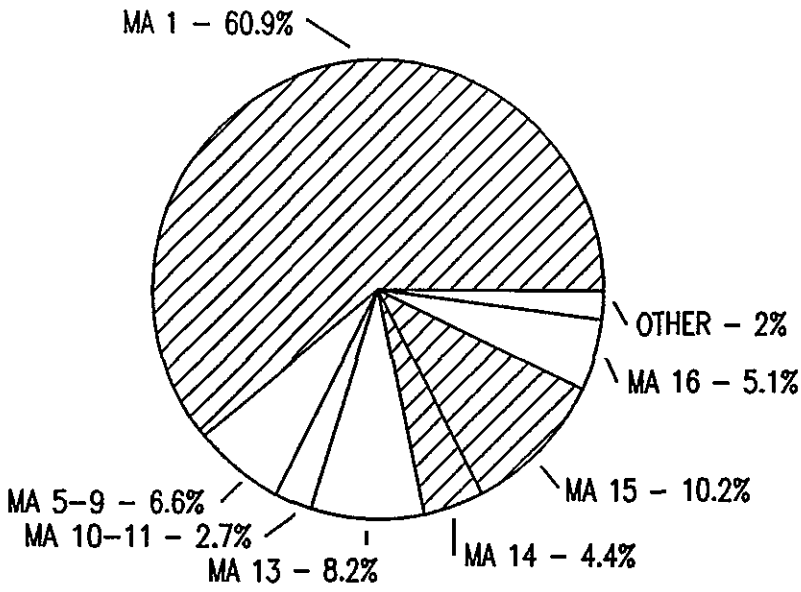
To maintain viable populations of cavity-excavating species which in turn provide habitat for other species, snags would be managed to provide habitat for at least 40 percent of the potential population in timber and range emphasis areas, and at least 60 percent in wildlife emphasis areas In addition, dead trees would be left to fall across streams to produce fish-rearing pools

Alternative NC includes 54,167 acres of roadless areas managed to provide a scenic or semiprimitive, nonmotorized recreational opportunity Timber harvesting, road construction, and motor vehicles of any kind would be prohibited in these areas. These areas, along with the 81,320 acres of wilderness, would provide places for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing would be modified on 66,720 acres of land that occur along visually sensitive travel routes These foreground viewing areas would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery.

Figure II-2 represents the percent of land in various management areas in Alternative NC. The acres by management area are displayed in Table II-4.

FIGURE II-2: Management Areas for Alternative NC (Percents)



b *Alternative A (No Action)*

Alternative A was developed to continue implementation of the management direction provided by the existing land management plans (John Day, Silvies-Malheur, and South Fork Unit Plans) and the Timber Resource Management Plan updated to meet current laws and regulations This includes compliance with Management Requirements (MRs) and National Forest Management Act provisions and regulations. This alternative provides an estimate of the activities and outputs likely to occur if management were to continue under existing direction The goal of these plans is to intensively manage the timber resource coordinated with nonintensive management of recreation and wildlife

Alternative A serves as the No Action Alternative required by the National Environmental Policy Act of 1969

Timber Management The timber management goal of this alternative is to grow moderate size trees (17-inch diameter and larger) while emphasizing rapid fiber growth rates Ponderosa pine would be emphasized on approximately 311,111 acres, and mixed conifer species emphasized on approximately 531,177 acres A full range of timber management intensities would be made available to 967,327 acres Of these available acres, 898,424 acres are deemed suitable for timber harvest Of the suitable land, 86 percent would be managed for full yield, 4 percent for 50 to 90 percent of full yield, and 10 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative A would be 232 7 million board feet annually This is about 4 million board feet above 1980-89 average annual sell levels

Range Management The range management goal is to sustain permitted range use levels. Full utilization of forage by livestock would be encouraged Seeding would be done on some forested land after timber harvest to increase existing livestock forage production Livestock and big game may consume 50 percent of the annual growth of *forage on uplands in this alternative*

Recreation The recreation management goal is to emphasize dispersed, roaded recreation opportunities with sufficient recreation opportunities in both unroaded and developed settings to meet expected demand

Unroaded recreation opportunities outside wilderness would be provided in 6 currently unroaded areas encompassing 59,179 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use (sanitation facilities only would be provided) Management activities would be modified on 249,591 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat Improvement in resident trout habitat would generally be achieved through a gradual improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work would generally be for mitigation only This would be done on approximately 3 miles of stream per year

Livestock and big game would be allowed to consume 70 percent of the annual growth of grass forage and 67 percent of the annual shrub growth in riparian areas In addition to approximately 3 miles of lower intensity instream structural work done as mitigation, more intensive instream habitat improvements would be applied at a rate of about 2 miles per year in anadromous streams

Wildlife Habitat The big-game habitat management goal is to manage elk summer range and wildlife emphasis areas via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres). A specific goal is to manage all elk winter range for an optimal mix and distribution of forage and cover in unit plan wildlife emphasis areas Satisfactory big-game cover would be retained at a minimum of approximately 10 percent in general forest allocations (where possible)

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species in areas assigned to wildlife emphasis and 40 percent in timber and range emphasis areas Replacement snag habitat would be provided.

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur. It would include burning, seeding and planting to improve forage conditions Also included would be snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands Habitat enhancement would occur at a low level.

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at or above their minimum viable population levels. Total old-growth habitat provided would be 104,661 acres, with 40,800 acres on timber producing lands outside wilderness, roadless areas, and bald eagle winter roosts

Management of Undeveloped Areas The undeveloped area management goal is to maintain, in a roadless condition, key roadless areas identified during the unit planning process (McClellan Mountain, North Fork Malheur River, Malheur River, Glacier Mountain, Greenhorn Mountain, and Pine Creek) These areas would be managed using boundaries shown in unit plans. The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 59,179 acres. The Pine Creek Further Planning Area would not be recommended for wilderness designation, but would be retained as a roadless area.

Research Natural Areas: The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing Research Natural Area Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley.
Mitigation Measures Alternative A provides management direction for wildlife, roadless areas, and scenic travel corridors.

Within the acreage available for timber production, enough old-growth habitat areas would be dedicated to maintain the dependent wildlife species at or above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels.

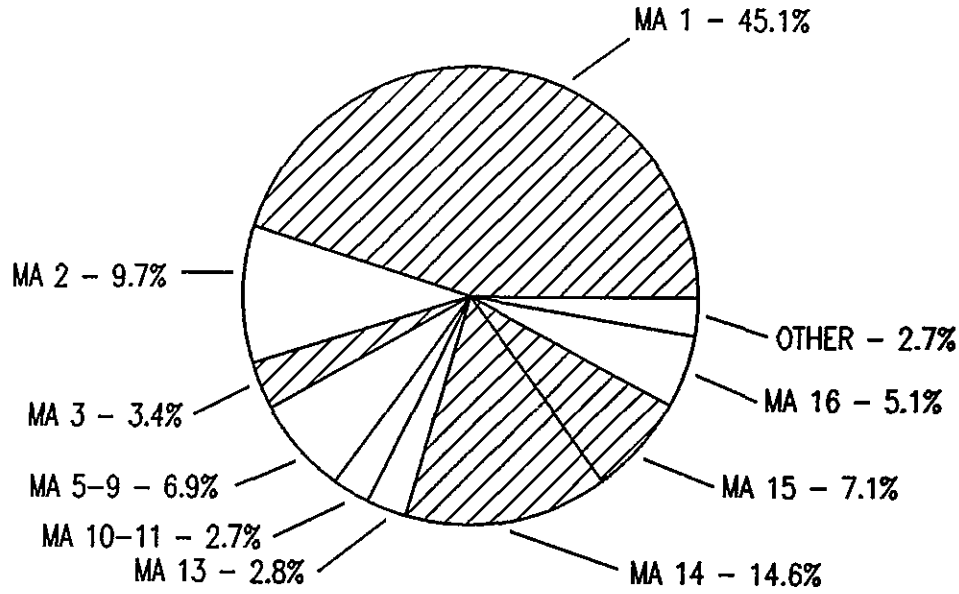
To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 40 percent of the potential population in timber and range emphasis areas, and at least 60 percent in wildlife emphasis areas In addition, dead trees along stream courses would be left to fall across streams to produce fish-rearing pools

Alternative A includes 59,179 acres of roadless areas managed to provide a semiprimitive, Non-Motorized recreational opportunity Timber harvesting, road construction, and motor vehicles of any kind would be prohibited in these areas These areas, along with the 81,320 acres of wilderness, would provide places for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing would be modified on 249,591 acres of land that occur along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery.

Figure II-3 represents the percent of land in various management areas in Alternative A. The acres by management area are displayed in Table II-4.

FIGURE II-3: Management Areas for Alternative A (Percents)



c *Alternative B-Mod (DEIS Alternative B as Modified to Incorporate Preferred - Plus Alternative)*

Alternative B-Modified emphasizes the production of resources such as timber, developed recreation, minerals, and most other resources which have the potential to return revenue to the U S. Treasury and local counties Management of other resources is at economically and environmentally feasible levels that are consistent with the overall emphasis on market-oriented outputs

Alternative B-Modified also attempts to meet the 1980 Resources Planning Act program output targets assigned to the Forest for timber production through the Pacific Northwest Regional Guide

Timber Management The timber management goal of this alternative is to grow moderate size trees (17-inch diameter and larger) while meeting Resources Planning Act program targets for the first 50 years and emphasizing rapid fiber growth by utilizing later successional timber species Ponderosa pine would be emphasized on approximately 316,152 acres and mixed conifer species on approximately 580,632 acres A full range of timber management intensities would be made available to 987,088 acres to meet this goal Of these available acres 956,783 acres are deemed suitable for timber harvest Of the suitable land, 91 percent would be managed for full yield, 4 percent for 50 to 90 percent of full yield, and 5 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative B-Modified would be 265 9 million board feet annually. This is about 38 million board feet above 1980-89 average annual sell levels

historic use levels Utilization of forage by livestock would be encouraged. Seeding would be done annually on both forested and nonforested rangeland to optimize forage for cattle. Livestock and big game may consume 50 percent of the annual growth of forage on uplands in this alternative

Recreation. The recreation management goal is to emphasize recreation in a roaded modified setting.

Unroaded recreation opportunities outside wilderness would be provided in the 13,322 acres of the Vinegar Hill-Indian Rock Scenic Area Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 61,830 acres managed for semiprimitive wilderness opportunities and 6,870 acres managed as primitive trailless Unroaded recreation opportunities would also be available in 3066 acres of the Malheur River designated as wild under the Oregon Omnibus Wild and Scenic Rivers bill

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation. Of the 25 existing campgrounds, 11 would be managed as developed sites. The remaining campgrounds would be managed for dispersed use Management activities would be modified on 199,913 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat Improvement in resident trout habitat would generally be achieved through improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work on about 3 miles of stream per year would generally be for mitigation only

In riparian areas, livestock and big game may consume 45 percent of the annual growth of grass forage and 40 percent of the annual shrub growth in this alternative Livestock use would be limited on streamside forage along about 70 miles of anadromous streams with riparian areas in less than desired condition, for a period of time to accelerate riparian improvement in these areas In addition to approximately 3 miles of lower intensity instream structural work as mitigation, more intensive instream habitat improvements in anadromous streams would be applied at a rate of about 3 miles per year

Wildlife Habitat· The big-game habitat management goal is to manage elk summer and winter range via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres). Winter range would be managed to provide a mix and distribution of forage and cover Three of the elk winter ranges would receive intensive timber management Satisfactory big-game cover would be retained at a minimum of 5 percent in both summer and winter ranges across the forest.

Snag habitat would be retained to support 40 percent of the potential population of cavity-dwelling species Forest-wide In riparian areas and areas immediately adjacent to riparian areas snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively Snag replacement habitat would also be provided at the same levels

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur It would include burning, seeding and planting to improve forage It will also include snag creation, leaving of dead and down woody material, and rehabilitating decadent aspen stands Habitat enhancement would occur at a low level

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at or above their minimum viable population levels Total old-growth habitat provided after decade 5 would be limited to 90,509 acres, with 43,600 acres on timber-producing lands outside wilderness, roadless areas, and bald eagle winter roosts

Management of Undeveloped Areas The undeveloped area management goal is to maintain, in a roadless condition, the Vinegar Hill-Indian Rock Scenic Area and wild portion of Malheur River The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 13,322 acres The Pine Creek Further Planning Area would not be recommended for wilderness and is assigned to other resource emphases

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing Research Natural Area Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures Alternative B-Modified provides management direction for wildlife, roadless areas, riparian areas, and scenic travel corridors

Within the acreage available for timber production, enough old-growth habitat areas would be dedicated to maintain the dependent wildlife species at or above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas, with a Forest-wide objective of 40 percent In addition, dead trees along stream courses would be left to fall across streams to produce fish-rearing pools

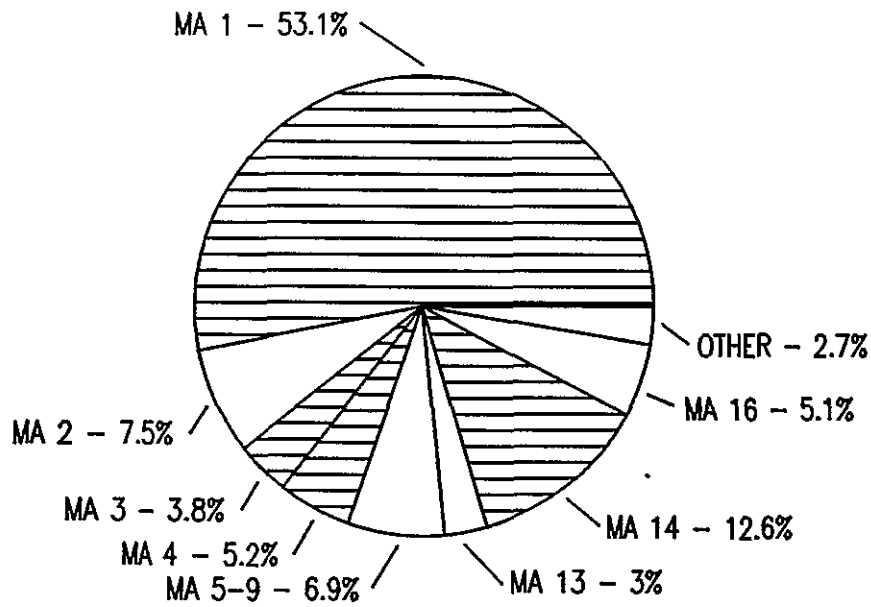
Alternative B-Modified includes the 13,322 acre Vinegar Hill-Indian Rock Scenic Area (part of the Greenhorn Mountain roadless area) that has been designated as semiprimitive motorized Timber harvesting, road construction, and motor vehicles (other than snowmobiles) would be prohibited in this area This area, along with the 81,320 acres of wilderness, would provides a place for the Forest visitor to get away from the sounds and sights of human activity

Logging activities, road construction, and grazing are modified on another 199,913 acres of land that occurs along visually sensitive travel routes These viewsheds will be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Alternative B-Modified mitigates the impacts of livestock grazing on riparian areas along anadromous streams that are in unsatisfactory condition Livestock grazing will be reduced or eliminated for a period of time to allow the riparian vegetation and streambanks to improve to an acceptable level Once recovered, the riparian areas will be managed to maintain an acceptable condition

Figure II-4 gives a representation of the percent of land in various management areas in Alternative B-Modified The acres by management area are displayed in Table II-4

FIGURE II-4: Management Areas for Alternative B-Modified (Percents)



d. *Alternative C-Mod (DEIS Alternative C Modified to Incorporate Grant County Conservationist and Citizens Multiple Use Alternatives)*

Alternative C-Modified assigns all current roadless areas outside existing wilderness to a management prescription which will maintain their roadless status It also emphasizes the protection of natural scenery, fish and wildlife habitat, and other amenity values Management of other resources would be at economically and environmentally feasible levels consistent with the overall emphasis on amenity values.

Timber Management The timber management goal is to grow large-size ponderosa pine trees (26-inch diameter and larger), utilizing both even-aged and uneven-aged management systems. Timber management would favor perpetuation of ponderosa pine across the Forest where biologically possible Ponderosa pine would be emphasized on approximately 481,783 acres, and mixed conifer species emphasized on approximately 245,470 acres A range of timber management intensities emphasizing production of large-size ponderosa pine trees would be made available to 831,340 acres to meet this goal. Of these available acres, 770,387 acres are deemed suitable for timber harvest. Of the suitable land, 35 percent would be managed for full yield, 54 percent for 50 to 90 percent of full yield, and 11 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative C-Modified would be 154 0 million board feet annually This is about 74 million board feet below 1980-89 average annual sell levels

Range Management: The range management goal is to allow range use where it does not conflict with the amenity orientation of this alternative Grasses, forbs, and other forage would be managed to provide forage for both livestock and big game Livestock

and big game would be allowed to consume 50 percent of the annual growth of forage on uplands

Recreation The recreation management goal is to emphasize unroaded recreation opportunities

Unroaded recreation opportunities outside wilderness would be provided in all currently unroaded areas encompassing 175,416 acres (including 3,066 acres of the wild portion of the Malheur River). Wilderness acreage would increase to 86,740 acres. Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities. Strawberry Mountain Wilderness would have 61,830 acres managed as primitive trailed wilderness and 6,870 acres managed as primitive trailless. Pine Creek roadless area would be recommended for wilderness and managed for semiprimitive wilderness recreation opportunities In addition, roughly 17,100 acres would be added to the RARE II areas to make more manageable boundaries.

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 11 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 307,819 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and improve anadromous and resident fish habitat. No timber harvest would be scheduled for Class I, II and III stream riparian zones Improvement in resident and anadromous fish habitat would be achieved through improved livestock management adjacent to streams and a moderate level of instream improvements

No scheduled timber harvest will occur in riparian areas Livestock and big game may consume 45 percent of the annual growth of grass forage and 40 percent of the annual shrub growth in this alternative Livestock use would limited for a period of time on pastures adjacent to riparian areas in less than desired condition to allow improvement of these areas Instream improvements would be applied at a rate of about 5 miles per year

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range (maintenance and enhancement) via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres). All elk winter range would be managed to enhance forage production and provide an optimum mix and distribution of forage and cover. The carrying capacity of five of the elk winter ranges would be enhanced Livestock use would be limited to 25 percent of the forage available in these 5 winter range areas Satisfactory big-game cover would be retained at a minimum of 15 percent in both summer and winter ranges (where possible).

Snag habitat would be retained to support 60 percent of the potential population of cavity-dwelling species Forest-wide In riparian areas and areas immediately adjacent to riparian areas, snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively Snag replacement habitat would also be provided at these levels

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur. Habitat enhancement would occur at moderate-to-high levels It would include burning, seeding and planting to improve forage It will also include snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands.

This alternative would meet Oregon State Fish and Wildlife management objectives

Old-Growth Forest: The old-growth management goal is to provide sufficient habitat to maintain dependent species at 50 percent or more above their minimum viable population levels. After decade 5, total old-growth habitat provided would be limited to 178,761 acres, with 47,930 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas.

Management of Undeveloped Areas The undeveloped area management goal is to maintain all existing roadless areas in a roadless condition

Unroaded recreation opportunities outside wilderness would be maintained at approximately 193,064 acres. Boundaries would be those used in the RARE II process, with modifications in several areas The Pine Creek Further Planning Area would be recommended for wilderness designation

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing Research Natural Area Three candidate RNAs would be identified for the Forest, one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures Alternative C-Modified provides management direction for wildlife, roadless areas, riparian area improvement, insect-resistant stands, and scenic travel corridors.

Within the acreage available for timber production, old-growth habitat areas would be dedicated to maintain the dependent wildlife species at 50 percent or more above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas for a Forest-wide objective of 60 percent Dead trees which fall across streams would also be left to produce fish-rearing pools

The risk of a western spruce budworm epidemic in the mixed conifer stands is mitigated by silvicultural prescription These stands would receive a regeneration cut and would be planted with ponderosa pine

Livestock grazing would be mitigated on five of the inventoried elk winter ranges with an enhancement strategy Of the available grass and grass-like forage, 75 percent would be allocated to big game Other management activities which would enhance elk winter range, such as burning, seeding, or shrub restoration, would be implemented to maintain quality forage

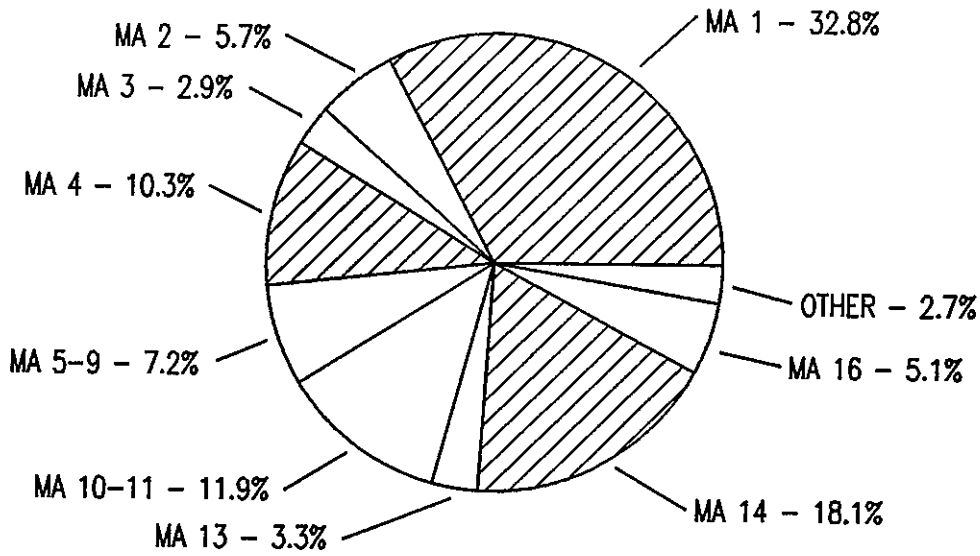
Effects of timber management activities such as logging and road construction would be mitigated in Alternative C-Modified with roughly 192,500 acres of roadless areas. There are two kinds of roadless areas planned There would be about 119,479 acres of roadless areas that will provide semiprimitive, nonmotorized recreation Timber harvesting, road construction, and motorized vehicles of any kind would be prohibited in these areas These areas, along with 86,740 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human presence There would also be 73,037 acres which would provide semiprimitive motorized recreation Timber harvesting and road construction would be prohibited in these areas, while motorized vehicles would be permitted and trails can be constructed to provide for Forest visitors who enjoy motorized recreation in a semiprimitive setting

Logging activities, road construction, and grazing would be modified on 307,819 acres of land that occur along visually sensitive travel routes These visual zones would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Alternative C-Modified mitigates the impacts of livestock grazing on riparian areas in unsatisfactory condition Livestock grazing would be reduced for a period of time to allow riparian vegetation and streambanks to improve to an acceptable level Once recovered, the riparian areas would be managed to maintain an acceptable condition

Figure II-5 gives a representation of the percent of land in various management areas in Alternative C- Modified The acres by management area are displayed in Table II-4

FIGURE II-5: Management Areas for Alternative C-Modified (Percents)



e. *Alternative F (Preferred Alternative in DEIS)*

Alternative F emphasizes market-oriented outputs while providing for a moderate level of amenity features in land allocations To balance the economic effects of amenity features outside of unroaded areas, commodity production is featured on a majority of the currently unroaded areas tentatively suited for timber production

Timber Management The timber management goal is to grow moderate-size trees (17-inch diameter and larger) while emphasizing fiber production on a majority of the productive true fir sites Ponderosa pine would be emphasized on approximately 311,202 acres, and mixed conifer species emphasized on about 552,790 acres A full range of timber management intensities would be made available to 951,028 acres to meet this goal Of these available acres, 919,748 acres are deemed suitable for timber harvest Of the suitable land, 88 percent would be managed for full yield, 4 percent for 50 to 90

percent of full yield, and 8 percent for less than 50 percent of full yield First decade annual timber harvest in Alternative F would be 246 6 million board feet annually. This is about 18 million board feet above 1980-89 average annual sell levels

Range Management The range management goal is to maintain permitted range use levels with some reduction to improve riparian areas in unsatisfactory condition. Full utilization of forage will be encouraged Livestock and big game would be allowed to consume 50 percent of the annual growth of forage on uplands

Recreation: The recreation management goal is to emphasize dispersed, roaded recreation opportunities with a moderate level of unroaded and developed recreation opportunities.

Unroaded recreation opportunities outside wilderness would be provided in 7 currently unroaded areas encompassing 66,962 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acres would remain at the level they are today, 81,320 acres. Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation. Of the 25 existing campgrounds, 11 would be managed as developed sites. The remaining campgrounds would be managed for dispersed use Management activities would be modified on 204,215 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat. Improvement in resident trout habitat would generally be achieved through improvement in riparian condition rather than by habitat improvement work occurring in the stream itself Structural habitat improvement work on about 3 miles of stream per year would generally be for mitigation only.

In riparian areas in good condition, livestock and big game would be targeted to consume 45 percent of the annual growth of grass forage and 40 percent of annual shrub growth In riparian areas in less than desired condition (approximately 60,000 acres of land containing approximately 2,000 acres of anadromous riparian areas), livestock would be targeted to consume 0-40 percent of the annual growth of grass forage. In addition to approximately 3 miles of lower intensity instream structural work as mitigation, more intensive instream habitat improvements would be applied at a rate of about 2 miles per year in anadromous streams

Wildlife Habitat· The big-game habitat management goal is to manage elk summer and winter range areas via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) Elk winter range would be managed to provide an optimum mix and distribution of forage and cover Satisfactory big-game cover would be retained at a minimum of 5 percent for both summer and winter ranges across the forest

Snag habitat would be retained to support an average of at least 40 percent of the potential population of cavity-dwelling species Forest-wide. In riparian areas, and areas immediately adjacent to riparian areas snag habitat would be retained to support 80 percent and 50 percent of the potential population of cavity-dwelling species, respectively. Commercial Forest lands outside riparian would be managed at the 40 percent level. Snag replacement trees would be provided to maintain these levels of habitat through time.

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur. Habitat enhancement would occur at a low-to-moderate level. It would include burning, seeding and planting to improve forage. It

will also include snag creation, leaving dead and down woody material, and rehabilitating decadent aspen stands

Old-Growth Forest The old-growth management goal is to provide sufficient habitat to maintain dependent species at 30 percent or more above their minimum viable population levels Total old-growth habitat remaining after decade 5 would be 121,042 acres, with 50,090 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas

Management of Undeveloped Areas The undeveloped area management goal is to maintain in a roadless condition Aldrich, McClellan Mountain, Malheur River, North Fork Malheur River, Glacier Mountain, Myrtle-Silvies, and Greenhorn Mountain areas utilizing manageable boundaries The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 66,962 acres The Pine Creek Further Planning Area would not be recommended for wilderness designation but is assigned to other resource emphases

Research Natural Areas The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing Research Natural Area Three candidate RNAs would be identified for the Forest one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are McClellan Mountain and Antelope Valley

Mitigation Measures Alternative F provides management directions for wildlife, roadless areas, riparian area improvement, and scenic travel corridors

Within the acreage available for timber production, sufficient old-growth habitat would be dedicated to maintain the dependent wildlife species at 30 percent or more above their minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

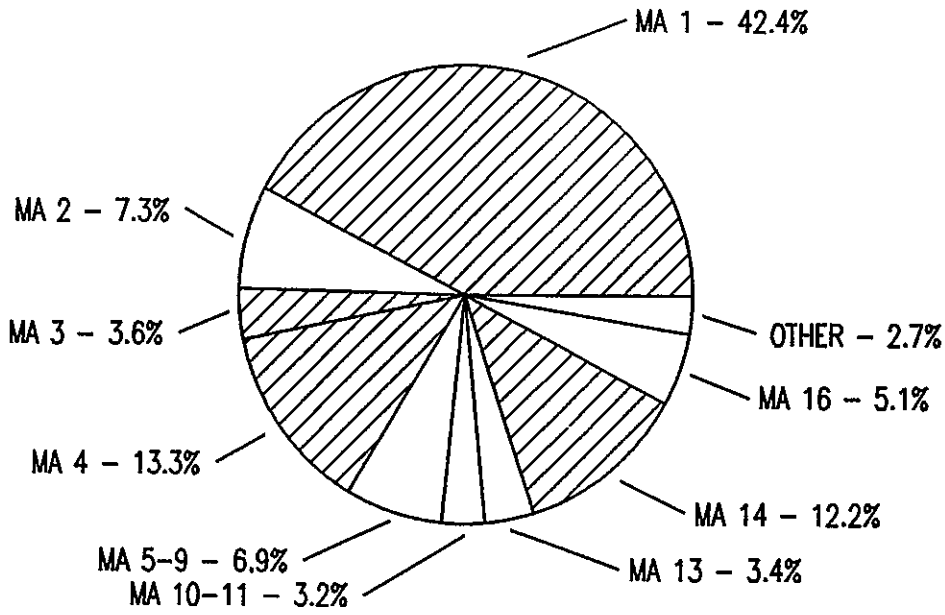
To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 80 percent of the potential population in riparian areas and 50 percent of potential populations immediately adjacent to riparian areas for a Forest-wide objective of around 40 percent. Dead trees along stream courses which fall across streams would be left to produce fish-rearing pools

Effects of timber management activities, such as logging and road construction, are mitigated in Alternative F with 66,962 acres of roadless areas Two kinds of roadless areas are planned. There would be 50,949 acres of roadless areas that would provide semiprimitive, nonmotorized recreation Timber harvesting, road construction, and motorized vehicles of any kind would be prohibited in these areas These areas, along with 81,320 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human presence There are 16,013 acres which would provide semiprimitive, motorized recreation Timber harvesting and road construction would be prohibited in these areas while allowing for motorized vehicles and trail construction to provide for Forest visitors that enjoy motorized recreation in a semiprimitive setting

Logging activities, road construction, and grazing would be modified on 204,215 acres of land that occur along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Figure II-6 gives a representation of the percent of land in various management areas in Alternative F The acres by management area are displayed in Table II-4

FIGURE II-6: Management Areas for Alternative F (Percents)



f *Alternative I (Preferred Alternative)*

Alternative I features a range of land uses between amenity values and commodity production emphasis This alternative reduces harvest in riparian zones, features uneven-aged management on roughly 30 percent of the suitable timber lands, and intensifies regeneration harvests where severe insect and disease agents have recently occurred Approximately one-half of unroaded areas remain unroaded

Timber Management The timber management goal is to grow a range of moderate-size trees (18-inch diameter and larger) while emphasizing the conversion of mixed conifer stands to ponderosa pine in order to produce harvest volumes of 60 to 70 percent ponderosa pine in future decades Ponderosa pine would be emphasized on approximately 454,388 acres, and mixed conifer species emphasized on approximately 330,829 acres. A full range of timber management intensities would be made available to 905,151 acres to meet this goal Of these available acres 835,970 acres are deemed suitable for timber production Of the suitable land, 56 percent would be managed for full yield, 39 percent for 50 to 90 percent of full yield, and 5 percent for less than 50 percent of full yield Heavily defoliated and slow-growing, diseased mixed conifer stands would be scheduled for regeneration harvest in the first decade In Alternative I, first decade timber sale program quantity and annual timber harvest would be 211 million board feet annually This is about 17 million board feet below the 1980-89 average annual sell levels

Range Management The range management goal is to maintain permitted range-use levels with some reduction occurring to improve anadromous riparian areas in unsatisfactory condition Full utilization of forage would be encouraged Livestock and big game would be allowed to consume 50 percent of the annual growth of forage on uplands

Recreation. The recreation management goal is to emphasize dispersed, roaded recreation opportunities with moderately high levels of unroaded and developed recreation opportunities

Unroaded recreation opportunities outside wilderness would be provided in 8 currently unroaded areas encompassing 79,854 acres (including 3,066 acres of the wild portion of the Malheur River) Wilderness acres would remain at the level they are today, 81,320 acres Monument Rock Wilderness would be managed for semiprimitive wilderness recreation opportunities Strawberry Mountain Wilderness would have 8,244 acres in the lakes basin managed for semiprimitive wilderness opportunities, 53,586 acres managed as primitive trailed wilderness, and 6,870 acres managed as primitive trailless

Virtually all the remainder of the Forest would be managed to provide opportunities for roaded recreation Of the 25 existing campgrounds, 20 would be managed as developed sites The remaining campgrounds would be managed for dispersed use Management activities would be modified on 225,953 acres along visually sensitive travel routes

Riparian Area Management and Fisheries Habitat The riparian and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve fish habitat Habitat improvement will be achieved with a combination of riparian area improvement and structural habitat improvement Improvement in the abundance and diversity of riparian vegetation, with the associated geomorphic recovery of the stream channel, will account for the larger part of the expected increase in fish habitat capability over time Structural work will be done to accelerate this riparian improvement as well as to provide direct habitat improvement Habitat improvement work will be applied at a rate of about four miles per year Forest-wide Priority for appropriated funds for this work will go to anadromous streams Fish habitat improvement will also be funded with K-V funds generated by timber sale receipts

In riparian areas in a condition to meet the needs of riparian-dependent resources, the forage utilization objective will generally be no more than 45 percent for grasses and 40 percent for shrubs (for livestock and big game combined) Utilization standards may

vary based on site-specific standards in allotment management plans. In riparian areas not in a condition to meet the needs of riparian-dependent resources, such as areas with unstable banks, lowered water table, or a lack of stream surface shade, forage utilization will generally be restricted to 0-35 percent of the annual growth of grass forage and 0-30 percent of annual growth on shrubs Again, standards may vary depending on the specific interdisciplinary objectives of the allotment management plan

Wildlife Habitat The big-game habitat management goal is to manage elk summer and winter range, and wildlife emphasis areas, via a Habitat Effectiveness Index (HEI) model developed for the Blue Mountains, applied on a subwatershed basis (3,000-15,000 acres) Satisfactory big-game cover would be retained at a minimum of 10 percent in winter ranges (where possible), 10 to 15 percent in summer ranges, and at 15 percent in Wildlife Emphasis areas

Snag habitat would be retained to support 40 percent of the potential of cavity dwelling species Forest-wide. In riparian areas, snag habitat would be retained to provide 60 percent of potential, 60-100 percent in wildlife emphasis areas, and at or near natural levels in wilderness areas, Research Natural Areas, the Scenic Area, bald eagle winter roosts, and dedicated old-growth areas Snag replacement habitat trees would also be provided to maintain these levels into the future

Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource would occur Habitat enhancement would occur at a moderate level It would include burning, seeding and planting to improve forage. It would also include snag creation, retention of dead and down woody material, and rehabilitating decadent aspen stands

Old-Growth Forest: The old-growth management goal is to provide sufficient habitat to maintain dependent species at 30 percent or more above their minimum viable population levels Total old-growth habitat provided would be on approximately 121,042 acres, with 47,690 acres on timber-producing lands outside wilderness, bald eagle winter roosts, and roadless areas In addition, there would be approximately 25,000 acres of old-growth replacement stands that would facilitate that old growth conditions are ensured well into the future.

Management of Undeveloped Areas: The undeveloped area management goal is to maintain in a roadless condition Aldrich, McClellan Mountain, North Fork Malheur River, Malheur River, Glacier Mountain, Myrtle-Silvies, Greenhorn Mountain and Shaketable areas utilizing manageable boundaries The remaining roadless areas would be assigned to other resource emphases

Unroaded recreation opportunities outside wilderness would be provided on 79,854 acres The Pine Creek Further Planning Area would not be recommended for wilderness designation but would be assigned to other resource emphases

Research Natural Areas: The Research Natural Area (RNA) management goal is to preserve the established areas as examples of naturally occurring ecosystems in unmodified conditions for research and education Canyon Creek is the only existing Research Natural Area. Four candidate Research Natural Areas would be identified for the Forest; one is located in the Strawberry Mountain Wilderness (Baldy Mountain), and the others are Shaketable Mountain and Dixie Butte, and Dugout Creek

Mitigation Measures: Alternative I provides management direction for wildlife, roadless areas, riparian area improvement, insect-resistant stands, and scenic travel corridors.

Within the acreage available for timber production, old-growth habitat areas would be dedicated to maintain the dependent wildlife species at 30 percent or more above their

minimum viable level In areas that have no programmed harvest, the dependent species would be present at or near their maximum population levels

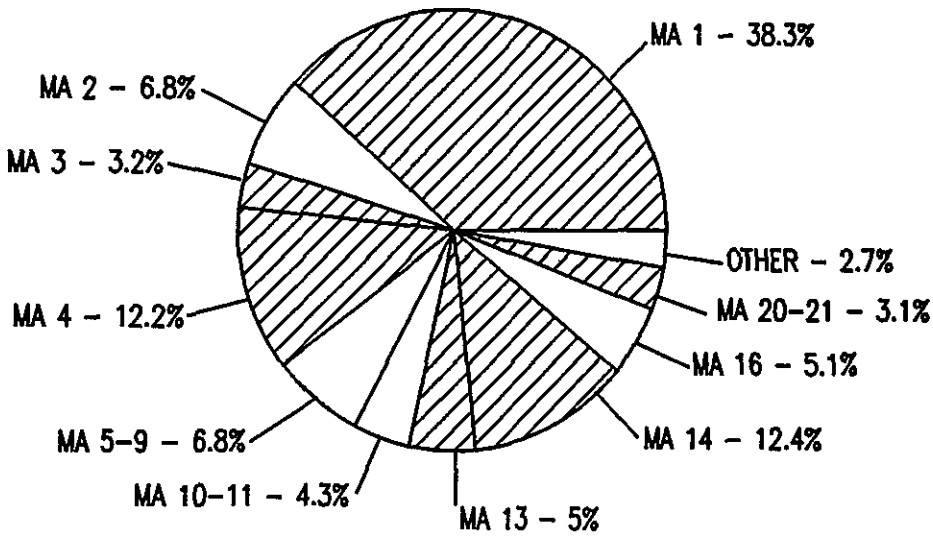
To maintain viable populations of cavity-excavating species, which in turn provide habitat for other species, snags would be managed to provide habitat for at least 60 percent of the potential population in riparian areas and 40 percent of potential populations in other management areas for a Forest-wide objective of slightly greater than 40 percent Snag replacement trees would be provided across the managed forest and dead trees along *stream courses which fall across streams would be left to produce fish-rearing pools*

Effects of timber management activities such as logging and road construction are mitigated in Alternative I with 79,854 acres of roadless areas Two kinds of roadless areas are planned There would be 62,210 acres of roadless areas that would provide semiprimitive, *nonmotorized recreation Timber harvesting, road construction, and motorized vehicles* of any kind would be prohibited in these areas These areas, along with 81,320 acres of wilderness, would provide for the Forest visitor who wants to get away from the sounds and sights of human activity There are 14,578 acres which would provide semiprimitive, motorized recreation Timber harvesting and road construction would be prohibited in these areas while allowing for motorized vehicles and trail construction to provide for Forest visitors who enjoy motorized recreation in a semiprimitive setting

Logging activities, road construction, and grazing would be modified on 225,953 acres of land occurring along visually sensitive travel routes These viewsheds would be managed to provide travelers with "natural-appearing" to "slightly altered" scenery

Figure II-7 gives a representation of the percent of land in various management areas in Alternative I The acres by management area are displayed in Table II-4

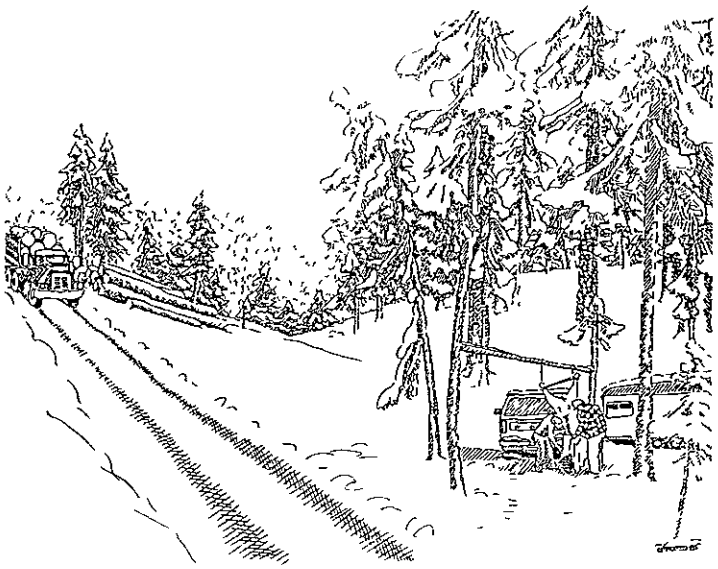
FIGURE II-7: Management Areas for Alternative I (Percents)



7 Management Areas by Alternative

One of the key factors in formulating alternatives is the mixture of land management areas These identify the types of management activities that can occur in specific areas Each of the management areas used to build alternatives is described on the following pages. Table II-1 summarizes the types of timber harvest activity which would be allowed in each of the management areas and Table II-4 presents the acres of each management area for each alternative in a format for comparison The maps enclosed with this Environmental Impact Statement provide both a brief description of each management area and its location on the Forest The applicable management practices specified by the standards are presented in Appendix D and in the accompanying Forest Plan except for the No Change Alternative Standards for that alternative can be found in the three Unit Plans and the 1979 Timber Resource Management Plan

FIGURE II-8: Management Area 1 - General Forest



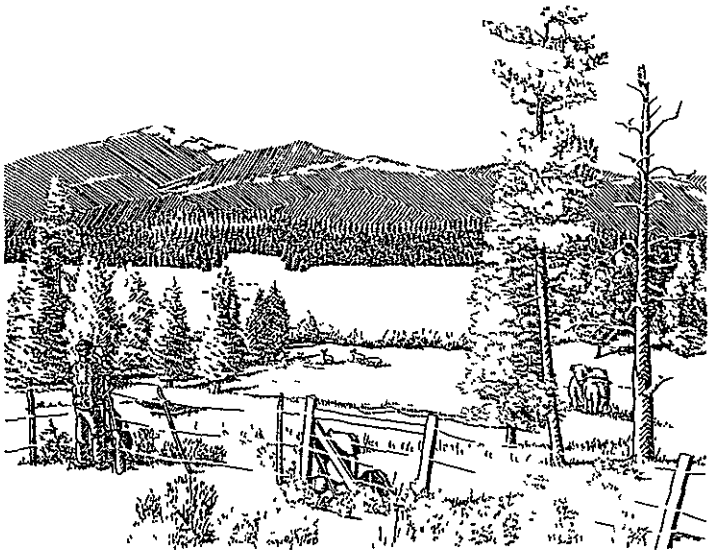
Management Area 1 emphasizes wood fiber and sawtimber production while providing forage production, wildlife habitat, and opportunities for public use and enjoyment

This management area consists primarily of forested lands All site productivity classes and commercial tree species are represented (ponderosa pine, white fir, Douglas-fir, western larch, white pine, lodgepole pine, Engelmann spruce, and subalpine fir) A variety of physical and biological environments results from soil, slope, aspect, elevation (approximately 4,300-7,000 feet), and climate This management area occurs across the entire Forest

The objective of timber management in this management area is to have stands in a variety of age classes with all stands growing as vigorously as possible. This is achieved through stand treatments which include controlling stocking levels, maintaining soil productivity, maintaining satisfactory growth rates, protecting stands from insects, disease, and damage, and controlling species composition

Forage within this management area will be available for use by cattle and big game Some lands have no available forage so there will be no grazing On other lands there will be need for coordination between timber and range management In some areas grazing will be an emphasized use. The management of other resources will be commensurate with the primary emphasis of timber production

FIGURE II-9: Management Area 2 - Rangeland

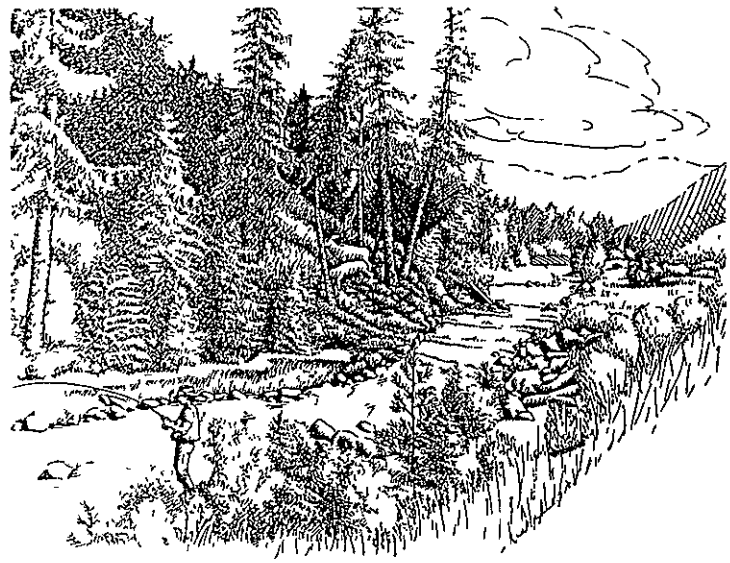


Management Area 2 emphasizes forage production, wildlife habitat, and opportunities for public use and enjoyment

This management area consists primarily of nonforested grasslands and low-site ponderosa pine lands that are unsuitable for timber production. It occurs across the Forest. A variety of physical and biological environments results from soil, slope, aspect, elevation (approximately 4,300-7,400 feet), and climate

Forage within this management area will be available for use by cattle and big game. Grazing will be an emphasized use. Range structural improvements such as fences and water troughs may be constructed and maintained to meet range management objectives. Range improvement projects, such as prescribed burning or seeding, may be utilized to improve the forage base

FIGURE II-10: Management Area 3 (A and B) - Riparian Areas



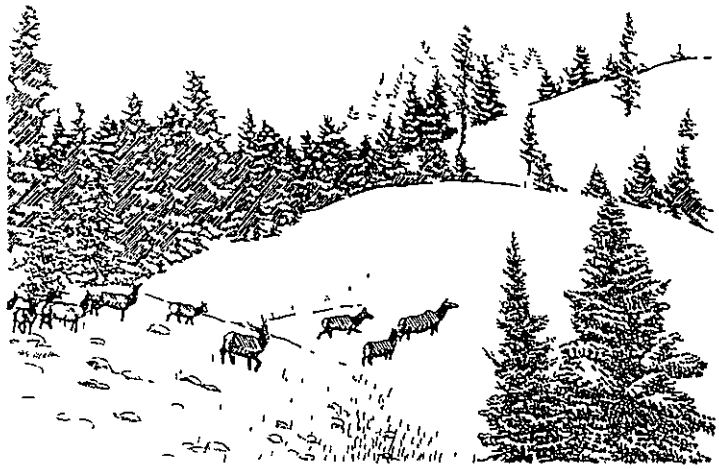
Management area 3 includes lakes and reservoirs, perennial and seasonally flowing streams, floodplains and wetlands, wet or moist areas, such as meadows, springs, seeps, bogs, wallows and quaking aspen stands The management area will be a minimum of 100 feet around lakes, springs, wallows, etc , and on each side of streams These areas will include the aquatic area, which is the wetted area of streams, lakes and wetlands, up to high water level, the riparian area, which is the area where the vegetation and microclimate are influenced by perennial or intermittent water, and the riparian area of influence, which is the transition area between the riparian area and upland vegetation. The riparian area of influence contains trees which may provide shade or contribute fine or large woody material or terrestrial insects to a stream, and trees that provide habitat for wildlife associated with the riparian management area

This management area will provide an environmental setting producing riparian area conditions of stable streambank, vigorously growing grass, herbaceous vegetation, shrubs, and trees, and clean, clear running streams Timber, recreation, range, minerals, and other resource management will be consistent with riparian and fish habitat needs

Public comments on the Draft Environmental Impact Statement indicated that there was a need to re-define the riparian management area This has resulted in the distinction as two Management Areas (3A, Non-Anadromous Riparian Areas and 3B, Anadromous Riparian Areas) in order to geographically portray these areas

The rationale behind this change is to establish geographical distinction between these two types of riparian areas Non-anadromous riparian areas include those watersheds that do not support anadromous fish Anadromous riparian areas include those watersheds that do support anadromous fish

FIGURE II-11: Management Area 4A - Big-Game Winter Range Maintenance



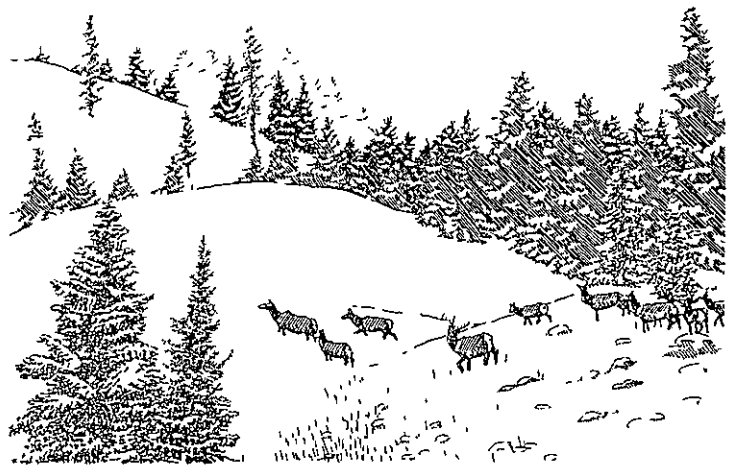
Management Area 4A emphasizes habitat management for big game on winter ranges while providing livestock feed, wood products, and opportunities for public use and enjoyment

This management area is composed of portions of the Forest which provide winter habitat for Rocky Mountain elk and other big-game species These areas are primarily below 5,200 feet in elevation and include nonforested grasslands, bitterbrush and mountain-mahogany brushfields, and timbered lands Nonforested areas are generally on southern and western aspects, landtypes and slopes vary

Trees, shrubs, and grasses in these areas will be managed to provide continuing amounts of cover and forage Vegetation conditions will be improved where conditions are poor or in limited amounts Habitat quality will be influenced through vegetative manipulation of thermal and hiding cover adjacent to forage areas and by road management techniques Forage areas will be created where lacking Cover will also be developed where lacking, maintained when in proper balance, or reduced when overabundant and more foraging areas are needed

Livestock grazing will be permitted Range improvements such as fences and water developments may be constructed Forage improvement practices will be permitted

FIGURE II-12: Management Area 4B - Big-Game Winter Range Enhancement



Management Area 4B emphasizes enhanced habitat management for big game on winter ranges while providing livestock feed, wood products, and opportunities for public use and enjoyment The majority of forage will be allocated to big game

This management area is composed of certain ranges within the total winter range area which may need vegetation enhancement to increase carrying capacity for wintering Rocky Mountain elk These winter ranges are generally on the northwest and west portions of the Forest

Trees, shrubs, and grasses in these areas will be managed to provide continuing cover and forage Vegetation conditions will be improved where conditions are poor or in limited amount Habitat quality will be influenced through vegetative manipulation of hiding and thermal cover adjacent to forage areas and by road management techniques Forage areas will be enhanced by seeding where lacking Cover will also be developed where lacking, maintained when in proper balance, or reduced when overabundant and more foraging areas are needed

Livestock grazing will be permitted Range improvements such as fences and water developments may be constructed

The majority of forage will be allocated to big game Forage improvement practices will be permitted

FIGURE II-13: Management Area 5 - Bald Eagle Winter Roosts

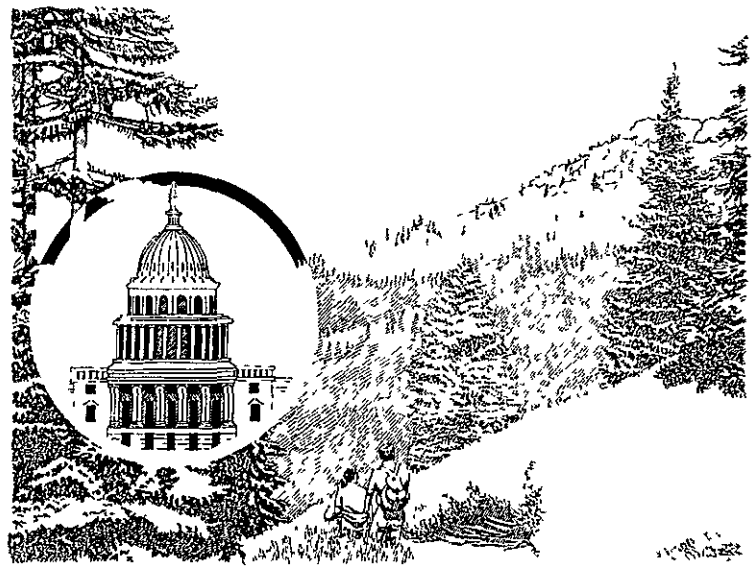


Management Area 5 emphasizes protection and management of winter roosting habitat for bald eagles

This management area is composed of timbered stands in mature or old-growth condition which provide winter roosting habitat for bald eagles This habitat is located in drainages on the southern edge of the Forest Roost sites have an eastern aspect, are on slopes greater than 35 percent, and are generally the first tall timber adjacent to the Harney Basin.

Retention of old-growth stands with large trees will be emphasized for bald eagles Stands will be managed so that suitable roosting sites are available on a continuing basis Access will be managed so that human disturbance will be minimal during the roosting season

FIGURE II-14: Management Area 6A - Strawberry Mountain Wilderness

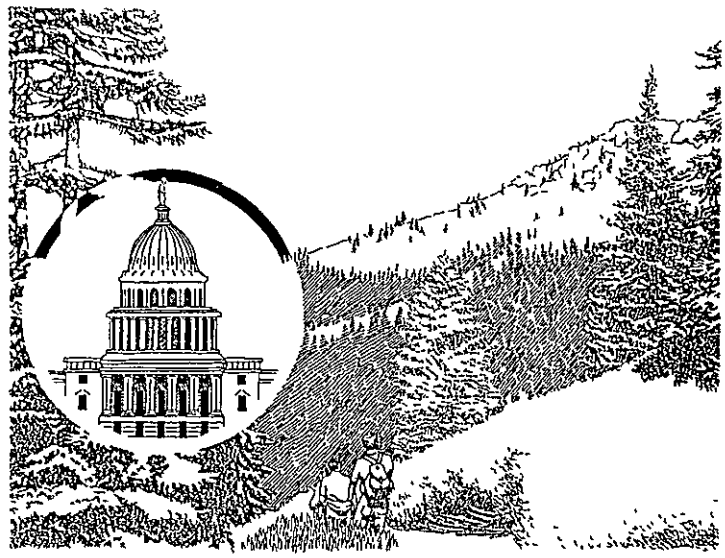


Management Area 6A provides management of the Strawberry Mountain Wilderness to preserve and protect its physical and biological character

This management area consists of the Strawberry Mountain Wilderness, which is wholly within the Malheur National Forest. An east-west hydrologic divide separates the Wilderness into two distinct parts The northern portion drains into the mainstem of the John Day River and the southern portion drains into the Silvies and Malheur River systems.

A variety of physical and biological environments occurs in the area–both forested and nonforested–as determined by soil, slope, aspect, elevation (4,600-9,038 feet), and climate. Management will be designed to maintain a primitive or semiprimitive setting within the area. Use by recreationists and recreation stock will be managed to avoid impacts which detract substantially from the wilderness characteristics of the area Trail construction and reconstruction will be permitted in some but not all of the area

FIGURE II-15: Management Area 6B - Monument Rock Wilderness



Management Area 6B provides management of the Malheur National Forest portion of the Monument Rock Wilderness to preserve and protect its physical and biological character

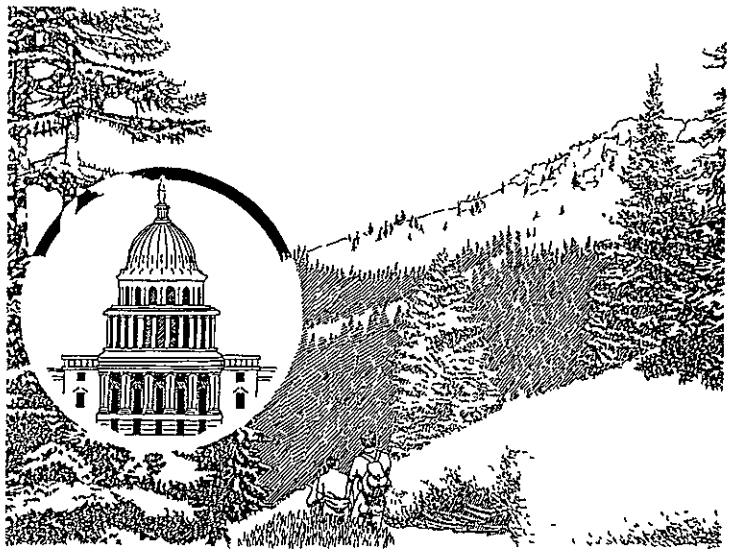
This management area is the Malheur National Forest portion of the Monument Rock Wilderness This 19,650-acre wilderness was established in 1984 The 12,620 acres that occur on the Malheur National Forest are administered by the Prairie City Ranger District The Little Malheur River flows through the Wilderness

The area has been grazed in the past by sheep and cattle and evidence of human presence can still be found because of this activity

A variety of physical environments occurs in the area–both forested and nonforested–as determined by soil, slope, aspect, elevation (4,900 to 7,035 feet), and climate

Management will be designed to maintain a semiprimitive setting within the area Use by recreationists and commercial and recreation stock will be managed to avoid impacts which detract substantially from the wilderness characteristics of the area Trail construction and reconstruction will be permitted in the area

FIGURE II-16: Management Area 6C - Pine Creek



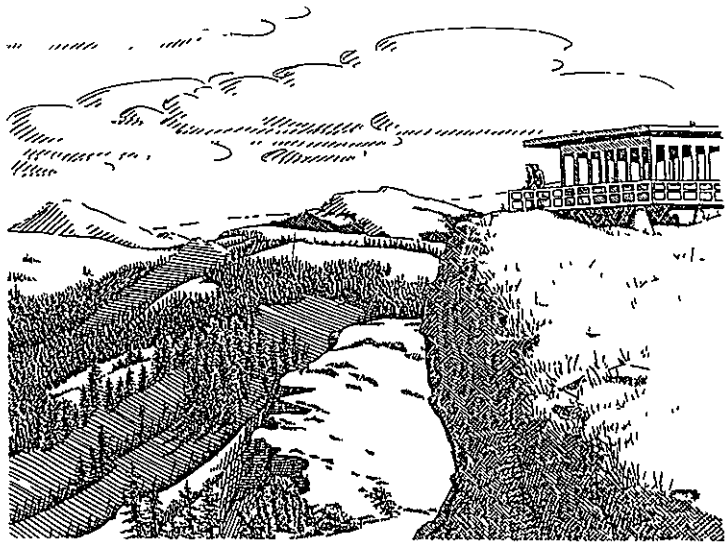
Management Area 6C provides management of the Pine Creek roadless area which preserves and protects its physical and biological features for possible future inclusion in the wilderness system

This management area consists of the Pine Creek Further Planning Area, which is entirely within the Malheur National Forest The area is found in the southeast corner of the Forest and is drained primarily by Pine Creek

A variety of physical and biological environments, mainly the drier types, occurs in the area–both forested and nonforested–as determined by soil, slope, aspect, elevation (approximately 4,400 to 5,970 feet), and climate

Management will be designed to maintain a semiprimitive setting within the area Use by recreationists and commercial and recreation stock will be managed to avoid impacts which detract substantially from the wilderness characteristics of the area Trail construction and reconstruction will be permitted in the area

FIGURE II-17: Management Area 7 - Scenic Area



Management Area 7 conserves, protects, and manages (in a substantially unmodified condition) the Malheur National Forest portion of the Vinegar Hill-Indian Rock area for its unique character and scenic values

This 17,234 acre scenic area is administered by two National Forests The Malheur National Forest portion, 13,322 acres, is administered by the Long Creek Ranger District The area is drained by the Middle Fork and North Fork of the John Day River.

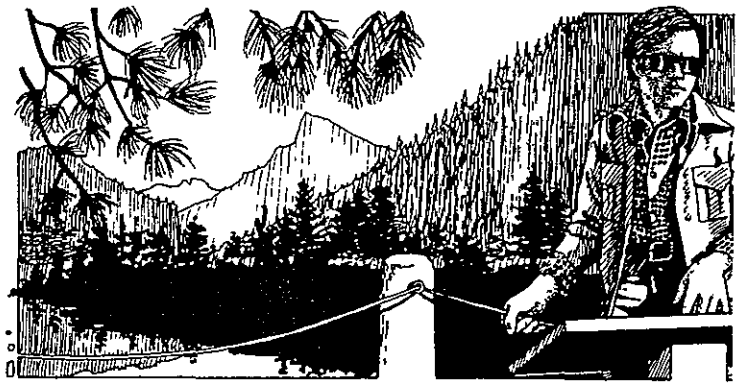
A variety of physical and biological environments, mainly high elevation types, occurs in the area (both forested and nonforested) as determined by soil, slope, aspect, elevation (4,400-8,131 feet), and climate

Because of past mining activities, the eastern half of the area shows the impact of human activity.

Management of the area will provide opportunities to enjoy scenic, wildlife, and recreation values in a setting that is not dominated by human activities Some motorized use and recreation-related facilities are permitted

Management will provide an environmental setting producing the kinds of recreation experiences that are attainable in large undeveloped areas It will generally provide a feeling of vastness and remoteness It will be in a predominately unmodified or natural state. The environmental setting will include a wide diversification of vegetation, terrain, and visible landform

FIGURE II-18: Management Area 8 - Special Interest Areas



Management Area 8 preserves and provides for interpretations of unique geological, biological, zoological, and cultural areas for education, scientific, and public enjoyment purposes

This management area consists of both forested and nonforested lands which are set aside for their uniqueness Areas include the Cedar Grove Botanical Area (Alaskan yellow cedar), the Magone Lake Geological Area (landslide forming natural lake), and Tex Bridge Geological Area (natural rock formation) Cedar Grove and Tex Bridge are located in the Aldrich Mountains on the Bear Valley Ranger District Magone Lake is located south of Lake Butte on the Long Creek Ranger District

These unusual geological or biological sites and areas will be preserved and managed for education, research, and to protect their unique character Facilities and opportunities may be provided for public interpretation and enjoyment of the unique values of these sites and areas These areas will be officially designated by Regional Forester authority

FIGURE II-19: Management Area 9 - Research Natural Areas

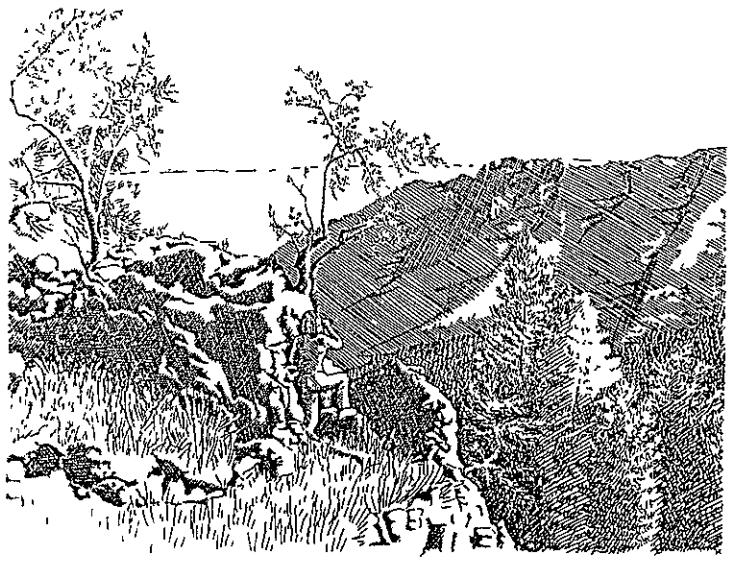


Management Area 9 preserves examples of naturally occurring ecosystems in unmodified conditions for research and education

This management area contains the existing and proposed Research Natural Areas (RNAs) on the Malheur National Forest The existing RNA is Canyon Creek Six candidate RNAs have been identified across the Forest

Natural features will be preserved for scientific purposes and natural processes are allowed to dominate Research Natural Areas provide baseline areas against which effects of human activities can be measured, sites for study of natural processes in undisturbed ecosystems, and gene pool preserves for all types of organisms

FIGURE II-20: Management Area 10 - Semi-Primitive, Non-Motorized Recreation Areas



Management Area 10 emphasizes Non-Motorized recreation opportunities in an undeveloped natural environment while providing forage production and wildlife habitat

This management area consists of existing undeveloped areas which will be managed as semiprimitive nonmotorized recreation areas A variety of physical and biological environments occurs in these areas (both forested and nonforested) as determined by soil, slope, aspect, elevation, and climate

This management area will provide an environmental setting producing the kinds of recreation experiences that are attainable in large undeveloped areas It will generally provide a feeling of vastness and remoteness and will have little evidence of human activity It will be in a predominately unmodified or natural state The environmental setting will often include a wide diversification of vegetation, terrain, and visible landform

It will be managed to provide limited social contact and interaction among visitors Primitive facilities (such as shelters and small camps, signing, and a trail transportation system for visitor access and use) may be established

FIGURE II-21: Management Area 11 - Semi-Primitive, Motorized Recreation Areas



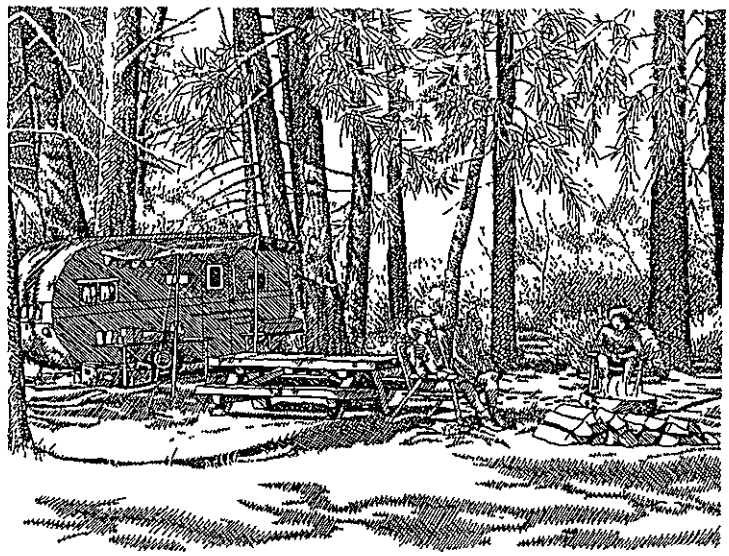
Management Area 11 emphasizes motorized recreation opportunities in an undeveloped natural environment while providing forage production and wildlife habitat.

This management area consists of existing roadless areas which will be managed as semiprimitive, motorized recreation areas A variety of physical and biological environments occurs in these areas (both forested and nonforested) as determined by soil, slope, aspect, elevation, and climate

This management area will provide an environmental setting producing the kinds of recreation experiences that are attainable in large undeveloped areas It will generally provide a feeling of vastness and remoteness and will have little evidence of human activity. It will be in a predominately unmodified or natural state. The environmental setting will often include a wide diversification of vegetation, terrain, and visible landform

It will be managed to provide limited social contact and interaction among visitors Primitive facilities (such as shelters and small camps, signing, and a transportation system for visitor access and use) may be established Motorized activities will be permitted. Low-standard roads and trails could be present.

FIGURE II-22: Management Area 12 - Developed Recreation



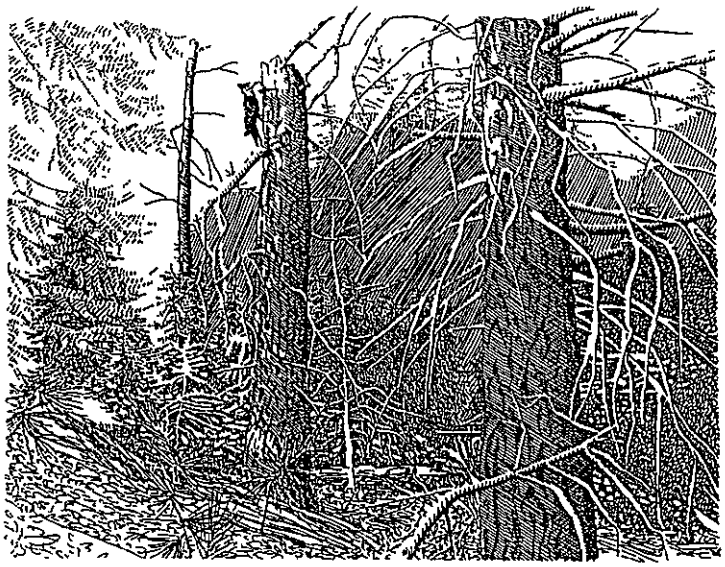
Management Area 12 provides outdoor recreation opportunities within a natural environment modified for visitor use and satisfaction, or to accommodate large numbers of visitors

This management area consists of campgrounds and picnic sites The developments are limited in size and provide a rustic experience Facilities are limited but include paved roads, water systems, toilets, and boat launches at a few of the campgrounds

This management area will provide a wide variety of recreation opportunities including, but not limited to, activities dependent on various intensities of development Sophisticated facilities and sights and sounds of human activity will be evident and often essential to provide the desired recreation experience Generally, high concentrations of visitors will occur around developments Fewer numbers will occur outside developments, but encounters between visitors can be frequent Visitors with little knowledge of outdoor skills will be able to enjoy the area

Opportunities for participation in a broad range of outdoor recreation activities will be available Activities will often include use of facilities and often, but not always, involve use of motorized vehicles and/or boats

FIGURE II-23: Management Area 13 - Old Growth



Management Area 13 provides old-growth tree stands for preservation of natural genetic pools, habitat for plants and wildlife species associated with mature or overmature tree stands, contributions to the ecosystem diversity, aesthetic quality, and Native American cultural values

This management area is composed of mature/overmature trees (150 years or older) which provide feeding and breeding habitat for wildlife species dependent on such forest conditions Included are suitable and unsuitable forested lands and a variety of landtypes These areas are distributed across the Forest Wildlife species known to be dependent on these lands include the pileated woodpecker and the pine marten

Vegetation will be managed to provide mature or overmature tree stands having large trees, snags, dead downed materials, and in many cases, two or more canopy levels Such stands would vary in size and be located so a wide variety of conditions are represented.

Other management activities such as livestock grazing and road construction may occur where they do not detract substantially from the management objective of maintaining old-growth characteristics of the tree stand

In addition, this Management Area may include old-growth replacement stands Such stands are capable of meeting the habitat definition for old-growth at some future point in time. Management activities which promote old-growth replacement stands is allowed prior to becoming suitable old growth

FIGURE II-24: Management Area 14 - Visual Corridors



Management Area 14 provides Forest visitors with visually appealing scenery Landscapes seen from selected travel routes and use areas will be managed to maintain or enhance their appearance To the casual observer, forest activities will not be evident or will be visually subordinate to the natural landscape

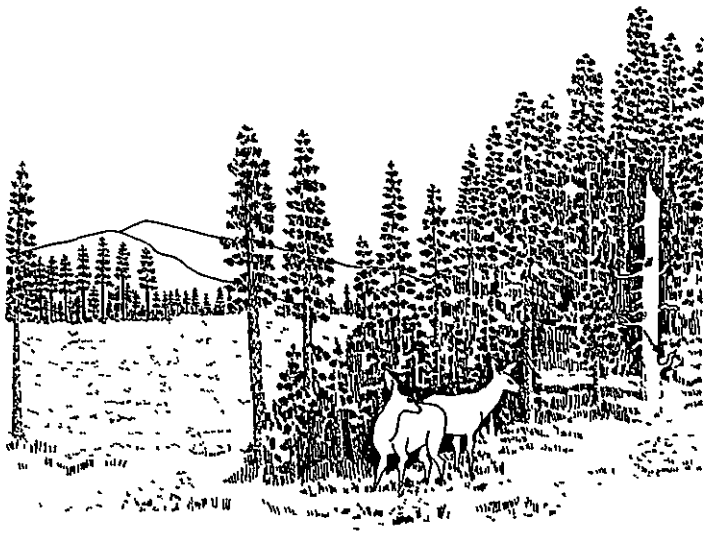
This management area consists primarily of forested and nonforested lands along major travel routes that have a high-to-medium degree of visual sensitivity These lands have a range of physical and biological environments as determined by soil, slope, aspect, elevation, and climate

Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest Timber harvest is permitted, but only to protect and improve the visual quality of the stands both now and in the future. Timber stands which have remained unmanaged in the past because of their visual sensitivity may be treated to avoid loss of the stand to natural causes Landscapes containing *negative visual elements–such as skid roads, activity residue, or cable corridors–will be* rehabilitated

The desired condition for ponderosa pine is to achieve and maintain visual diversity through variations of stand densities and size classes Large, old-growth ponderosa pine will remain an important component, with individual specimen trees achieving 36-inch diameters and larger (Foreground Retention) or 26 inches in diameter (Foreground Partial Retention) and having deeply furrowed, yellowbark characteristics

For other species, the desired condition requires obtaining visual variety through spatial distribution of age classes and species mixes, through density manipulation, or through a mixture of age classes within a stand

FIGURE II-25: Management Area 15 - Unit Plan Wildlife Emphasis Areas



Management Area 15 is to be managed principally for fish and wildlife habitat This management area is composed of forested and nonforested portions of the Forest which have been designated to maintain higher populations of old-growth dependent and cavity-nesting wildlife species Some of these areas are also used by elk as winter range A variety of physical and biological environments occurs as determined by soil, slope, aspect, elevation (4,000 to 7,600 feet), and climate The majority of this management area is unroaded. This management area is used only in the No Action and No Change alternatives.

All uses and activities in this area will be designed and/or scheduled to maintain or improve the area to support fish and wildlife populations. Forest management will maintain five stages of forest growth succession Snag management, water quality, streamside management, and big-game cover are given special consideration Roads will be managed to protect key wildlife areas

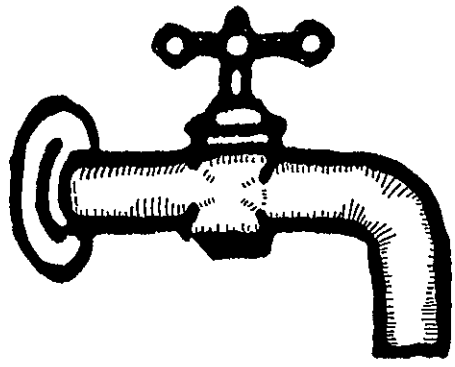
FIGURE II-26: Management Area 16 - Minimum Level Management



Management Area 16 provides the minimum management necessary to provide for resource protection This management area consists primarily of nonforest and low productivity forestlands that occur as small, dispersed parcels within the nonclassified portion of the Forest, and as low-value species stands Many of the areas are rock outcrops, talus slopes, or areas of shallow soils along canyons and major drainages Elevation and vegetation vary greatly from low elevation grasslands along the major river drainages to high elevation subalpine/tree line vegetation Landforms are also variable, ranging from flat, nonforested openings in the forest to rock outcrops on steep slopes

Management of this area will be designed to provide for resource protection with minimal investment No timber harvest or other activities are scheduled in the areas that are limited by natural site conditions, such as rock outcrops, talus slopes, or shallow soils. Management activities which do occur, such as noxious weed control or road building, will be for protection of resources or to provide support to management of adjacent areas.

FIGURE II-27: Management Area 17 - Byram Gulch Municipal Supply Watershed

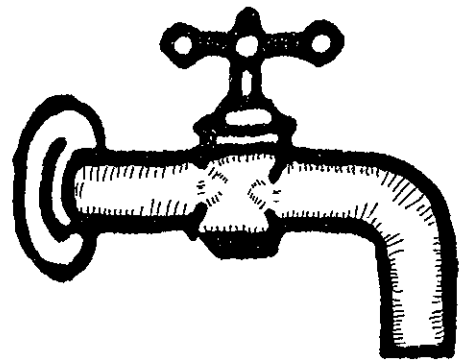


Management Area 17 provides protection of the National Forest portion of the watershed that supplies water for domestic use to the town of Canyon City, Oregon This management area consists of 610 acres within the Byram Gulch Municipal Supply Watershed

Management of this area will be designed to provide for resource protection with minimal investment No timber harvest or other activities are scheduled for this area Management activities which do occur will be subordinate to water quality maintenance objectives.

The desired condition for this management area is one that ensures that Oregon water quality standards for community public supply water are met. The objective is to protect and, where needed, improve the quality and quantity of the water resource in a manner consistent with National, State, and Forest goals

FIGURE II-28: Management Area 18 - Long Creek Municipal Supply Watershed

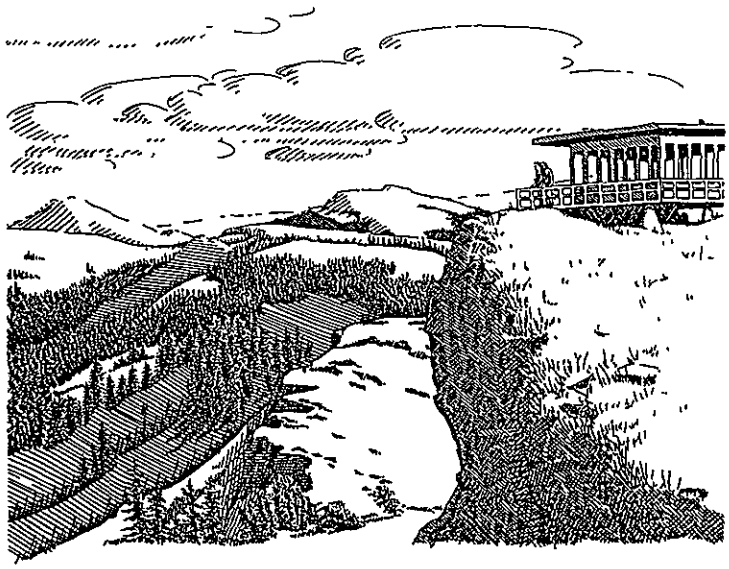


Management Area 18 consists of the National Forest portion of the Long Creek Municipal Supply Watershed This watershed provides water for domestic use for the town of Long Creek, Oregon This management area consists of 224 acres within the Long Creek watershed

Management of this area will be designed to provide for resource protection with minimal investment Management of this area does not preclude harvest of timber

The objective for managing this area is to ensure that Oregon water quality standards for community public supply water use are met This means that the watershed is to be protected and, where needed, improved in terms of the quality and quantity of the water resource in a manner consistent with National, State, and Forest goals

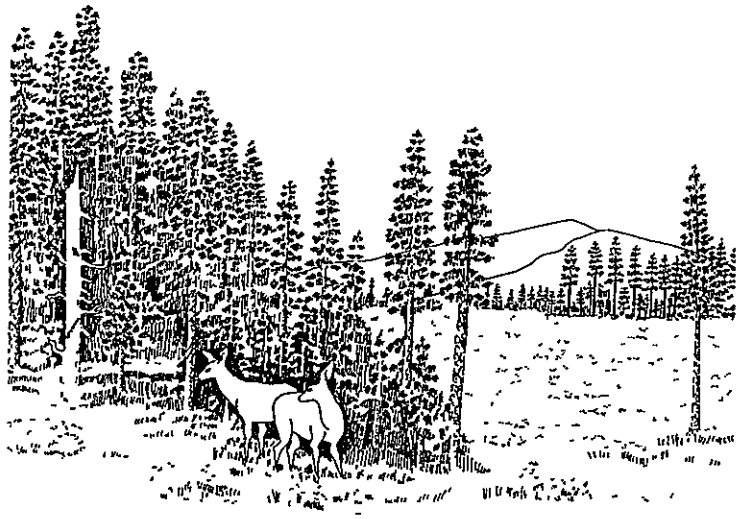
FIGURE II-29: Management Area 19 - Administrative Sites



Management Area 19 consists of Ranger Stations, work centers, other administrative sites and long-term special-use areas such as the Lake Creek Organizational Camp This management area comprises 1,369 acres of Malheur National Forest land.

The objective for this management area is to provide and maintain these sites for facilities necessary for the administration of Malheur National Forest lands

FIGURE II-30: Management Area 20 - Wildlife Emphasis with Scheduled Timber Harvest

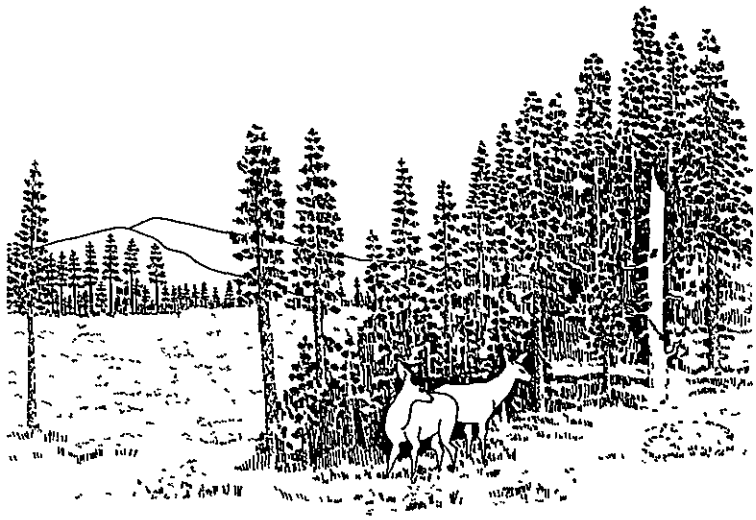


Management Area 20 consists of specific geographical areas on the Forest that are portions of and lands adjacent to former roadless areas These areas include a variety of physical and biological environments, including both forested and non-forested lands, as determined by soil, slope, aspect, elevation, and climatic factors

The objective for this management area is to provide for high quality wildlife and fish habitat, scenic beauty, and water quality Big-game habitat is to be managed to provide at least 70 percent of Elk Habitat Effectiveness, while allowing for scheduled timber harvest Opportunities for high quality semiprimitive dispersed recreation are to be provided under this management strategy

Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest Timber harvest is permitted, but will be manipulated to protect and improve the big-game habitat, visual quality, and watershed conditions of the stands both now and in the future

FIGURE II-31: Management Area 21 - Wildlife Emphasis with Non-Scheduled Timber Harvest

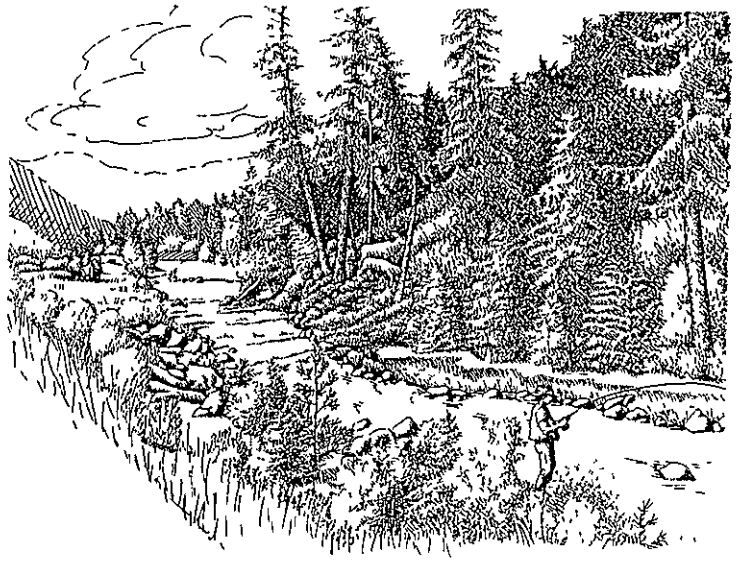


Management Area 21 consists of specific geographical areas on the Forest that are portions of former roadless areas These areas include a variety of physical and biological environments, including both forested and non-forested lands, as determined by soil, slope, aspect, elevation, and climatic factors See Appendix K in the Forest Plan for a more detailed description of each area

The objective for this management area is to provide for high quality wildlife and fish habitat, visual beauty, and water quality Big-game habitat is to be managed to provide at least 70 percent of Elk Habitat Effectiveness, but with no scheduled timber harvest Timber harvest is not excluded, but will be done only on a non-scheduled basis and will be used only to meet a wildlife and/or fish habitat improvement objective, following the establishment of vegetation management plans This management area will provide opportunities for high quality semiprimitive dispersed recreation

Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest Timber harvest is permitted, but will be manipulated in order to maintain and improve the big-game habitat, watershed, and visual conditions of the stands both now and in the future

FIGURE II-32: Management Area 22 - Wild and Scenic River



Management Area 22 consists of river systems on the Forest that are suitable for designation as Wild and Scenic rivers As a result of the Omnibus Oregon Wild and Scenic Rivers Act of 1988 (P L 100-577) two rivers have been designated for inclusion in the Wild and Scenic River System to be managed to preserve their scenic and wild characters in conformance with the Act The Malheur River has both wild and scenic segments designated, with a total area encompassing approximately 3,534 acres of National Forest land within the river corridor A variety of physical and biological environments occur in these areas, both forested and non-forested, as determined by soil, slope, aspect, elevation, and climatic factors The North Fork of the Malheur River is designated as entirely scenic and encompasses about 6,722 acres Both rivers are located in the southeast portion of the Malheur National Forest See the discussion of Management Area 22 in the Forest Plan for more detailed description of this management area

The objective for this management area will be to protect, enhance, and maintain the outstandingly remarkable values and natural beauty for the use and enjoyment of present and future generations The Act identified geological and scenic characteristics as outstandingly remarkable values Another objective for both rivers is to protect water quality and to preserve the free flowing conditions of these wild and scenic rivers The wild portion of this management area is excluded from any programmed timber harvest Areas within the scenic river boundaries may be available for timber harvest after completion of management plans While timber harvest is permitted, it will be conducted in a way to improve and maintain the scenic character of these areas The majority of this management area will provide opportunities for high quality semiprimitive dispersed recreation

The acreages shown in Table II-4 display the actual acreage of land assigned to each management area Each acre of the Forest is assigned to only one management area If a unit of land could logically be assigned to two or more management areas within an alternative, it was assigned to the management area with the more restrictive management direction. An example would be the proposed McClellan Mountain Research Natural Area (RNA) For all alternatives, it is located within an area retained for semiprimitive recreation RNAs require more restrictive management than do semiprimitive areas Thus, only RNA acres are counted, and semiprimitive acres are reduced similarly, even though both management areas are being utilized

The assignment process should be carefully reviewed when attempting to compare acres assigned to various management areas with outputs and effects for each alternative The acres assigned to Management Areas 10 and 11, which are managed for semiprimitive recreation, may be less than the acres which actually provide a semiprimitive recreation experience. This is because several other overlapping management areas, such as Management Areas 7 and 9, may also provide this recreation experience due to their location and management

This process of assignment was not used for the No Change Alternative Acreages of management areas for that alternative were derived from the 1979 Timber Resource Management Plan and the Unit Plans and are not comparable to the other alternatives. The General Forest Management Area (MA 1) and the Unit Plan Wildlife Emphasis Area (MA 15) most likely include acres incorporated into other management area acreages

Under the No Change Alternative, the Old-Growth Management Area (MA 13) reflects a three-tier management system which provides for approximately 1/3 of the area to be in an old growth stage at any one time (41,195 acres)

The Visual Corridors (MA 14) only reflect forested acres and Riparian Areas (MA 3A and 3B) only reflect the actual acres identified in the Timber Resource Management Plan That plan was based on the assumption that additional riparian acres would receive adequate protection under wildlife emphasis area and visual management

Figure II-33 displays the general distribution of management areas across the Forest by alternative for comparison

Of the acreage shown on Table II-4, the lands assigned to Management Areas 1 through 4B, 14, 15, 18, 20 and the scenic portions of 22 had the option in FORPLAN of being assigned to this management area or to minimum level management The FORPLAN computer simulation model was used to determine which management regime would be more efficient for these areas The assignments shown in the table were the result The lands assigned to all other management areas were fixed. The Timber Management Plan upon which the No Change Alternative is based was developed in 1979 That plan was not a thoroughly-integrated plan and, consequently, did not address all resource uses and outputs in an integrated manner As a result, these acreages are not directly comparable to the other alternatives.

TABLE II-4: Management Areas by Alternatives
(Acres)

	Alternatives					
	NC[1] (No Change)	B Modified	A (No Action)	F (DEIS Pref)	I Preferred	C Modified
1 General Forest	922,563	775,479	657,726	618,456	553,053	478,973
2 Rangeland	N/A	109,919	141,702	105,840	99,203	82,989
3 Riparian Areas	3,707					
3A Non-Anadromous Riparian	N/A	21,706	18,567	19,779	19,268	17,047
3B Anadromous Riparian	N/A	33,954	31,185	32,132	28,092	24,722
4A Big-Game Winter Range Maintenance	0	76,599	0	194,141	177,406	115,764
4B Big-Game Winter Range Enhancement	0	0	0	0	0	35,145
5 Bald Eagle Winter Roosts	4,326	4,580	4,326	4,040	4,040	4,064
6A Strawberry Mountain Wilderness	68,700	68,700	68,700	68,700	68,700	68,700
6B Monument Rock Wilderness	12,620	12,620	12,620	12,620	12,620	12,620
6C Pine Creek Proposed Wilderness	0	0	0	0	0	5,420
7 Scenic Area	13,322	13,322	13,322	13,322	13,322	13,322
8 Special Interest Areas	312	312	312	312	246	312
9 Research Natural Areas	0	1,310	1,310	1,310	750	1,310
10 Semiprimitive Nonmotorized Recreation Areas	40,845	0	38,848	36,687	48,888	96,015
11 Semiprimitive Motorized Recreation Areas	0	0	0	9,536	14,578	77,250
12 Developed Recreation Sites	N/A	427	427	427	484	427
13 Old-Growth Habitat	123,587[2]	43,600	40,800	50,090	72,690[3]	47,930
14 Visual Corridors	66,720	183,244	212,953	178,380	186,682	263,762
15 Unit Plan Wildlife Emphasis Areas	154,883	0	102,974	0	0	0

1/The Timber Management Plan upon which the No Change Alternative is based was developed in 1979 The plan was not an integrated plan and consequently did not address all resource uses and outputs in an integrated manner As a result, these acreages are not directly comparable to the other alternatives Overlap among management areas for the NC Alternative cannot be added to equal the total Forest acres

2/Potential old growth acres managed on three tier system with 260 year rotation so that approximately 1/3 of area is old growth at any one point in time

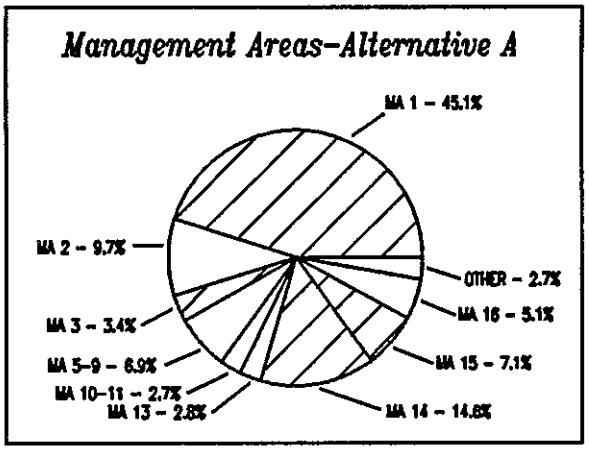
3/Includes 25,000 acres of old growth replacement

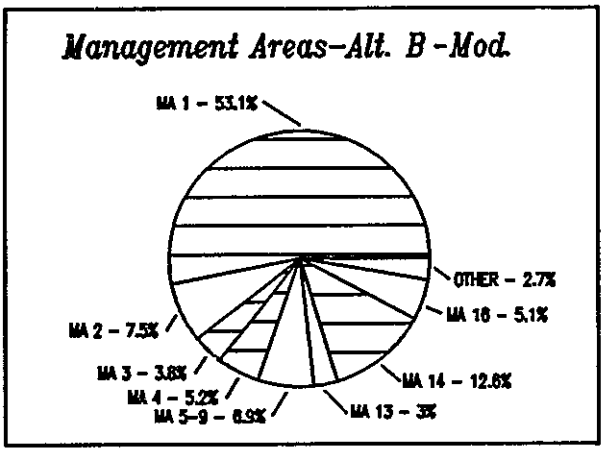
TABLE II-4: Management Areas by Alternatives (continued)
(Acres)

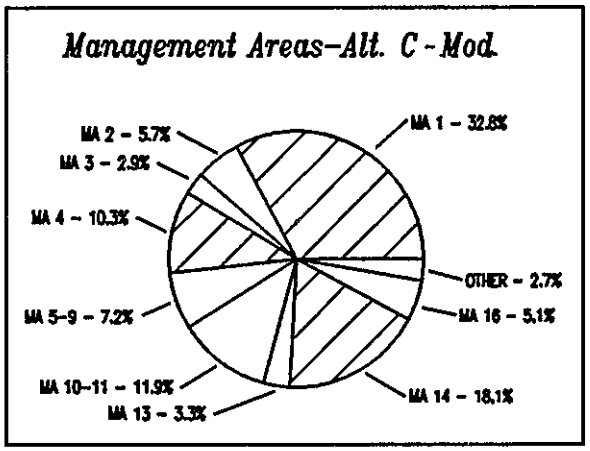
	Alternatives					
	NC[1/] (No Change)	B Modified	A (No Action)	F (DEIS Pref)	I Preferred	C Modified
16 Minimum Level Management[4/]	76,600	74,668	74,668	74,668	74,668	74,668
17 Byram Gulch Municipal Supply Watershed	N/A	300	300	300	300	300
18 Long Creek Municipal Supply Watershed	N/A	224	224	224	224	224
19 Administrative Sites	N/A	1,369	1,369	1,369	1,369	1,369
20 Wildlife Emphasis with Scheduled Timber Harvest	N/A	N/A	N/A	N/A	23,674	N/A
21 Wildlife Emphasis with Non-Scheduled Timber Harvest	N/A	N/A	N/A	N/A	22,076	N/A
22 Wild and Scenic River	N/A	10,256	10,256	10,256	10,256	10,256
Roads, Water, etc	26,833	26,833	26,833	26,833	26,833	26,833
TOTAL	1,459,422	1,459,422	1,459,422	1,459,422	1,459,422	1,459,422

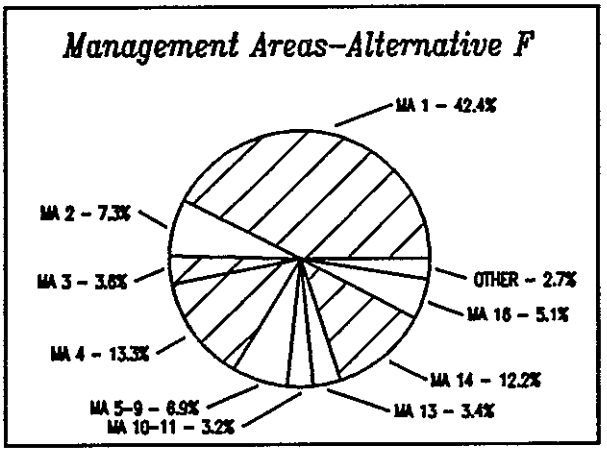
4/ Lands assigned to Management Areas 1 through 4B, 14, 15, 18, 20, and scenic portions of 22 had the option in FORPLAN of being assigned to that management area or to minimum level management (Management Area 16) Lands assigned to all other management areas were fixed (does not apply to the No Change Alternative).

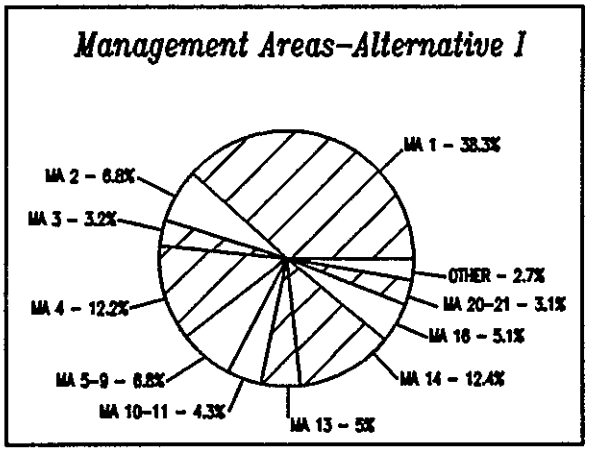
FIGURE II-33: Percent of Forest by Management Area by Alternative
(Management areas in which timber harvest will be scheduled are indicated with shading)

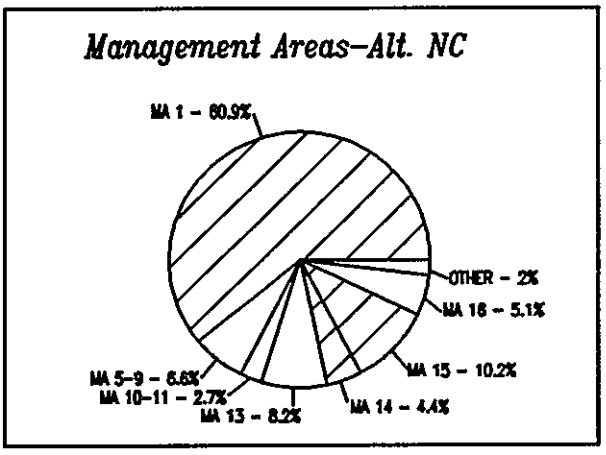












C Comparison of Alternatives

This section presents the details of the alternatives so they can be compared These details are summarized in tables and narrative to provide the basis for review, judgment, and eventual selection of a preferred alternative

The information displayed in tables includes:

Table II-5	Average Annual Quantifiable Resource Outputs and Environmental Effects That Vary Significantly by Alternative
Table II-6	Comparison of Past, Present and Alternative Timber Outputs.
Table II-7	Timber Resource Management Information by Benchmark and Alternative.
Table II-8	Present Net Value and Discounted Benefits and Costs of Alternatives
Table II-9	Present Net Value and Discounted Benefits and Costs by Resource Groups.
Table II-10	Average Annual Cash Flows and Noncash Benefits in the First and Fifth Decades by Alternative.
Table II-11	Comparison of Issue and Concern Response by Alternative.
Table II-12	Indicators of Responsiveness of Alternatives to Planning Issues and National Concerns.

In addition to tables, there are narrative sections describing differences between the alternatives.

1. Resource Outputs, Environmental Effects, Activities, and Costs

This section of the chapter presents the resource outputs, the environmental effects, the activities, and the costs of all the alternatives Direct, indirect, and cumulative outputs and effects are presented by alternative In Table II-5, the alternatives are shown in order from the one with the most land suitable for timber production (Alternative NC) to the least land suitable for timber production (Alternative C-Modified). Many of the outputs and effects are derived from the analysis process described in Appendix B. Outputs are estimates and projections based on available inventory data and assumptions, subject to annual budgetary limitations A comparison of alternatives for the resource management programs on the Forest follows Table II-5.

TABLE II-5

QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES

(Alternatives are ranked in order from most to least land potentially suitable for timber production.)

(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change[1]	B Mod	A No Action	F	I Preferred	C Mod
TIMBER							
LAND TENTATIVELY SUITABLE FOR TIMBER PRODUCTION	Acres	1,146,238	1,039,868	1,039,868	1,039,868	1,039,868	1,039,868
LAND AVAILABLE FOR TIMBER PRODUCTION (in FORPLAN)	Acres	N/A	987,088	967,327	951,028	905,151	831,340
LAND SUITABLE FOR TIMBER PRODUCTION	Acres	1,116,577	956,783	898,424	919,748	835,970	770,387
LAND WITH HARVEST REDUCTION (Acres Providing Percent of Full Yield)[2]	Acres						
91-100		655,770	866,977	769,160	811,952	468,656	265,232
50-90		460,807	39,691	34,384	36,115	322,862	414,907
1-49		0	50,115	94,880	71,681	44,452	90,248
No Programmed Yield		29,661	83,085	141,444	120,120	203,898	269,481
TIMBER HARVEST PRESCRIPTION	Acres						
Clearcut		N/A	478,452	377,229	380,621	364,616	347,789
Shelterwood		N/A	388,525	391,930	431,331	247,862	220,515
Selection		N/A	89,806	129,265	107,796	223,492	202,083
TIMBER SALE PROGRAM QUANTITY[3]							
Decade 1	Million	N/A	265 9	232 7	246.6	211 0	154 0
Decade 2	Board Feet	N/A	N/A	N/A	N/A	N/A	N/A
Decade 5		N/A	N/A	N/A	N/A	N/A	N/A

1/*The timber management plan upon which the No Change Alternative is based was developed in 1979* The plan was not an integrated resource management plan, and consequently did not address all resource uses and outputs. The missing information in this table cannot be reasonably estimated, since the original plan was based on yield tables and resource relationships which do not reflect the latest scientific technique or *information, reflect the standards in the NFMA regulations, or are otherwise inappropriate* Unit plans developed during 1978 provided new standards and management objectives which are best represented in Alternative A - No Action (Current Direction). Some of these standards and management objectives were incorporated in the timber management plan, and adjustments made in timber potential estimates to reflect *them* Consequently, *the timber potential yield estimates may not be feasible to implement and some* Forest-wide information or data is unavailable

2/Programmed yield is derived in a yield simulator, less operational falldown, without further yield reductions for other resource considerations, available for harvest at 95-100 percent of culmination of *mean annual increment (CMAI)*

3/Annual Average Million Board Feet for comparison for 1980-1989 Timber cut, 187 7; Timber Sold, 228 3, Timber Management Plan potential yield, 269 7

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
TIMBER SALE PROGRAM QUANTITY (continued)							
Decade 1	Million	N/A	48.6	42 6	45 2	38 4	28.2
Decade 2	Cubic Feet	N/A	48.6	42 6	45.2	38 4	28.2
Decade 5		N/A	48 6	43 0	45 2	38 4	28.2
ALLOWABLE SALE QUANTITY[4/]							
Decade 1	Million	N/A	252 0	220 6	233 7	200 0	146.0
Decade 2	Board	N/A	N/A	N/A	N/A	N/A	N/A
Decade 5	Feet	N/A	N/A	N/A	N/A	N/A	N/A
Decade 1	Million	N/A	44 0	38 6	40 9	34 8	25.5
Decade 2	Cubic	N/A	44 0	38.6	40.9	34 8	25 5
Decade 5	Feet	N/A	44 0	39 0	40 9	34 8	25.5
LONG-TERM SUSTAINED YIELD CAPACITY[4A/]	Million Cubic Feet	N/A	50 61	45 33	47 03	40 73	27.95
TIMBER GROWTH IN YEAR 2030	Million Cubic Feet	N/A	39 68	33 10	35 47	32 71	29 25
REFORESTATION PLANTING							
Decade 1	1,000 Acres	N/A	5 8	6 1	6 1	5 5	4 6
Decade 2		N/A	3 9	4 2	4 3	3 6	2 1
Decade 5		N/A	6 9	6 7	6 9	5 5	2 2
TIMBER STAND IMPROVEMENT							
Decade 1	1,000 Acres	N/A	12 0	11 8	12.1	10 8	9.7
Decade 2		N/A	20 4	20 5	21 3	16.2	12 5
Decade 5		N/A	20 4	19 7	20.0	16 4	6 5

4/The conversion ratio from board feet to cubic feet for the 1979 Timber Management Plan is 6.71 board feet to 1 cubic foot. This is reflected in Alternative No Change Alternatives A through I board foot to cubic foot conversion ratios vary by harvest patterns over time, with decade 1 at approximately 5 72 board feet equal to 1 cubic foot (see Appendix B for an overview of to the analysis process) The great difference in board foot to cubic foot conversion ratios between the 1979 Timber Resource Plan (TRP) and alternatives in this Final EIS can be attributed to two major factors A more intensive stratification of timber components and higher utilization standards in the Forest Plan than in the 1979 TRP. The potential yield for Alternative NC in the first decade is 269 7 MMBF annually (40 2 MMCF) Potential yield is not directly comparable to Allowable Sale Quantity

4A/Based on all material being offered for sell

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
BIOMASS-OTHER WOOD FIBER[5/]							
Decade 1	Million	N/A	3 88	3 74	3.83	2 92	2 45
Decade 2	Cubic	N/A	3 51	3 68	3 74	2 76	2 38
Decade 4	Feet	N/A	2.83	2 86	2 80	2 37	2 25
FUEL TREATMENT							
Decade 1	Thousands	N/A	10 4	10 2	10 2	9 6	7 0
Decade 2	of Acres	N/A	10 7	10 1	10 2	10.3	6 7
Decade 5		N/A	15 6	14 5	14 6	12.6	7 7
RANGE							
LIVESTOCK GRAZING CAPACITY							
Decade 1	1,000 Animal	N/A[6/]	120	131	117	113	76
Decade 2	Unit Months	N/A	122	135	120	112	87
Decade 5		N/A	119	131	118	116	105
ACRES AVAILABLE FOR GRAZING Each Decade	Acres	N/A	1,351,275	1,351,275	1,351,275	1,351,275	1,351,275
SOCIO-ECONOMIC							
OPERATIONAL COSTS							
Decade 1	Millions of	N/A	9 3	8 7	8 9	8 4	7 1
Decade 2	Dollars	N/A	9 5	9 0	9 1	8 8	7 5
Decade 5		N/A	9 6	9 1	9 2	8 9	7.5
CAPITAL INVESTMENT COSTS							
Decade 1	Millions of	N/A	10 0	6.3	7.3	7.1	5 0
Decade 2	Dollars	N/A	7 8	6 5	6 7	6 4	4.5
Decade 5		N/A	7 3	5 9	6 3	6 3	4.5

5/Estimated volume of forest residue, above that needed to meet other resource objectives, that could be removed after normal timber harvest activities have been completed
6/Livestock grazing capacity for Alternative NC as derived from information in the Unit Plans is 126 mAUMs for the first decade.

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
TOTAL APPROPRIATED							
Decade 1	Millions of	N/A	19 3	15.1	16.4	15 9	12 4
Decade 2	Dollars	N/A	17.3	15.5	15.8	15.2	12.0
Decade 5		N/A	16 9	15.0	15.5	15 2	12 0
TOTAL NATIONAL FOREST SYSTEM ALLOCATED[7/]	Millions of Dollars						
Decade 1		N/A	0.4	0.4	0.4	0.4	0.4
Decade 2		N/A	0	0	0	0	0
Decade 5		N/A	0	0	0	0	0
RETURNS TO GOVERNMENT							
Decade 1	Millions of	N/A	29 6	25 3	27 2	23 6	17 5
Decade 2	Dollars	N/A	29.2	25 5	27 4	23 4	19 4
Decade 5		N/A	34.3	32.6	34 3	28 1	15 7
PAYMENTS TO COUNTIES							
Decade 1	Millions of	6 0	7 4	6.3	6 8	5 9	4 4
Decade 2	Dollars	N/A	7 3	6 4	6 9	5.9	4.9
Decade 5		N/A	8 6	8 2	8.6	7 0	3 9
CHANGE IN JOBS over 10 years (Historic level of jobs based on 1980-89 outputs = 1,729 jobs)	Jobs	N/A[8/]	+235	0	+96	-161	-573
CHANGES IN TOTAL INCOME (Average level of income in 1977 $; Based on 1980-89 outputs: $56.4 MM)	Millions of Dollars	N/A[8/]	+7 8	0	+3 2	-5 3	-18 9

7/This figure represents Bonneville Power Administration funding for anadromous fish habitat improvement projects These funds are not expected to continue past the first decade.
8/Changes in jobs (+515) and income (+$13 0 MM) for the No Change Alternative were projected assuming the potential yield (269 7 MMBF) displayed in the 1979 TRP would be harvested Jobs and income estimates were calculated in a comparable fashion to the other alternatives. The 1979 TRP projected an increase of 266 jobs and $5.9 million, these estimates were generated employing other economic assumptions and methodology, and are not directly comparable to the jobs and income estimates presented for all other alternatives. Also note that jobs and income estimates reflect changes in the economic sectors that currently exist For the Malheur National Forest zone of influence, this is related predominately to timber, livestock, and retail industries now in place. If changes outside of these established industries were to occur and make a significant contribution to the local economic setting, it would not be reflected here, thus making these estimates unreliable. Job change estimates are based on a 10 year time period

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
RECREATION							
DEVELOPED RECREATION USE CAPACITY	Thousands of Recreation Visitor Days						
Decade 1		N/A	186 7	149 4	149 4	159.1	149 4
Decade 2		N/A	220.1	176 1	176 1	187 7	176 1
Decade 5		N/A	267 2	213.8	213 8	228 0	213 8
NONWILDERNESS DISPERSED USE CAPACITY	Thousands of Recreation Visitor Days						
Semi-Primitive Non-Motorized							
Each Decade		41 1	10.1	45.3	38 7	62 0	77 8
Semi-Primitive Motorized							
Each Decade		0	0	0	32 4 9/	17 2	63 5
Roaded Natural							
Decade 1		N/A	2,095	2,295	2,130	1,960	2,232
Decade 2		N/A	1,267	1,667	1,337	1,330	1,542
Decade 5		N/A	437	1,038	543	692	850
Roaded Modified							
Decade 1		N/A	1,844	1,600	1,641	1,724	1,350
Decade 2		N/A	2,404	2,025	2,229	2,150	1,820
Decade 5		N/A	2,966	2,451	2,766	2,583	2,286
WILDERNESS USE CAPACITY	Thousands of Recreation Visitor Days						
Pristine							
Each Decade		N/A	2 5	2 5	2 5	2 5	2 5
Primitive							
Each Decade		N/A	0	26.8	26 8	37 2	30 9
Semi-Primitive							
Each Decade		N/A	56 6	15.9	15 9	0	13 8

9/Alternative F would provide 32 4 thousand Recreation Visitor Days (RVD's) of semiprimitive motorized recreation during the first decade and 13 9 thousand RVD's annually each decade thereafter

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
Recreation Improvements							
Trail Construction/ Reconstruction	Miles						
Decade 1		N/A	21/7	26/8	25/8	28/6	28/9
Decade 2		N/A	0/7	2/9	5/9	4/9	8/11
Decade 5		N/A	0/7	0/9	0/9	0/9	0/13
Developed Site Reconstruction	Persons at One Time (PAOT) Cap						
Decade 1		N/A	139	139	150	170	150
Decade 2		N/A	139	139	150	170	150
Decade 5		N/A	139	139	150	170	150
Developed Site Construction (Decade 1 only)	PAOT	N/A	N/A	N/A	N/A	260 10/	N/A
VISUAL QUALITY OBJECTIVES	Acres						
Preservation		8,320	81,320	81,320	81,320	81,320	86,740
Retention		N/A	62,748	108,901	91,276	118,584	151,379
Partial Retention		N/A	150,599	200,277	170,407	174,662	331,542
Modification & Maximum Mod.		N/A	1,164,755	1,068,924	1,116,419	1,084,856	889,761
TRANSPORTATION							
TIMBER PURCHASER ROAD BUILDING							
Local Road Construction and Reconstruction							
Construction	Miles/yr						
Decade 1		74	81	81	80	62	49
Decade 2		N/A	38	33	36	30	10
Decade 5		N/A	9	5	4	9	7
Reconstruction	Miles/yr						
Decade 1		212	159	157	156	132	108
Decade 2		N/A	137	141	142	120	100
Decade 5		N/A	120	121	121	117	99

10/One campground of 260 PAOT

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
ARTERIAL AND COLLECTOR ROAD CONSTRUCTION & RECONSTRUCTION							
Construction	Miles/Year						
Decade 1		N/A	0	0	0	0	0
Decade 2		N/A	0	0	0	0	0
Decade 5		N/A	0	0	0	0	0
Reconstruction	Miles/Year						
Decade 1		N/A	62	62	62	62	62
Decade 2		N/A	62	62	62	62	62
Decade 5		N/A	62	62	62	62	62
GENERAL PURPOSE ROAD BUILDING							
Construction	Miles/Year						
Decade 1		N/A	0 3	0 3	0 3	0 3	0 3
Decade 2		N/A	0	0	0	0	0
Decade 5		N/A	0	0	0	0	0
Reconstruction	Miles/Year						
Decade 1		N/A	24	24	26	21	21
Decade 2		N/A	29	30	32	25	27
Decade 5		N/A	40	42	42	35	40
ROADS SUITABLE FOR PASSENGER CAR USE	Miles	N/A	1,200	1,200	1,200	1,200	1,200
ROADS SUITABLE FOR HIGH-CLEARANCE VEHICLES ONLY (Mid-point of decade) 11/	Miles						
Decade 1		N/A	7,775	7,775	7,770	7,679	7,615
Decade 2		N/A	8,370	8,344	8,348	8,137	7,911
Decade 5		N/A	8,869	8,731	8,785	8,484	8,177
OPEN ROAD MILEAGE (end of decade)	Miles						
Decade 1		N/A	6,500	6,500	6,500	6,500	6,500
Decade 2		N/A	6,500	6,290	6,290	6,070	6,070
Decade 5		N/A	6,500	5,400	5,400	4,550	4,550

11/ Not all road mileages would be open for travel, due to road closure strategies

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
RIPARIAN AREA MANAGEMENT AND FISHERIES							
Sediment[12/]	Index						
Decade 1		N/A	855	853	852	807	495
Decade 2		N/A	809	806	811	772	399
Decade 5		N/A	625	597	628	600	287
WATER YIELD	Thousands of acre-feet						
Each Decade		N/A[13/]	620	620	620	620	620
Improved Watershed Conditions	Acres						
Each Decade		N/A	200	200	500	1000	1000
Anadromous Fish Use	Thousands of Wildlife & Fish User Days						
Decade 1		N/A	29.7	19 9	25.5	27 4	33 2
Decade 2		N/A	39 9	20 7	32.0	35 8	47 4
Decade 5		N/A	45 1	23.4	42 0	49 5	60 6
Anadromous Fish Habitat Improvements	Thousands of Pounds of Fish						
Decade 1		N/A	95 7	18 0	62 4	77 7	123 5
Decade 2		N/A	176 1	25 0	113.8	144 3	235 8
Decade 5		N/A	217.8	45 8	192 8	252 5	339 9
Anadromous Fish Commercial Harvest	Thousands of Pounds of Fish						
Decade 1		N/A	40 1	26.8	34.4	37 0	44 9
Decade 2		N/A	53 9	28 0	43 2	48 4	64 1
Decade 5		N/A	61 0	31.6	56.7	66 9	81.9
Steelhead Production	Thousands of Smolt						
Decade 1		N/A	195 5	130 7	167 8	180 5	218 7
Decade 2		N/A	262.6	136 5	210 6	236 0	312 4
Decade 5		N/A	297.3	153 9	276 5	326 3	399 2

12/ These numbers are an index for comparison. They have no absolute value

13/ The procedure used for calculating water yield in the Unit Plans (NC Alternative) was different than the methodology used in all the other alternatives, which utilized FORPLAN runs. Therefore, the results are not directly comparable. Refer to Appendix C (Derivations of coefficients for water) in the Unit Plans for additional information on NC methodology.

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
Chinook Salmon	Thousands of Smolt						
Decade 1		N/A	52 0	34.7	44 6	48 0	58 1
Decade 2		N/A	69 8	36 3	55 9	62 7	83 0
Decade 5		N/A	79.0	40 9	73 5	86 7	106 1
BIG-GAME HABITAT							
Wildlife Habitat Improvement							
Decade 1	Acres	N/A	500	230	500	500	1,300
Decade 2		N/A	350	210	500	500	1,250
Decade 5		N/A	325	210	500	500	1,200
Decade 1	Structures	N/A	100	230	325	325	180
Decade 2		N/A	65	215	325	325	180
Decade 5		N/A	65	215	315	315	160
Big-Game Use	Thousands of Wildlife &						
Decade 1	Fish User	N/A	121 7	117 9	119 8	121 7	115 3
Decade 2	Days	N/A	126.2	126 2	124 9	130 6	124 9
Decade 5		N/A	121 7	128 7	128 7	139 6	137 0
Habitat Effectiveness Index (HEI)							
Decade 1		N/A	56	.54	55	56	.53
Decade 2		N/A	58	.58	58	60	58
Decade 5		N/A	.56	59	59	64	63
Rocky Mountain Elk Potential Population[14/]	Thousands of Animals						
Summer							
Decade 1		N/A	13 4	13.0	13.2	13 4	12 7
Decade 2		N/A	13 9	13 9	13 9	14 4	13 9
Decade 5		N/A	13.4	14.2	14 2	15.4	15.1

14/Estimate of population potentials between alternatives is strictly a modeling approach used to estimate habitat capability to carry potential numbers of elk There is no link to current population numbers and is soley used to illustrate differences between alternatives.

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
Winter							
Decade 1		N/A	5 7	5 5	5 6	5.7	5 4
Decade 2		N/A	5 9	5 9	5 7	6.1	5 7
Decade 5		N/A	5.7	6.0	6 0	6 5	6 4
Primary Cavity Excavator Species	Percent of Potential Population	40	40	40	40	40	60
OLD GROWTH							
Old-Growth Indicator Species Pileated Woodpecker	Potential Pairs						
Each Decade		N/A	149	174	201	199	297
Old-Growth Indicator Species Pine Marten	Potential Pairs						
Each Decade		N/A	86	86	107	107	120
Three-Toed Woodpecker[15/]							
Decade 1		N/A	N/A	N/A	N/A	N/A	N/A
Decade 2		N/A	N/A	N/A	N/A	N/A	N/A
Decade 5		N/A	165	251	215	215	247
Acres of Old Growth Remaining After:	Acres						
Decade 1		228,352	247,320	248,976	252,384	251,583	267,189
Decade 2		N/A	181,758	185,952	192,216	191,577	226,591
Decade 5		N/A	90,509	104,661	121,042	121,042	178,761
UNDEVELOPED AREAS							
Unroaded Areas Assigned to Undeveloped Management	Acres	54,167	13,322	59,179	66,962	79,854	193,064

15/Due to a mountain pine beetle epidemic, very little lodgepole pine old growth will be available until the third decade.

TABLE II-5 (continued)
QUANTIFIABLE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS BY ALTERNATIVES
(Alternatives are ranked in order from most to least land potentially suitable for timber production.)
(Average Annual Units Planned in First Decade, Projected in Subsequent Decades)

Average Annual Resource Output, Environmental Effect, Activity, or Cost	Unit of Measure	ALTERNATIVES NC No Change	B Mod	A No Action	F	I Preferred	C Mod
Unroaded Areas Assigned to Roaded Management Remaining Undeveloped After	Acres						
Decade 1		0	0	0	17,937	0	N/A[16/]
ACRES AVAILABLE FOR MINERAL EXPLORATION[17/]	Acres						
Each Decade		1,372,755	1,372,755	1,372,755	1,372,755	1,372,755	1,372,275
MINERAL OPERATING PLANS	Number Active/year						
Decade 1		92	92	92	92	92	83
Decade 2		105	105	105	105	105	94
Decade 5		130	130	130	130	130	116
ENERGY MINERALS PRODUCED	Billions of BTU's/Year						
Decade 1		187	187	185	184	184	177
Decade 2		928	940	928	923	923	892
Decade 5		1,875	1,900	1,875	1,866	1,866	1,802
NONENERGY MINERALS PRODUCED	Millions of Dollars						
Decade 1		13 0	13 0	13 0	13.0	13 0	12 8
Decade 2		39 6	39 6	39 6	39 6	39 6	38 0
Decade 5		86 5	86 5	86 5	86 5	86 5	83 4
FIRE MANAGEMENT EFFECTIVENESS INDEX	Dollars/ Thousand Protected						
Each Decade	Acres	1,344	1,344	1,344	1,344	1,344	1,344

16/Alt. C modified retains all presently unroaded areas in a roadless status
17/Includes land with mineral rights reserved by others

a. *Comparison of Past, Present, and Future Timber Outputs*

This section presents information for comparison of the No-Action Alternative (Alternative A) against timber management in the other alternatives and against historical timber management outputs represented in Alternative NC. The basis of the No Action Alternative is presented in the National Forest Management Act (NFMA) regulations (36 CFR 219 12(f)(7)) and is defined in the National Environmental Policy Act (NEPA) regulations (40 CFR 1502 14(d))

The No Action Alternative "shall reflect the current level of goods and services provided." For timber outputs, the current level is that identified as the potential yield in the 1979 Timber Resource Management Plan (TRMP). This alternative also shall reflect, "the most likely amount of goods and services expected to be provided in the future if current management continues " Current management comprises the land management direction in the South Fork, Silvies, and John Day Unit Plans and in the 1979 Timber Resource Management Plan. This direction is modified as a result of the 1984 Oregon Wilderness Act, the NFMA regulations, including compliance with Management Requirements (MRs) discussed earlier in this chapter, and the Omnibus Oregon Wild and Scenic Rivers Act of 1988 Within these modifications, the No Action Alternative was developed to maintain the current level of timber offered for sale

Recent levels of timber sold and harvested for the ten-year period 1980-1989 are shown in Table II-6 The potential yield of the 1979 Timber Resource Management Plan (Alternative NC, No Change) is modified only by the 1984 Oregon Wilderness Act in Table II-6. In addition, comparable information for each of the other alternatives is shown

As shown in Table II-6, the average amount of timber sold and harvested each year over the last decade is below both the potential yield and slightly below the programmed harvest of the 1979 Timber Resource Management Plan. During the early 1980's, the demand for timber locally was greatly reduced, due in part to high interest rates and a national recession Recent economic recovery of the timber industry has resulted in much higher average volumes harvested during the last two years of the decade Overall, the timber volume sold and harvested for the decade covered by the 1979 Timber Resource Management Plan will be below the potential yield projected in that plan In addition, Forest budget and staffing allocations have not been sufficient to prepare and offer timber sales at the levels called for in the 1979 Timber Resource Management Plan

The harvest level in recent years (1986 and 1988) has averaged 249.4 million board feet per year. This harvest level exceeds the programmed harvest but not the potential yield levels set in the 1979 Timber Resource Management Plan When the current inventory of sold volume under contract is depleted, the timber volume harvested is expected to equal timber volume sold

The differences between the current levels of timber cut, timber sold, potential yield, and future levels of production can be explained by looking at a number of different items Utilization standards will have changed between the 1979 Timber Resource Management Plan to the Forest Plan from 9-inch DBH with a 6-inch top to a 7-inch DBH with a 4-inch top for all managed stands This change in utilization standards has increased net wood fiber production computations by including more wood fiber on a per acre base.

The most important changes from the past plan have come in two areas, a new Forest timber inventory and re-evaluation of the forested land base A new Forest timber inventory was conducted in 1979-1980 and was based on an inplace mapping system which placed timbered stands into different categories based on broad species compositions (working groups) and by structural composition (management needs). The earlier inventory was based on a plot expansion system with fewer management needs identified The new system is considered to be more representative of actual forest land conditions. Significant changes have occurred because of the re-evaluation of the timbered land base. There has been a reduction of approximately 106,370 acres of tentatively suitable forested

lands for timber production under the current direction Categories in which there were significant changes were non-forest lands (juniper types from forested to non-forested), lands unsuitable for timber production (regeneration difficulty), and road and stream acres removed from the forested land base

There were also changes in the yield tables used to develop the allowable sale quantity New yield tables were developed using state-of-the-art methods and many different management scenarios specifically developed for the Malheur National Forest. Similar types of timber yield tables developed for the Forest Plan produced about the same harvest level as ones in the Timber Resource Management Plan The major change in yield table development for the Forest Plan was the development of a broader range of management scenarios for each timber stratification in the Forest Plan as compared to the limited number used in the Timber Resource Management Plan

There have been changes in Management Requirements since the release of the Unit Plans and the Timber Resource Management Plan These changes have not had a great effect on the No Action Alternative This is due to the fact that the Malheur's Unit Plans and Timber Resource Management Plan were developed in the late 1970's and they had already incorporated items such as water quality protection, riparian habitat requirements (SMU concept), old-growth needs of specific animals, harvest unit diversity, and visual quality objectives

Of all the changes discussed, the one that has had the greatest effect on the current and future allowable sale quantity and timber sale program quantity is the change in the tentatively suitable land base This change has reduced the forested land base on which timber can be produced In general, actual timber sale program quantity levels have not met the projected level in the Timber Resource Management Plan or the No Action Alternative for the Forest Plan The actual cut (harvest) level has been controlled by market conditions which have resulted in less material being demanded in five of the last ten years than the potential yield level established in the Timber Resource Management Plan The actual timber volume sold for the past ten years has been controlled by Forest Service budget allocations for timber production and has not met the potential yield level, but it has exceeded the timber sale program quantity for the first decade of the preferred alternative in fiscal years 1984, 1986, 1987, 1988, and 1989



TABLE II-6: Comparison - Past, Present, and Alternative Timber Outputs (Million Board Feet)

	1980-89 Average Annual Timber		NC (No Change)1/	
	Sold	Cut	Potential2/ Yield	Programmed Harvest
I Allowable Sale Quantity (ASQ)4/				
A Green	210 8	169 0	264 9	225 2
B Salvage	8 2	5 3	4 8	5 1
Total Allowable Sale Quantity	219 0	174 3	269 7	230 3
II Other Sawtimbers5/				
A Sawtimber from lands designated unsuitable for timber production6/				
1 Green	0	0	0	0
2 Salvage	0	0	0	0
Total Sawtimber Volume from Unsuitable Lands	0	0	0	0
B Dead sawtimber7/	0	0	0	0
Total Other Sawtimber	0	0	0	0
III Submerchantable Volumes From all Lands8/				
A Fuelwood	5 2	5 2	0	0
B Other (including cull)	4 1	9 2	0	0
Total Submerchantable Volume	9 3	13 4	0	0
Total Net Merchantable Sawtimber (I + II)	219 0	174 3	269 7	230 3
Total Nonchargeable (II + III)	9 3	13 4	0	0
IV Timber Sale Program Quantity (I + II + III B)	228 3	187 7	N/A	N/A

1/Conversion ratio used in the 1979 Timber Resource Management Plan was 6 713 board feet/cubic feet for sawtimber, and 5 board feet/cubic feet all other wood products, not comparable to other alternatives

2/The assumptions used in the existing Timber Management Plan to calculate potential yield differ from those used to calculate allowable sale quantity While potential yield represented a level that could be produced, allowable sale quantity represents a timber objective and program for achievement of planned levels However, potential yield and allowable sale quantity represent a ceiling on amount of chargeable timber volume that could be sold for a given decade In this context, the two terms are comparable

3/Conversion ratios used for planning alternatives were 5 72 board feet/cubic feet for sawtimber, 3 board feet/cubic feet all other wood products for first decade outputs All Alternatives have conversion ratios that vary over time, dependent upon size of harvestable material and utilization standards

4/The allowable sale quantity is composed of those volumes resulting from the yield projections of FORPLAN Allowable sale quantity is obtained from lands designated as suitable for timber production under NFMA standards, and meets utilization standards in the Regional Guide When sold, the volume is called "chargeable", and is used to determine achievement of planned allowable sale quantity goals

ALTERNATIVES				
A3/ (No Action)	B-Mod	C-Mod	F	I (Preferred)
220 6	252 0	146 0	233 7	200 0
0	0	0	0	0
220 6	252 0	146 0	233 7	200 0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
5 4	6 2	1 3	6 2	4 3
5 4	6 2	1 3	6 2	4 3
3 1	3 1	3 1	3 1	3 1
3 6	3 6	3 6	3 6	3 6
6 7	6 7	6 7	6 7	6 7
226 0	258 2	147 3	239 9	204 3
12 1	13 9	6 7	6 7	6 7
232 7	265 9	154 0	246 6	211 0

5/ Meets utilization standards in Regional Guide but is not considered "chargeable" against allowable sale quantity goals

6/ Volume is estimated from incidental volume of timber that will be sold from lands not designated for timber production

7/ Dead sawtimber from lands designated suitable for timber production but which were not included in yield tables

8/ Estimated timber volume that does not meet utilization standards in the Regional Guide but could be utilized for products other than sawtimber It is not considered "chargeable" against planned allowable sale quantity goals

9/ Timber sale program quantity includes allowable sale quantity for the first decade and estimated additional volume planned for sale during the first decade Timber sale program quantity includes personal use firewood here

Management of the timber resource differs in each alternative On lands suitable for timber production, the volume sold, the long-term growth potential, and the silvicultural activities vary by alternative. The amount of land suitable for timber production also varies substantially by alternative

Lands suitable for timber production are the base from which the allowable sale quantity (ASQ) is calculated. Timber resource inventory and management data are presented in Table II-7 The table and the accompanying narrative provide an understanding of how and why differences in timber related data occur and the interaction of timber management with other resource management as overall management goals vary from alternative to alternative

Suitable acres are displayed in column 1 of Table II-7. This information reflects the difference in land management between alternatives With the exception of acres which are not cost-efficient for timber production, the total suitable acres are a function of acres assigned to wilderness, roadless recreation, and old-growth stands. As old growth, roadless recreation, and/or wilderness acres increase, the number of suitable acres decreases Consequently, the alternative having the fewest acres in these categories will have the most suitable acres. Alternative B-Modified has the fewest acres assigned to management strategies precluding timber management, and thus the most suitable acres, with the exception of Alternative NC which uses the pre-1978 base for the determination of commercial forest (suitable) lands This trend is generally followed throughout all alternatives Alternative C-Modified has the most acres assigned to management strategies precluding timber management and, therefore, the fewest suitable acres

An exception to this trend occurs in Alternatives A and F where the combination of acres assigned to non-timber management strategies combined with acres of tentatively suitable land that is not cost-efficient have caused these two alternatives to change position in the ranking, with Alternative F having more suitable acres Most tentatively suitable acres that are not cost-efficient for timber production occur in visual management areas and low site potential lands in all alternatives . Alternative B-Modified has the least, where only 30,305 acres are cost-inefficient, they occur both in the Visual and in the General Forest management areas These cost-inefficient acres occur in the visual management areas due to the high extraction cost and the low value of tree species being harvested; i.e., low value species such as mixed conifer and lodgepole pine located on steep ground, with its high logging cost. How many acres become cost-inefficient (i e , managed under minimum level management) is dependent on the overall theme of the alternative and the total number of acres found in visual management areas Certain management constraints on outputs, such as cover for elk habitat, also may drive the assignment of cost-inefficient acres Alternative B-Modified, a high commodity alternative, has relatively few cost-inefficient visual management acres because there are relatively few visual management acres in the alternative, where Alternative C-Modified, an amenity alternative with a large number of timbered visual acres, has the most acres of tentatively suitable land which is not cost-efficient for timber production purposes. Alternative B-Modified also approximates the Resource Planning Act Alternative and minimum timber harvest levels are set each decade to meet Resource Planning Act goals The FORPLAN model uses all but 30,305 acres of the tentatively suitable land base to reach these goals This is the primary reason why there are so few tentatively suitable acres managed under minimum level management in the alternative

TABLE II-7

Timber Resource Management Information by Benchmark

Benchmark or Alternative1/	Suitable Lands M Ac	Inventory Vol/Ac Begin 1980 MMCF	Inventory Vol/Ac 1980 CF	Inventory Vol/Ac End 2130 MMCF	First Decade Average Annual ASQ MMCF	% of Col (2)	First Decade Average Annual ASQ MMBF	LTSYC MMCF	% of Col (4)	Decade Met	Average Annual Net Growth Cu Ft /acre Present	2030	MMCF 2030	% of Col(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(13 1)
Benchmarks														
Max Tbr BM 1	1044 86	1879 35	1798 66	2153 16	54 82	2 9	313 57	63 95	3 0	15	21 09	55 96	58 47	91 4
Max PNV BM 3	1041 55	1874 41	1799 64	2038 13	53 26	2 8	304 64	59 39	3 0	10	21 09	41 57	43 27	72 9
Max PNV with MR's BM7	996 08	1771 74	1787 69	2062 95	47 72	2 7	272 95	57 23	2 8	13	21 09	47 68	47 49	83 0

Timber Resource Management Information by Alternative

Benchmark or Alternative1/	Suitable Lands M Ac	Inventory Vol/Ac Begin 1980 MMCF	Inventory Vol/Ac 1980 CF	Inventory Vol/Ac End 2130 MMCF	First Decade Average Annual ASQ MMCF	% of Col (2)	First Decade Average Annual ASQ MMBF	LTSYC MMCF	% of Col (4)	Decade Met	Average Annual Net Growth Cu Ft /acre Present	2040	MMCF 2035	% of Col(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(13 1)
Alternatives														
NC (No Change)	1116 58	2497 13	2236 41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15 91	N/A	N/A	N/A
B-Modified	956 78	1815 49	1897 46	2009 83	44 00	2 4	252 00	50 61	2 3	13	21 09	41 47	39 68	78 4
F	919 75	1747 27	1899 83	1912 31	40 90	2 3	233 70	47 03	2 3	12	21 09	38 57	35 47	75 4
A (No Action)	898 42	1711 55	1905 11	1882 83	38 60	2 2	220 60	45 33	2 3	12	21 09	36 84	33 10	73 0
I (Preferred)	835 97	1541 88	1844 35	1504 33	34 80	2 2	200 00	40 73	2 4	12	21 09	39 13	32 71	80 3
C-Modified	770 39	1392 66	1807 71	1610 41	25 50	1 8	146 00	27 95	1 3	14	21 09	37 97	29 25	104 6

1/ Tentatively suitable lands for all alternatives except NC are 1,039,868 acres

Timber Resource Management Information by Benchmark and Alternative

Benchmark or Alternative	Area and Percent of Suitable Land by Yield Level: Full Yield M Ac	Full Yield % of Col (1)	50-90% Yield M Ac	50-90% Yield % of Col (1)	Under 50% Yield M Ac	Under 50% Yield % of Col (1)	Harvest Methods: Comm Thin M Ac	Clearcut M Ac	OSR Existing Stands M Ac	Shelterwood Seed Tree M Ac	2/ Selection M Ac	Harvest Total % of Col (1)	Regen Hvst Total % of 3/ Col (1)
	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(21 5)	(22)	(23)	(23 5)	(24)
Benchmark													
Max Tbr BM 1	1,044 8	100 0	0	0	0	0	0	52 8	295 6	25 7	21 2	37 8	8 0
Max PNV BM 3	1,041 6	100 0	0	0	0	0	0	1 9	341 6	49 0	12 1	38 8	5 2
Max PNV with MR's BM7	949 1	95 3	47 0	4 7	0	0	0	30 1	222 8	51 4	24 3	33 0	9 2
Alternatives													
NC (No Change)	655 8	58 7	460 8	41 3	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A
B-Modified	867 0	90 6	39 7	4 1	50 1	5 2	103 0	43 2	104 5	71 6	40 5	37 9	10 1
F	811 9	88 3	36 1	3 9	71 7	7 8	81 4	27 5	96 0	92 0	57 8	38 6	9 2
A (No Action)	769 1	85 6	34 4	3 8	94 9	10 6	75 0	27 5	85 6	89 3	57 4	37 3	8 8
I (Preferred)	468 7	55 9	322 9	38 6	44 5	5 3	67 8	33 3	63 0	50 8	64 2	33 4	9 5
C-Modified	265 2	34 4	414 9	53 8	90 2	11 7	38 4	21 9	58 2	37 4	50 1	26 7	8 1

2/ One forth of these acres are considered regeneration in the first decade

3/ Combines clearcut, shelterwood regeneration, and 25% of selection harvest acres

Inventory information (columns 2, 3, and 4) vary by the number of suitable acres available, the species present, and in the case of the ending inventory values (column 4), the management intensities being followed The beginning inventories are the direct result of the amount of suitable acres and tree species present, i e., those alternatives that have a higher proportion of their acre base in mixed conifer species, with its higher volume per acre, will have a higher starting inventory then those alternatives that have a higher proportion of ponderosa pine, with a low volume per acre, in its acre base.

This same principle also applies to per-acre-cubic-foot volume of any given alternative. The ending inventory volumes are dependent on (1) suitable acres, (2) the ending age-class distribution, i e , a lot of acres in large old-growth ponderosa pine as in Alternative C-Modified results in higher ending inventory, (3) the species mix, i e., more acres of ponderosa pine as in Alternatives C-Modified, and I, and (4) the management options prescribed, i e., intensive timber management to produce wood fiber as in Alternatives B-Modified, F, and I; or prescriptions to produce large diameter ponderosa pine on available acres as in Alternative C-Modified

Most alternatives produced an ending inventory volume in the year 2130 that is larger than their beginning inventory in 1980, and all are higher than in 1990. Any lower ending inventory would be related to timber growth and harvest patterns that are tied to timber management intensities Alternative C-Modified has relatively lower ending inventories because of the change from mixed conifer species on many acres to ponderosa pine, but relatively higher volumes per acre than other alternatives because the volumes remaining in the residual trees are grown to produce larger diameter ponderosa pine Beginning inventory and cubic volumes per acre for Alternative NC were developed using a different suitable land base and the 1970 Forest inventory information Since then there have been adjustments in forested land acres and sampling methods used to determine standing volume and species present Alternative A gives an accurate picture of these inventory changes, with the updates for forested acres and species present made. Because of the differences in these items, Alternative NC has the highest values for any alternative or benchmark. For this alternative, inventory information was based on the 1970 Forest timber inventory and is not considered as reliable as contemporary inventory information

First decade allowable sale quantity (displayed in columns 5, 6, and 7) reflects the management intensity chosen and the number of suitable acres available Timber management in the first decade (1990-1999) includes a full range of timber prescriptions to produce the desired timber products Those alternatives that do not produce a specialty product (e g., large diameter ponderosa pine in Alternative C-Modified, or uneven-aged management regimes in Alternative I) rely on timber prescriptions that remove the existing overstory and then manage the majority of stand understories to produce future harvestable volume. Most timber harvests occurring over the forest in the past 10 years were similar to this management scenario

Alternative B-Modified has predetermined first decade minimum allowable sale quantity levels based on the Forest's Resource Planning Act timber goal for the first decade Alternative A had a budget constraint applied proportionally to the timber management program in the first decade to reflect current budget levels This budget constraint causes the first decade allowable sale quantity to be lower than expected in Alternative A. The management goals of Alternatives C-Modified, and I reduce the first decade allowable sale quantity. Here the theme of the alternative provides for growing more ponderosa pine and/or large diameter ponderosa pine on as many acres as possible or meeting other resource objectives. This, combined with the nondeclining flow constraint, keeps the harvest volume down in the first decade Alternative F has a first decade allowable sale quantity level that represents the volume that could be produced while meeting the objectives of growing the species that has the greatest fiber growth potential Alternative NC produces the highest allowable sale quantity (Potential Yield in MMBF) of all the alternatives Again, this alternative is based on a different suitable land base, timber yield tables, and computer model

Long-term sustained yield capacity (columns 8-10) is determined by suitable acres and timber management intensities in each alternative Alternatives B-Modified, F, and A with a large number of suitable acres and a large number of acres assigned to full-yield prescriptions (see columns 14 and 15), have the higher levels of long-term sustained yield capacity The lower long-term sustained yield capacities are found in those alternatives which have fewer acres assigned to full yield timber prescription, Alternatives C-Modified, and I Alternative C-Modified has more acres assigned to ponderosa pine production and is designed to produce 26-inch diameter or larger ponderosa pine trees over a longer rotation. Ponderosa pine stands do not have the potential to produce fiber volume as quickly as mixed conifer species on a per acre basis Although this will result in stands that are more resistant to insects and diseases, this causes a reduction in growth potential. Alternative C-Modified also has the lowest number of suitable timbered acres. This combination gives this alternative the lowest long-term sustained yield capacity of all the alternatives

The allowable sale quantity in all alternatives equals the alternative long-term sustained yield capacity volume between the 12th and 14th decades, with the majority (Alternatives A, F, and I) reaching this level by the 12th decade Management of existing understories has the effect of postponing future regenerated stand management for at least three decades, thus delaying the point when the allowable sale quantity equals the long-term sustained yield capacity of the alternative until the 12th decade Management of the majority of the existing understories does produce a higher first decade allowable sale quantity in these alternatives The theme of Alternative B-Modified has the same effect, but the allowable sale quantity equals long-term sustained yield capacity one decade later The point where allowable sale quantity and long-term sustained yield capacity are equal in Alternative C-Modified, does not occur until the 14th decade This alternative is designed to produce large diameter ponderosa pine trees Because of this, the overall conversion to future managed stands takes longer and more volume is maintained in standing inventory Alternative NC did not have a long-term sustained yield capacity when it was developed in 1979 The long-term sustained yield capacity for Alternative A would be representative of NC if the land base and computer modeling assumptions were the same for Alternative NC

There has been an upward trend in growth since the first Forest inventory was taken in 1956-1958 At that time the annual board foot/acre/year growth was 89 3 board feet (18 6 cubic foot/acre/year) in sawtimber The most recent Forest inventory (1979) showed an increase in average growth rate to 130 1 board feet/acre/year (20 8 cubic foot/acre/year) in sawtimber material The growth rate (columns 11-13 1) of all the computer simulation runs for benchmarks and alternatives continue this upward trend By the 5th decade, growth is anticipated to have increased over current levels The highest growth levels occur in those alternatives (A, B-Modified, and F) that have the largest number of acres assigned to full-yield timber intensities and a high number of mixed conifer acres The lower growth rates occur in those alternatives that have fewer acres sent to full-yield timber intensities and produce large-diameter ponderosa pine (Alternative C-Modified) and/or ponderosa pine on mixed conifer acres (Alternative I) All alternatives, by the 5th decade, produce net growth which is at least 80 percent of the long-term sustained yield capacity and in Alternative C-Modified it exceeds long-term sustained yield capacity by about 15 percent Growth meets or exceeds long-term sustained yield capacity in Alternatives A, B-Modified, F, and I in the 9th, 10th, or 11th decades Growth meets or exceeds long-term sustained yield capacity in Alternative C-Modified in the 5th decade No information is available on Alternative NC for growth or long-term sustained yield capacity A more current estimate of when growth equals long-term sustained yield capacity could be derived from Alternative A if the current land base and modeling system were the same

When growth equals long-term sustained yield capacity is a result of the timber management activities that have occurred (i e , full yield timber intensities, amount of mixed conifer or ponderosa pine acres present, acres of suitable land) up to that point and what

the long-term sustained yield capacity of the alternative is The alternative that has the lowest long-term sustained yield capacity (Alternative C-Modified) has growth equaling long-term sustained yield capacity the earliest. Alternative I, with higher long-term sustained yield capacity and ponderosa pine emphasis management goals, takes longer for the management prescription to produce growth that is equal to long-term sustained yield capacity In all of the alternatives except Alternative B-Modified, growth usually fluctuates at or below that level in at least one or more of the remaining decades once long-term sustained yield is met The main reasons for this fluctuation are: (1) the objective of the alternative, and (2) how the FORPLAN model selects and schedules timber management prescription (full-yield vs. less-than-full yield) to meet the objectives of the alternative This selection/scheduling has the effect of determining what the growth will be at any given time

The area of suitable acres by different levels of timber yields can be found in columns 14-19. Those alternatives that have high numbers of acres going to full-yield prescriptions (Alternatives B-Modified, F, and A) produce a higher first decade allowable sale quantity, higher long-term sustained yield capacity, and higher growth Those alternatives that have the majority of their acres assigned to less than full-yield prescriptions (Alternatives C-Modified, and I) have a lower first decade allowable sale quantity and long-term sustained yield capacity This is clear when allowable sale quantity and long-term sustained yield capacity are compared with acres sent to full-yield prescriptions Alternative NC uses a ranking system based on the 1979 Timber Resource Plan of standard (full yield), special, and marginal (50–90 percent of full yield), in addition to using a different land base and computer model to determine volumes. A close representation of what this alternative would produce if updated to current standards can be found in Alternative A

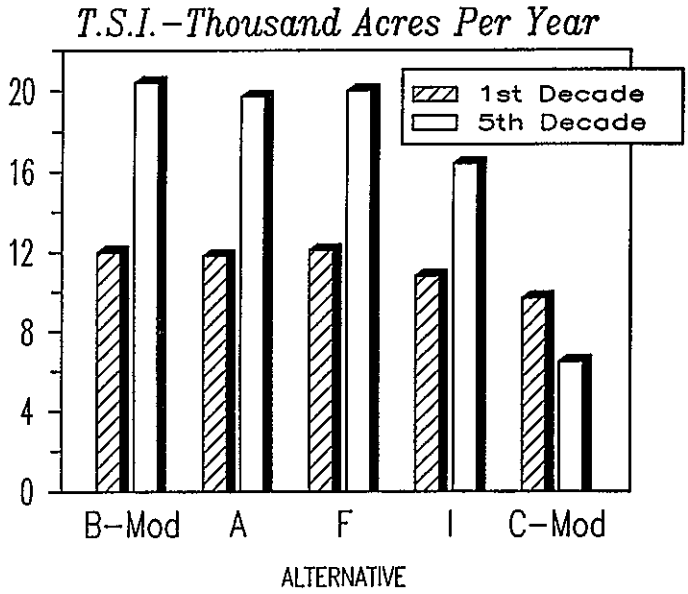
Acres by harvest methods can be found in columns 20–23 Those alternatives that have higher harvest levels (Alternatives A, B-Modified, and F) have more flexibility in developing a harvest schedule to produce a base sale schedule (BSS) from the more productive lands first using full-yield timber intensities (columns 14–19). Those alternatives that have higher levels of wilderness and roadless management and/or more special resource objectives (i e , visual, riparian management, large diameter ponderosa pine, and as many acres of ponderosa pine as possible) usually have a reduced flexibility in meeting a base sale schedule (Alternatives C-Modified and I) They also harvest less productive sites and/or use less-intensive timber prescriptions to meet harvest levels Based upon area harvested, it would take from 29 to 37 years to cut over the Forest's suitable land base at the rates established by the first decade harvest level The majority of the alternatives (A, B-Modified, F, and I) would require 29 to 32 years, depending upon actual volumes realized during timber harvest implementation The actual transition of the Forest from existing stands to managed stands would require 100 to 130 years based on FORPLAN runs The majority of the alternatives (B-Modified, F, and I) require 100 to 110 years Alternative NC does not supply this information, but a close approximation would be Alternative A if the NC Alternative was updated to current standards

A pattern as to how fast the suitable land base in a given alternative is entered is determined by the amount of overstory removals occurring in existing stands and the regeneration harvest level The more overstory removals in an alternative, the quicker the suitable land base is cut over (column 20 5) Conversely, the more regeneration harvest and less overstory removal acres in an alternative, the slower the suitable land base is cut over Regeneration harvest levels tend to have the effect of reducing the rapidity of harvest entries on the suitable land base of the Malheur National Forest.

Timber stand improvement consists primarily of precommercial thinning. For the first three decades, most of the thinning occurs immediately following an overstory removal (estimated at 60 percent of the stands) or initiation of uneven-aged management Starting in the fourth decade, thinning occurs primarily in newly regenerated stands This

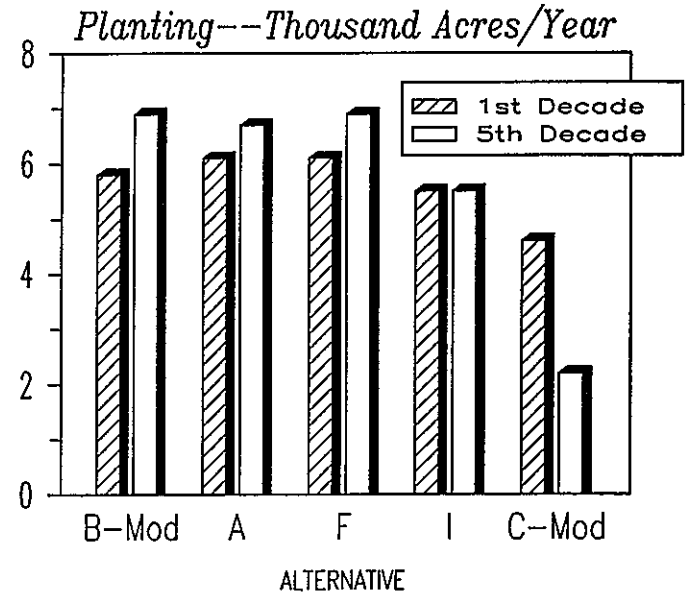
variation over time is shown in Figure II-34, as is the variation between alternatives. Information for the fifth decade for Alternative NC is not available.

FIGURE II-34: Timber Stand Improvement Acres by Alternative



Tree planting is expected to occur as a result of clearcutting mixed conifer stands and also shelterwood harvesting on slopes over 35 percent Figure II-35 displays the acres of reforestation planting by alternative Information for Alternative NC is not available

FIGURE II-35: Reforestation Planting by Alternative



Fuelwood (biomass) supply potential will vary with changes in harvest methods over the first five decades in all alternatives and will vary with changes in emphasis for leaving woody material on the site Regeneration harvest methods generally provide more fuelwood potential than partial-cut harvest methods

The species mix and size of material being provided will not remain constant over time in any of the alternatives. This material will include moderate and small diameters as harvests progress across the forest. Potential ponderosa pine harvest volume available will differ slightly by alternative, but will average slightly less than 50 percent for the first decade, decreasing to about 30 to 35 percent by the end of the third decade After the second decade the size of material provided will decrease, and the species mix will shift to approximately 65 percent mixed conifer species This change coincides with an increased emphasis on regeneration harvests used to manage released understories In Alternative C-Modified, a variety of sizes of harvestable material will be provided as the forest is managed to produce large diameter ponderosa pine. Species mix will vary between 25 and 50 percent ponderosa pine for the first few decades. In the third decade, ponderosa pine volume is expected to be reduced to 25 percent in this alternative In all alternatives, access to firewood will be available on the acres accessed for timber management activities

Firewood supplies are expected to increase over the first two decades in all alternatives Large diameter trees will become less available by the end of the second to the middle of the third decade in most alternatives due to a combination of timber management activities and wildlife snag requirement levels Timber management activities will have removed many large diameter trees or the remaining trees will be left to meet snag requirements During the third decade material will be smaller and woodcutters will become more dependent on logging slash as a source of firewood. Lodgepole pine is expected to cease to be a major firewood source by the end of the first decade due to the recent recovery efforts following heavy mortality as a result of the mountain pine beetle infestation

The supply of fuelwood for domestic use will vary in a fashion similar to that for industrial use, except that domestic users will not be limited to harvest units as potential fuelwood sources

Woodcutters will find some restrictions due to snag protection and, in specific instances, decreased access to certain roads for resource management objectives They will have to travel greater distances to find plentiful sources of firewood, but overall accessibility should remain good due to the existing density of roads throughout the forest.

Higher quality fuelwood will be provided in Alternative C-Modified because the forest will be managed to produce large diameter ponderosa pine trees. This will cause existing and future stands to be managed using longer rotations, resulting in larger trees. Woodcutters will be less dependent on logging slash than in other alternatives Access to wood will not be as good as in other alternatives as fewer roads will be maintained for timber hauling due to lower harvest levels Woodcutters will have to travel greater distances to find sources of firewood

Management for higher wildlife snag levels may result in increased restrictions on woodcutting in Alternative C-Modified.

No estimate for fuelwood (biomass) or personal use firewood supply potential for Alternative NC is available due to the lack of information about this alternative.

b. *Range - Alternative Comparisons*

Livestock grazing capacity is the number of animal-unit-months that are permitted to graze on the Forest while maintaining plant vigor and growth and providing for other resources such as watershed stability, enhanced water quality, wildlife habitat, etc Most of the livestock grazing capacity on the Forest is provided on non-forested lands Variations in livestock grazing capacity are related to the amount of transitory range provided through timber harvest and the method of management used to provide for improvement of riparian areas in less than satisfactory forage condition.

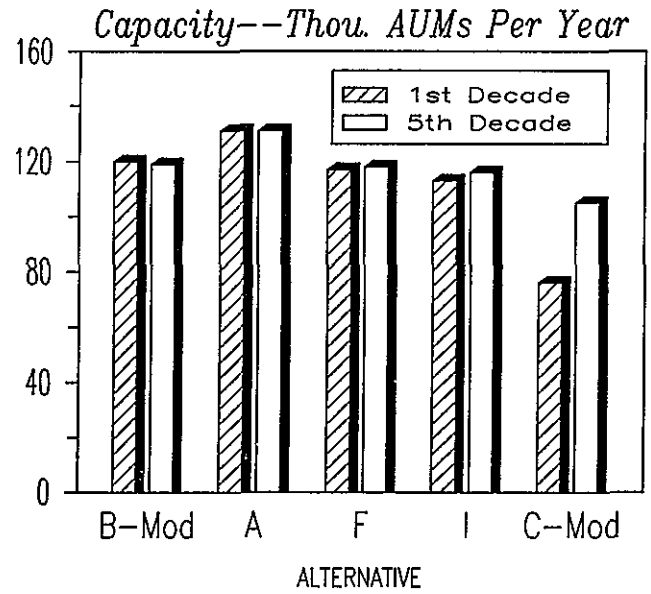
At this time local ranching operations receive over 50 percent of their cattle operations' feed supply from rangelands. Actual use of National Forest forage by livestock is currently 109 thousand animal unit months (fiscal year 1985 actual use), permitted use for that same year was 117 thousand animal unit months

Nationally, the demand for red meat has decreased for several years However, Forest demand for grazing land for cattle exceeds the current resource supply despite the fact that some permittees have recently elected to take nonuse rather than utilize the available forage (This source of forage, when made available to other permittees, was applied for immediately) Demand for grazing land is expected to remain constant or possibly increase because. 1) range forage is priced below concentrates, hay and privately owned rangeland, and 2) the appraised fair market rental value of grazing on public rangelands is below the overall private land lease rate Constant or increased demand for forage on the Forest is further evidenced by the fact that each year a number of requests for grazing permits are received, but permits are rarely available

Alternative A has the highest level of first decade capability for livestock grazing among the alternatives, followed by Alternatives NC, B-Modified, F, I, and C-Modified (see Figure II-41) Therefore, since Alternative A has the highest capacity for livestock grazing, it also has the highest capability to meet potential increased future demand Alternatives A and NC result in an increase above currently permitted levels and will provide increased capacity for potential increased livestock grazing demand Grazing capacity in the fifth decade is not available for Alternative NC The remaining alternatives would require a slight reduction in permitted levels over the planning period, as displayed in Figure II-41, except for Alternative C-Modified, which requires a large reduction

All alternatives, except for Alternative NC provide 1,351,275 acres available for livestock grazing within allotments The acres which are not suitable for livestock grazing occur in the Strawberry Mountain Wilderness Acres for Alternative NC are not available.

FIGURE II-36: Grazing Capacity by Alternative



c. *Wildlife - Alternative Comparisons*

Habitat for big-game provided by the Forest is determined by cover quality, size, and spacing, forage quantity and quality and by the amount of road traffic. As can be seen in Figure II-37, winter ranges can provide habitat for only a fraction of the summer elk populations Big-game populations are reduced each year by hunters (shown as wildlife user-days in Figure II-38), predation, and other natural causes Game animals are managed by the Oregon Department of Fish and Wildlife

FIGURE II-37: Potential Rocky Mountain Elk Populations

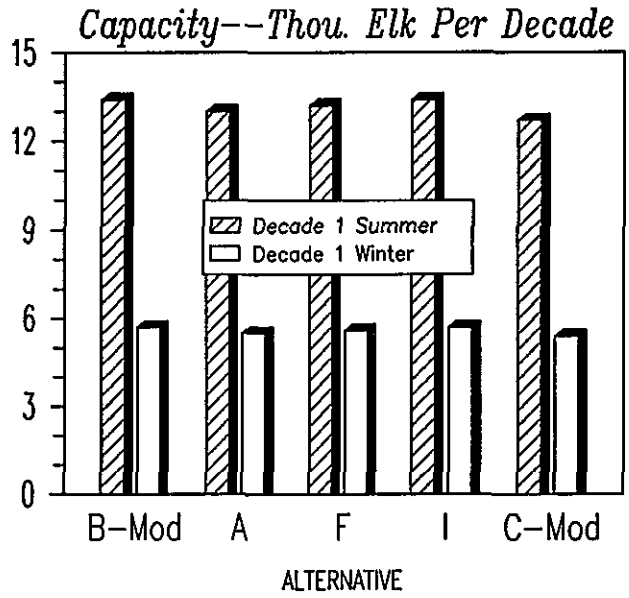
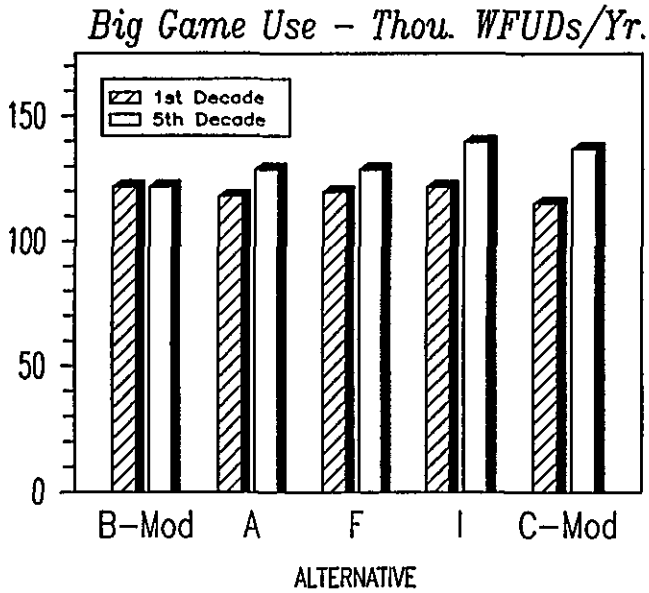


FIGURE II-38: Big-Game Use (Wildlife User-Days) By Alternative



Old growth is monitored through the use of indicator species that are dependent on the habitat for survival The capacity for potential pairs of two indicator species, pine marten and pileated woodpecker, are shown in Figure II-39 Data for Alternative NC are not available. Alternative C-Modified maintains more old growth than any other alternative, as shown in Figure II-40. All alternatives are expected to retain sufficient old growth to maintain viable populations of old-growth dependent species The amount of old growth remaining over time by alternative is shown in Figure II-41

FIGURE II-39: Potential Pairs of Indicator Species for Old Growth by Alternative

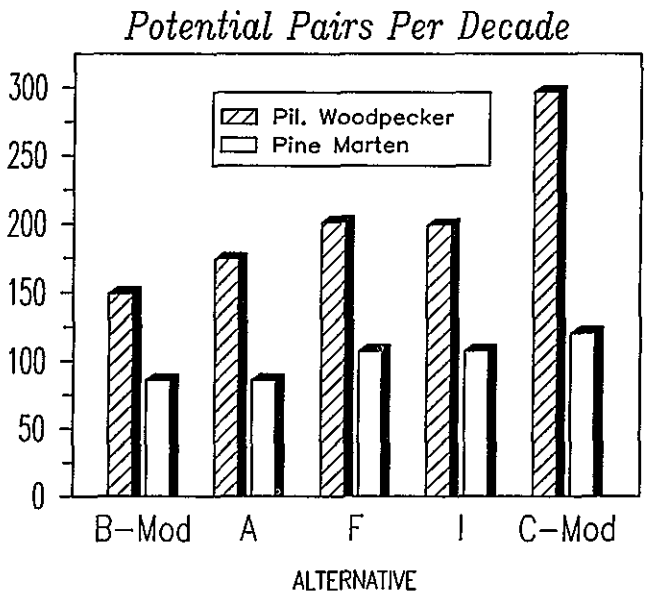


FIGURE II-40: Total Acres of Old Growth by Alternative

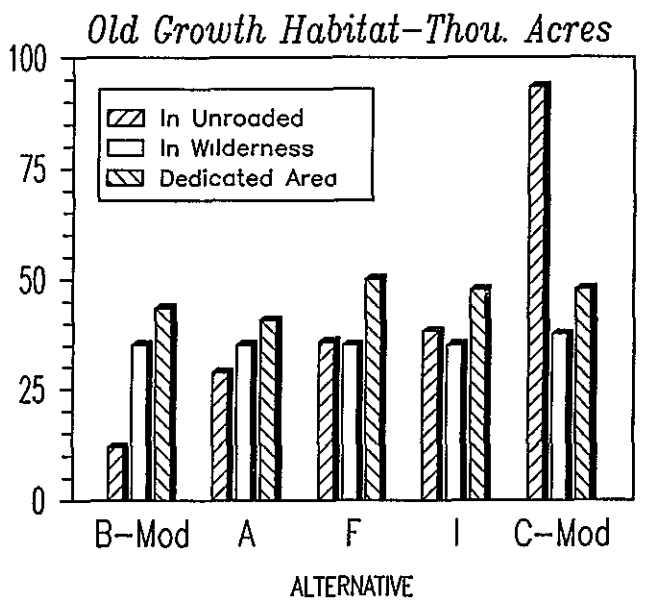
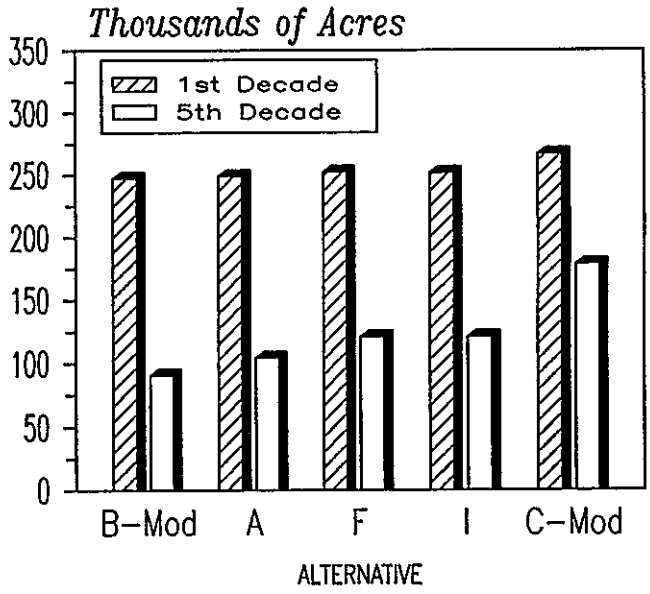


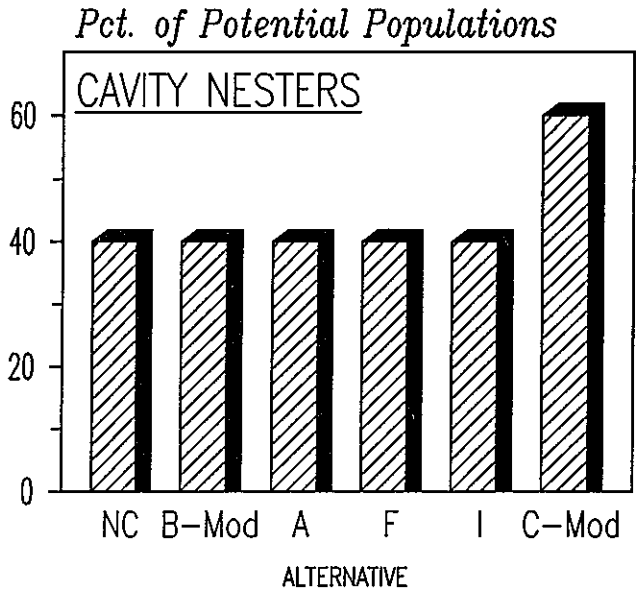
FIGURE II-41: Acres of Old Growth Remaining Over Time by Alternative



Primary cavity-nesting species population capacities will be managed consistent with the theme of each alternative, with minimum thresholds established by management requirement and regional objective As shown in Figure II-42, Alternatives B-Modified and F provide the lowest capacity at 40 percent of potential populations The Management Requirement (MR) level established 20 percent of potential populations for these species However, Forest Service Manual 2630 3 requires that this minimum standard for all alternatives be raised to 40 percent. Alternative C-Modified provides for the greatest potential populations across the Forest at 60 percent of potential. Alternative I provides for 40 percent of potential populations in most scheduled timber lands and 60 percent within riparian zones, thus providing for slightly above 40 percent population Forest-wide Alternatives A and NC provide snags to support 60 percent of the potential population in wildlife emphasis areas and 20 percent in all other areas of the Forest (40 percent in Alternative A), to meet an overall objective of 40 percent of potential populations Forest-wide Alternatives B-Modified, C-Modified, and F support 80 percent of potential populations in riparian areas and 50 percent within 600 feet of riparian areas.

Changes in habitat for non-anadromous fish management indicator species (bull trout, cutthroat trout and rainbow/redband trout) have not been modeled quantitatively Habitat condition would be closely related to changes in riparian vegetation condition Additional habitat improvement would be achieved with fish habitat improvement projects, especially in alternatives C-modified and I Thus, the improvement in habitat condition for these species would be greatest in Alternative C-modified , followed by alternatives I, F, B-modified and A

FIGURE II-42: Potential Populations of Cavity-Nesting Species by Alternative



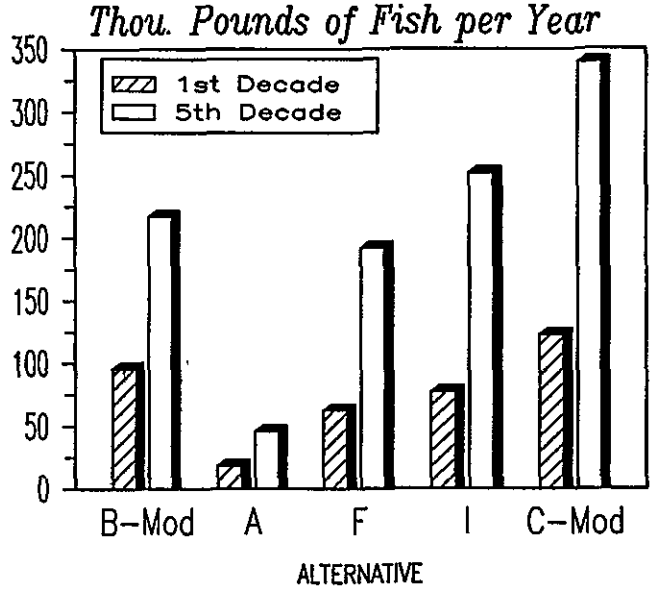
d *Fish - Alternative Comparisons*

Anadromous fish (spring Chinook salmon and summer steelhead trout) habitat capability was calculated outside FORPLAN The process for estimating anadromous fish outputs was revised between the Draft and the Final Environmental Impact Statement. In the Draft, including the Benchmark analyses, estimates were based on actual spawning ground counts of steelhead and Chinook in the John Day River and tributaries In response to Regional direction, other agency and organization comments on the Draft EIS, and to provide for more consistency among other National Forests, estimates for the Final Environmental Impact Statement were based on U S vs Oregon coefficients for rearing capacity The estimated Forest totals for current habitat capability, expressed as smolt habitat capability index (SHCI) are 30,470 Chinook and 115,700 steelhead

Changes from the existing condition were calculated for each alternative, based on expected changes in riparian vegetation condition and channel morphology, due to changes in livestock management and timber harvest prescriptions in riparian areas, and on the level of investment for structural watershed and fish habitat improvement The process paper showing this determination (Gritz 1990) is included in the Forest planning documents and is summarized in Appendix B

Increases in habitat capability due to riparian recovery and structural treatment are considered to be additive Changes in riparian condition due to riparian area management account for the largest part of the estimated increases in habitat capability, especially in those alternatives with higher anadromous fish outputs in the later decades

FIGURE II-43 Anadromous Fish Habitat Improvement by Alternative



Potential production of Chinook salmon and steelhead by alternative are displayed in Figures II-44 and II-45, respectively.

FIGURE II-44: Potential Chinook Salmon Production by Alternative

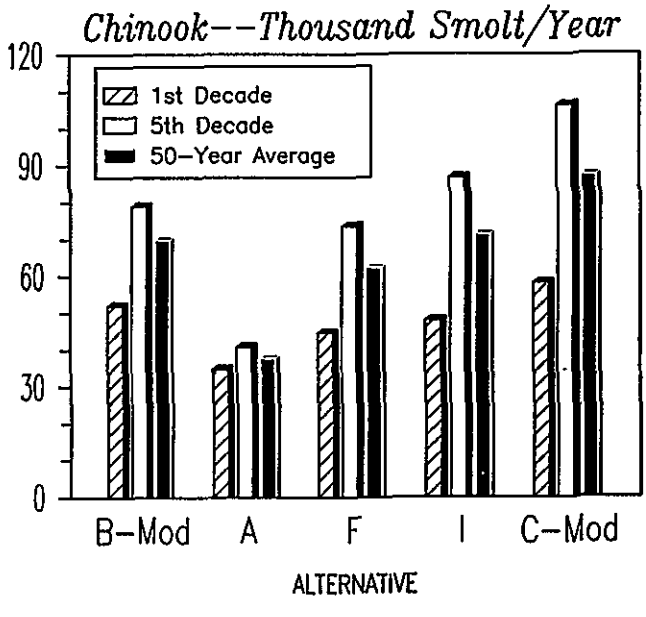
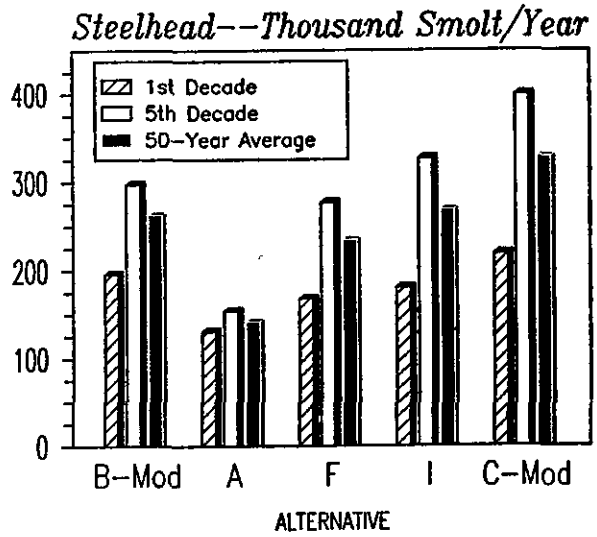


FIGURE II-45: Potential Steelhead Production by Alternative
(Thousand Smolt)

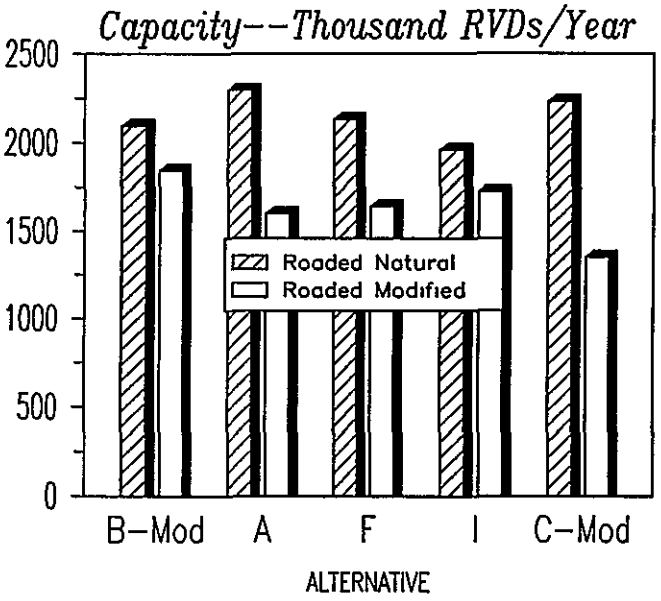


e *Recreation - Alternative Comparisons*

Alternative NC would provide for managing all 25 of the existing developed sites as developed sites. Alternative I proposes to manage 20 of the existing sites as developed sites, providing a range of services, while managing the remaining sites as dispersed sites This alternative would also add an additional 40 unit campground which would focus on the needs of recreational vehicle users and bicyclists by providing hookups and showers. This facility is not proposed to meet an overall increase in recreation demand, but to meet a particular need that is already in existence on the Forest The remaining alternatives would manage 11 of the existing sites as developed facilities and 14 sites as dispersed camp facilities

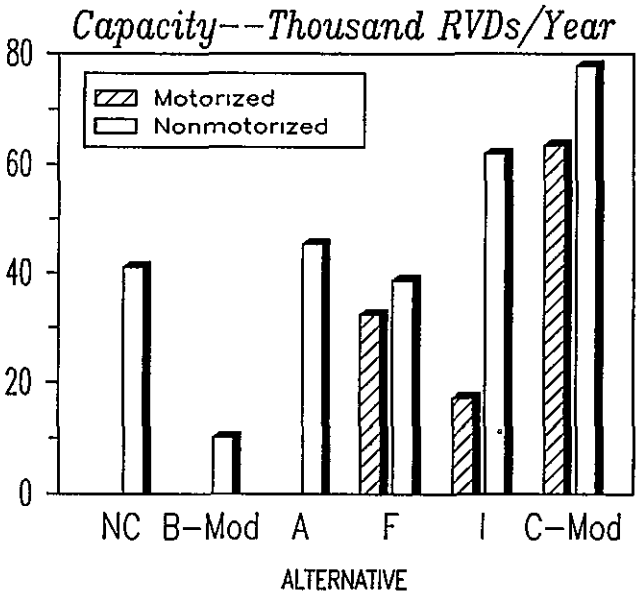
Nonwilderness dispersed recreation use capacity varies with the timber management emphasis and land management strategies of each alternative The alternatives which access and harvest the most timber will provide the most roaded recreation opportunity (See Figure II-46)

FIGURE II-46: First Decade Roaded Recreation Opportunity by Alternative



The amount of semiprimitive recreation provided by each alternative varies according to the theme of each alternative Generally, commodity-oriented alternatives provide fewer acres of semiprimitive recreation opportunity. The only alternative with more acres remaining undeveloped is Alternative C-Modified, which retains all of the inventoried unroaded acres. The recreation visitor day (RVD) capacity of each alternative (displayed in Figure II-47) is a function of these roadless area acreages A data set for Alternative NC is not available

FIGURE II-47: First Decade Semi-Primitive Recreation Opportunity



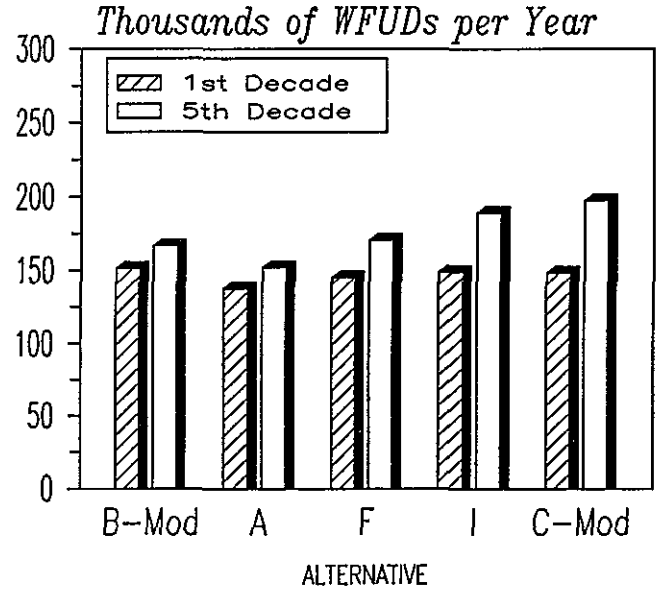
f *Wildlife-Related Recreation - Alternative Comparisons*

Hunting and fishing opportunities are managed through game species and fish habitat management, which includes regulation of these activities by permit and by controlling access The amount and quality of habitat affects potential populations of game and fish When populations are higher, opportunities for hunting and fishing are greater The amount of habitat varies by alternative, thus, opportunities for fishing and hunting will vary

Fluctuations in Wildlife-Fish-User-Days (WFUDs) are influenced by the acres of timber harvested per decade under the various alternatives The spacing and quality of adequate cover, along with the density of roads related to timber harvesting, will also affect the habitat requirements for big game This results in a difference in number of hunter days (WFUDs) attributable to big-game hunting (Refer to discussion of Habitat Effectiveness Index in Appendix B) Because no set of data is available for the number of WFUDs attributable to nonconsumptive use of wildlife on the Malheur, nonconsumptive WFUDs are estimated to be equal to the number generated by hunting This assumed relationship may not be correct, in a given alternative, WFUDs attributable to nonconsumptive use may fluctuate disproportionately to those generated by hunting Also, the number of big-game animals available for harvest may not directly correlate to the number of days hunters spend in the field

In relation to the present situation, all alternatives are expected to show a less than 10 percent change in WFUDs capacity per decade during the first 50 years of the planning period (Figure II-48) Increases in WFUDs are projected between the first and fifth decades for Alternatives C-Modified and I, primarily due to a greater emphasis being placed on access management which will affect open road densities Additionally, Alternative C-Modified is expected to create slightly more WFUDs due to higher quality wildlife habitat and greater potential for adequate spacing of cover, both marginal and satisfactory

FIGURE II-48: Average Annual Wildlife-and-Fish-User-Day Capacity

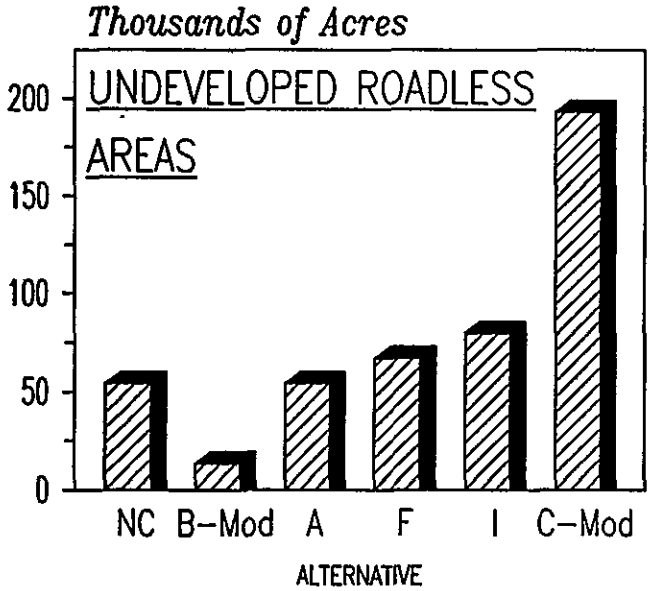


As stated above, in order to meet herd management objectives, most of the game management units on the Forest are regulated by permit. Therefore, even though the capacity may exceed demand for the first two decades, demand for big-game WFUDs may not be met in order to meet other management objectives through regulation by permit. In addition, due to population growth anticipated for the state of Oregon, demand is expected to exceed WFUD capacity by the fifth decade in all alternatives

g. *Roadless Areas - Alternative Comparisons*

The number of acres retained under a nondevelopment management strategy by alternative is shown in Figure II-49. Alternative C-Modified retains 100 percent of the currently available unroaded acres. Alternative I, 44 percent; Alternative F, 37 percent; Alternative A, 33 percent; and Alternative B-Modified, 7 percent

FIGURE II-49: Non-Wilderness Acres Retained Under a Nondevelopment Management Strategy by Alternative



h *Wilderness - Alternative Comparisons*

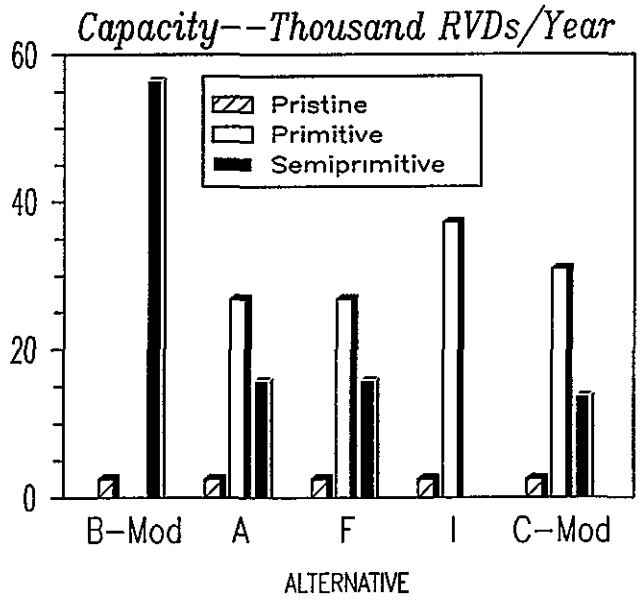
Wilderness will be managed to preserve and protect the wilderness values in accordance with the Wilderness Act of 1964 and acts establishing the individual wildernesses Wilderness use capacity is described by three management categories (pristine, primitive, and semiprimitive) which are defined primarily on a person-per-area basis. The primitive trailless category requires the most acres-per-recreation-visitor-day and semiprimitive requires the least acres among the three categories. The acreage of classified "pristine" wilderness remains the same under all alternative management proposals, but the amount of area managed as "primitive" and "semiprimitive," according to ROS Standards, varies by alternative, as shown in Figure II-50. Alternative C-Modified is the only alternative that increases the number of wilderness acres by recommending designation of Pine Creek Further Planning Area. Information for Alternative NC is not available.

Demand projections indicate that all alternatives except Alternative B-Modified will be able to meet anticipated needs for primitive recreation experiences Capacity is increased in Alternatives I and C-Modified by building trails in currently trailless areas It is anticipated that the demand for pristine, wilderness recreation will be met for all alternatives for the planning period, as shown in Figure II-50 It is also expected that the existing wilderness capacity can further accommodate the expected increase in primitive use.

Though capacity for pristine and primitive recreational experiences is expected to meet demand on an entire wilderness basis, use patterns indicate that for certain areas and

periods of time, demand may exceed capacity An example of this is the concentrated recreational use within the Strawberry Lakes basin during peak cross country ski season and on popular weekends during the summer months (Sullivan 1988).

FIGURE II-50: Wilderness Use Capacity by Alternative

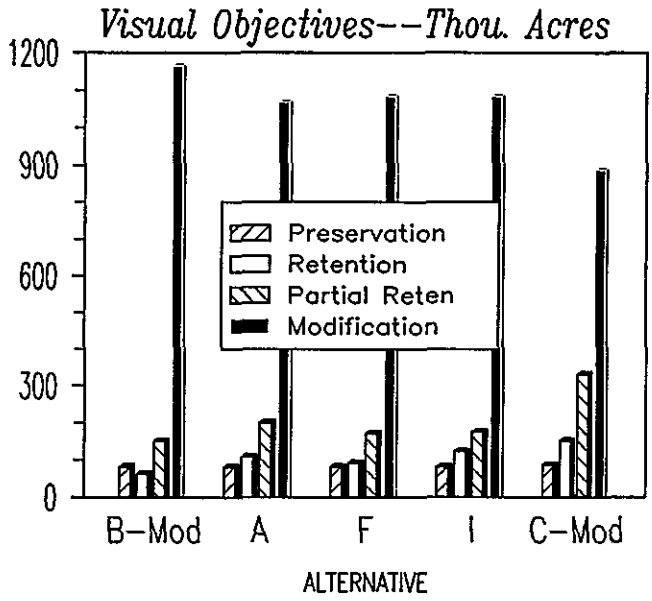


i. *Scenic Character - Alternative Comparisons*

Human activities will be apparent over most of the Forest in Alternative B-Modified The Alternative overall scenic character of the Forest will appear moderately altered in Alternatives A, F, and I, and only slightly altered in Alternative C-Modified.

Visual quality objectives are assigned to every acre on the Forest. The most restrictive objectives are applied to visually sensitive areas such as campgrounds, certain roads and trail corridors, and the roadless management areas. The visual quality objective of preservation preserves the visual character of the landscape without evidence of human modifications. This category is applied to wildernesses The visual quality objectives of retention and partial retention retain the character of the landscape with some evidence of human modification, retention is the more restrictive category of the two

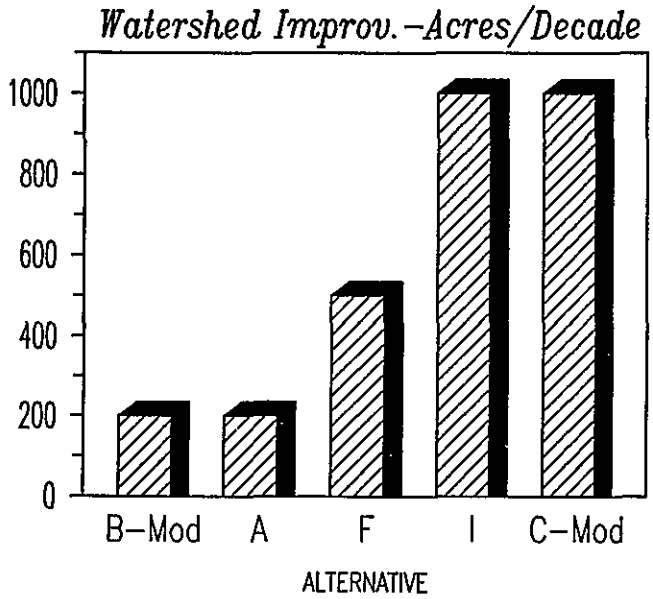
FIGURE II-51: Visual Management Acres by Alternative



3. *Watershed - Alternative Comparisons*

Watershed improvement activities occur in areas that are in less than satisfactory condition These areas have been identified on the Forest (Watershed Improvement Needs Inventory) and prioritized for improvement projects Figure II-52 displays the potential acres of watershed improvements based on the overall theme of the alternatives A set of data for Alternative NC is not available

FIGURE II-52: Acres of Watershed Improvement by Alternative

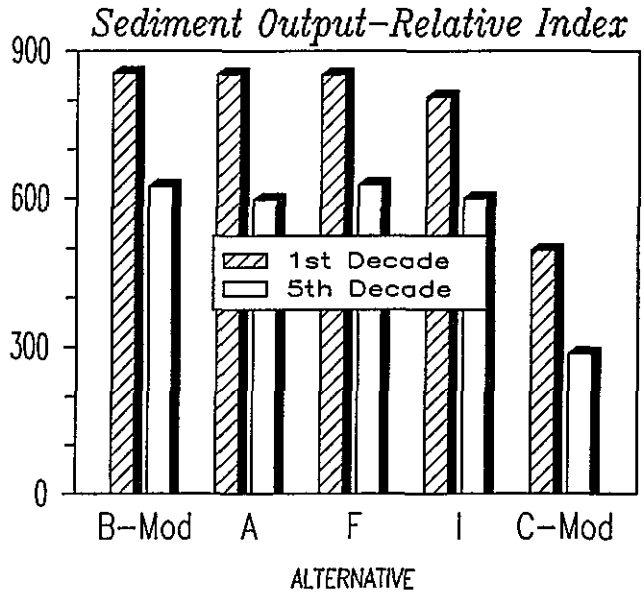


The potential impact to water quality is related to the amount of timber harvest, roads built, and livestock use While these activities do vary by alternative, there will not be a significant difference in water quality between alternatives Measures implemented to maintain or enhance water quality remain the same for all alternatives These practices are accomplished through the Forest-wide Standards and Best Management Practices Water quality will meet Oregon State water quality standards for all decades

Water yields from Eastern Oregon have been shown to be highly variable from year-to-year (State of Oregon 1986) There is no practical difference in projected water yields between alternatives

The sediment index provides a relative display of the effects of the management activities in each alternative The numbers in Figure II-53 have no absolute value, only a relative value as an index Information is not available for Alternative NC

FIGURE II-53: Index of Relative Sediment Effects of Alternatives



k *Minerals - Alternative Comparisons*

The land available for mineral exploration is the same for all alternatives (1,372,755 acres) The 1872 Mining Laws and the Federal Land Policy and Management Act of 1976 provide for mineral exploration anywhere on the Forest except for areas specifically withdrawn such as Wildernesses, most campgrounds, and administrative sites The potential for mineral exploration, however, is directly related to the acres of land managed without vehicle access, that is, the roadless management areas While exploration can involve means of travel which don't require roads, the potential for mineral exploration is diminished as access becomes more difficult or expensive The acres of roadless area management by alternative were displayed in Figure II-49

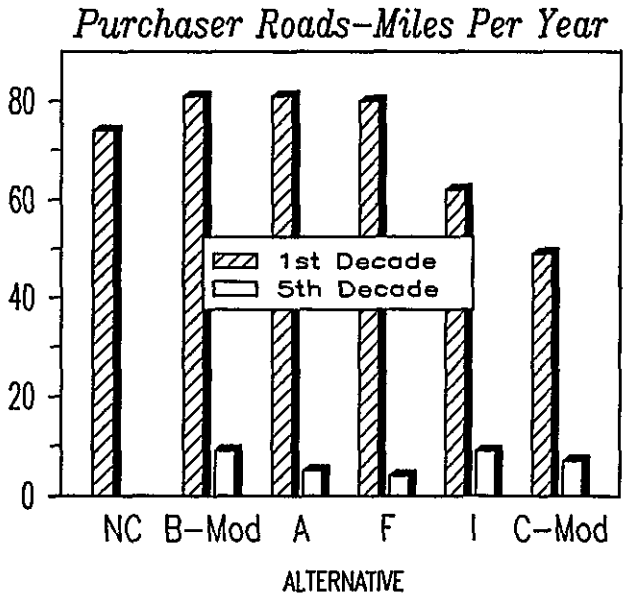
Alternatives NC, A, B-Modified, F, and I are the most favorable for mineral production in that the maximum amount of land with identified mineral potential is available, with the least restrictive management strategies Alternative C-Modified is the least favorable in that it has the highest amount of land with identified mineral potential under restrictive management strategies A detailed comparison of energy and nonenergy mineral production by alternative is displayed in Table II-5

l *Transportation - Alternative Comparisons*

The total amount of road construction displayed in Figure II-54 is directly related to the amount of timber harvested New road construction is higher in the first decade than in later decades because the number of areas which are not adequately roaded decreases over time. By the fifth decade, construction of new roads is considerably reduced The miles of road reconstruction, not shown in Figure II-54, does not vary as drastically over time and is very similar among alternatives Data for Alternative NC for the fifth decade are not available.

The road closure strategy for all alternatives is considerably different from that described in the draft EIS. Lands not classified as either wilderness or Wild and Scenic River will be managed to a specified Elk Habitat Effectiveness Index (HEI) This management specification is expected to increase road closure mileage in the first decade by approximately 30 per cent of the existing mileage (approximately 2700 miles of closed roads). Specific roads to be closed will be identified during a complete review of the existing road system and by incorporating road management as an issue during project level environmental analysis for all projects involving either new road construction or reconstruction. Currently, 564 miles or 6 6 per cent of the existing system miles are closed year round

FIGURE II-54: Miles of Timber Purchaser Road Construction by Alternative



m. *Utility Corridors - Alternative Comparisons*

Since there are no unoccupied and only two occupied utility corridor on the Forest, all alternatives would have minimal effects on utility corridors. None of the alternatives identify windows. Only Alternative C-Modified would recommend additional wilderness (Pine Creek Further Planning Area) which would be an additional 5,420 acre exclusion area.

Each alternative would make it clear where utility corridors would be excluded (exclusion areas) and where allocations would make it difficult or impossible to mitigate the negative environmental impacts of corridor designation (exclusion areas)

2 Economic Comparisons of Alternatives

a *Introduction*

Economics play a vital role in the development, operation, and decision-making process of the Forest Economic efficiency analysis is required by the National Forest Management Act Regulations (36 Code of Federal Regulations 219) and played an important role in the development and evaluation of benchmarks and alternatives Specifically, the Regulations (36 CFR 291.12(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 Maximizing net public benefits, however, is also subject to responding effectively to the public issues.

In this section, the key concepts and terms related to economic efficiency are detailed, and differences in economic consequences among the alternatives are presented Refer to Appendix B, Section IV, for a more detailed discussion of the process

A goal of the Forest planning process is to produce the greatest net public benefits to society while responding effectively to the issues Net public benefits are expressed as the overall value to the nation of all receipts and positive effects (benefits) minus all expenditures and negative effects (costs) The alternative which has the greatest excess of benefits over costs has maximized net public benefits

Net public benefits cannot be totally expressed in dollars or a numeric figure because of the inclusion of some non-quantifiable benefits (e g , maintaining Threatened and Endangered Species habitat, appreciation of scenic Forest vistas, etc) Therefore, determining an alternative with the most public benefits is, in a limited way, a subjective decision It is subjective because the decision requires responding to public issues effectively, which can result in a less-than-optimal present net value Net public benefits is an indicator that helps to determine which alternative provides the best mix of outputs and effects in response to the public issues

Present net value (PNV) is a dollar measure of economic efficiency It is estimated by the difference between the discounted value of all priced benefits less all costs associated with managing the planning area Stated another way, present net value is an estimate of the current market value of the priced Forest resources minus all costs of producing priced and nonpriced values. Not all benefits or costs are calculated in present net value For example, the benefit value of Threatened and Endangered Species or the costs of preserving long-term site productivity cannot be estimated An alternative with the highest present net value means, generally, that the alternative is generating more priced benefits while incurring fewer costs relative to the size of the benefit However, even if the costs or values associated with the alternatives are incorrect, the relative ranking would remain approximately the same

The benefits included in the calculation of present net value can be classified into two major types: market and nonmarket Market goods and services are widely exchanged in actual markets for a monetary price Nonmarket goods and services are not usually exchanged in actual markets (although some nonmarket items could have a monetary price) Nonmarket outputs have benefit values assigned which estimate what the public would be willing to pay With values assigned for various goods and services, the nonmarket goods and services can be more equally compared to market goods and services. For the Malheur National Forest planning process, the market benefits consist of timber, minerals, range and commercial anadromous fish harvest; the nonmarket benefits are values associated with recreation, anadromous and resident fish (sportfishing), and big game These benefits are included in the present net value calculation for all alternatives except the No Change Alternative (present net value for this alternative was developed in the 1979 Timber Resource Management Plan and nonmarket benefits were not analyzed).

The estimated benefit values of both the market and nonmarket items are discussed in Appendix B

The total discounted costs included in the present net value calculation comprise two major components the direct or budget costs which will be incurred by the Malheur National Forest and indirect costs incurred by purchasers of Malheur timber sales The direct costs can be further divided into variable and fixed costs Fixed costs are those items which generally occur regardless of the alternative under consideration Fixed costs include monitoring, general administration, wilderness management, planning and inventory, genetic tree improvement, law enforcement, minerals management, facility management, and fire management Variable costs are those items which can be expected to change for each alternative Variable costs include roads and trails, soil and water improvements, fish and wildlife habitat improvements, recreation administration and improvements, silvicultural activities, timber sale activities, and brush disposal Indirect costs are costs incurred by timber purchasers as a consequence of removing the timber from the Forest and delivering it to the mill (where it is valued) The indirect costs in the present net value calculation include logging costs, purchaser road maintenance, purchaser slash disposal, and purchaser road credits

Similar to the benefit values, all cost items are assumed to retain constant real values (1982 dollars) in the future

b. *Important Differences in Economic Values Among Alternatives*

This section compares and discusses the important differences in economic values among the alternatives considered in detail Economic values used to compare the alternatives include Present Net Value (PNV), discounted costs and benefits, and average annual cash flows and noncash benefits For reference, the Maximum Present Net Value Benchmark (with Management Requirements) is displayed

A comparison of the differences in present net value among the alternatives is displayed in Table II-8 The alternatives presented here are ranked in order of decreasing present net value The table shows the present net value, the total discounted costs, and the total discounted benefits for each alternative In addition, the change in each of these three items between the alternative with the highest present net value and the alternative with next highest present net value is identified. This continues for each alternative, successively comparing it to the alternative with the next lowest present net value This is useful to compare alternatives and identify the specific sources of marginal changes in present net value, discounted costs, and discounted benefits caused by the changes in resource management strategies among alternatives

When compared to the Max PNV benchmark, there is an important difference between PNV values for this benchmark and other alternatives considered Max PNV generally proposes management of non-commodity resources at a minimum level The result is significantly higher PNV value for the Max PNV benchmark from higher benefits being derived from increased timber harvest and AUM levels, with associated tradeoffs in visual quality, recreation quality, fisheries and wildlife habitat Costs for the Max PNV benchmark were also minimized by considering costs only for timber management This strategy results in a significantly higher PNV value when compared to the other alternatives due to the production of high levels of commodity outputs without corresponding increased expenditures

As displayed in Table II-8, Alternative NC has the highest present net value of all alternatives considered in detail, however, there are significant differences in economic assumptions between this alternative and all other alternatives, which make comparisons of economic indicators unreliable The present net value of the No Change Alternative (Alternative NC) was obtained from the 1979 Timber Resource Management Plan The present net value calculated in that plan was generated in 1977 dollars, and has been adjusted to 1982 dollars. Benefits and costs included in the present net value calculation

are those associated with timber management; other resource benefits and costs were not considered in the efficiency analysis completed in the 1979 Timber Resource Management Plan, and no attempt has been made to anticipate what those benefits and costs might be now The maximum present net value benchmark has a higher present net value than all alternatives because of higher outputs of priced resources (especially timber and range), however, this benchmark does not include some resource constraints necessary for acceptable management of the Forest (maintenance of visual quality, important roadless areas, etc), and all other resources are managed at minimum levels with associated low costs of management

Alternatives B-Modified, F, A and I (listed in order of decreasing present net value) are alternatives which would have comparatively high timber harvest levels; these harvest levels result in higher present net value than an alternative which would cut less timber (e g , Alternative C-Modified) The differences in present net value among Alternatives A, B-Modified, F and I are generally due to the effects of different mixes of management strategies for resources such as range, wildlife and fish, visual resources, and roadless areas while maintaining a fairly similar timber management strategy The significant PNV difference between the Max PNV and other alternatives is primarily due to increases in discounted costs estimated between the Draft and Final Environmental Impact Statements As timber management activities are modified to satisfy other resource considerations, present net value reductions occur

For Alternative C-Modified, primarily due to the alternative goal of growing a larger ponderosa pine product, the present net value is estimated to be the lowest The reductions in present net value for this alternative reflects both reductions in total harvest volumes and longer timber rotations Alternative C-Modified also has the least amount of suitable timber land available for timber management among all alternatives

To develop a sense of the contribution of the major Forest resource programs to present net value, the discounted benefits and costs of the major components of present net value are identified in Table II-9 The major sources of benefits identified are timber, range, wildlife (including fish), and recreation A category labeled "Other" accounts for watershed condition, wilderness, and other revenue sources It should be noted that almost all of the wildlife benefits are attributable to recreational use of fish and wildlife resources (i e , Wildlife-and-Fish-User-Days) The "Discounted Costs" side identifies the costs associated with the same resource programs and, additionally, identifies the costs attributable to road construction and maintenance The "Other" cost category includes all costs not associated with the five identified cost areas (examples include general administration, fire protection, wilderness management, soil and water management, etc.)

TABLE II-8: Present Net Value and Discounted Benefits and Costs of Alternatives
(Million Dollars - 1982)

Alternative (Ranked in order of decreasing PNV)	Discounted PNV	Change	Discounted Benefits	Change	Costs	Change
Max PNV (w/MRs)	472 6		774.3		301 7	
		- 90.9		- 144 7		- 53.8
NC (No Change)1/	381.7		629.6		247.9	
		- 31 2		+24.4		+55.6
B-Mod	350.5		654.0		303 5	
		- 22 2		- 42 3		- 20.1
F	328.3		611.7		283 4	
		- 28 1		- 34 4		- 6.3
A	300 2		577.3		277.1	
		- 43 6		- 58.8		- 15.2
I (Preferred)	256 6		518 5		261.9	
		- 130 2		- 150.6		- 20.4
C-Mod	126.4		367.9		241.5	

1/The No Change Alternative is based on the 1979 Timber Resource Management Plan This was not an integrated resource management plan and not all resource uses and outputs were valued Consequently, there are differences between the economic assumptions underlying the present net value calculations of the No Change Alternative and of all other alternatives which makes comparisons unreliable



TABLE II-9: Present Net Value and Discounted Benefits and Costs by Resource Groups 1/
(Million Dollars - 1982)

Alternative (Ranked in order of decreasing PNV)	Present Net Value	Discounted Benefits				
		Timber	Wildlife 2/	Range	Recreation	Other 3/
Max PNV (w MRs)	472.6	612 4	81 6	54 9	20 4	5 0
NC (No Change) 4/	381.7	N/A	N/A	N/A	N/A	N/A
B-Mod	350 5	523 3	71 9	32.7	19 6	6 5
F	328 3	483 2	73.4	30 6	18 4	6 1
A	300 2	460 7	63 3	28.8	17.3	5 8
I (Preferred)	256 6	414 8	57 0	25 9	15 6	5.2
C-Mod	126 4	250 1	73 6	22 1	18 4	3.7

1/Comparison of benefits and costs displayed for individual resource outputs indicates general relationships between alternatives However, they may be misleading because many outputs of multiple use management have common costs of production that cannot be attributed to individual resources
2/Benefits primarily due to recreation-oriented use of fish and wildlife resources (WFUDs)
3/Category includes wilderness, soil and water, special-uses, and minerals
4/The No Change Alternative is based on the 1979 Timber Resource Management Plan This Plan was not an integrated resource management plan, and not all resource uses and outputs were valued Consequently, there are differences in economic assumptions underlying the present net value calculations of the No Change Alternative and all other alternatives

Alternative (Ranked in order of decreasing PNV)	Discounted Costs					
	Timber	Wildlife	Range	Roads 5/	Recreation	Other 6/
Max PNV (w/MRs)	167 0	5 9	36 1	66.0	2 0	24 7
NC (No Change)	N/A	N/A	N/A	N/A	N/A	N/A
B-Mod	139 6	15 2	18 2	51 6	6 1	72 9
F	124 7	5 7	17 0	53 9	8 5	73 7
A	121 9	5.5	13 9	55 4	8.3	72 0
I (Preferred)	115 2	5 2	13 1	52 4	7 9	68.1
C-Mod	82 4	9.7	14 5	50 7	9.7	84.5

5/Primarily road construction, reconstruction, and maintenance related to timber management
6/Category includes general administration, fire protection, wilderness, lands, minerals, soil and water, and special-use management

c. *Differences in Benefits, Costs, and Cash Flows*

Table II-10 presents the cash and noncash benefits projected for each alternative for the first and fifth decade. The total receipts consist of receipts from timber sales, range use, and other receipts from minerals and special uses For every alternative, the timber sale program accounts for at least 99 percent of the total value of the receipts. The total costs identified are all direct costs of Forest management which would be financed by the Forest budget. The difference between the total receipts and total costs is the net cash receipts The noncash benefits identified include the value of recreation, fish and wildlife (primarily recreation use), watershed, and some range values not reflected in grazing fees All values are in 1982 dollars

As shown in Table II-10 for Decade 1, the differences between the total receipts of Alternatives A, F, B-Modified, and I are relatively small, these alternatives have first decade total receipts ranging from $34 3 to $28 1 million Generally, the receipts decrease as timber harvests decrease, reflecting the dependence of receipts upon timber harvests. Alternative C-Modified has lower total receipts reflecting lower timber harvests, first decade total receipts run about $15 7 million Noncash benefit variation among alternatives is unknown.

The No Change Alternative is included in Table II-10; however, no values are available for comparison purposes. The No Change Alternative is based on the 1979 Timber Resource Management Plan, and was not developed in a comparable fashion to the other alternatives

Differences in total costs by alternative are primarily due to varying levels of capital investments (timber, range, soil and water, and fish and wildlife improvements) To a lesser degree, differences in operational costs (e g. timber sale preparation) due to varying harvest levels among the alternatives also results in differing total costs by alternative

Between the Draft and Final Environmental Impact Statements, cost updates to the Forest Cost Package resulted in higher projected costs for implementation of all alternatives. For example, though it was evident that Alternative B-Modified generates the highest amount of total discounted benefits of all alternatives through extensive investments in many aspects of Forest management; the discounted costs of this alternative are also higher that any other alternative Higher discounted costs associated with Alternative B-Modified are partly due to increased expenditures for wildlife programs which are not matched by increased benefits (utilization of available forage by cattle results in no significant increases in elk herds despite habitat improvement investments) Timber costs are also higher under this alternative due to the higher level of management intensity necessary for increased outputs of these resources The end result of updating the costs of implementation considered for the Final Environmental Impact Statement, such as with Alternative B-Modified, is that PNV comparisons between alternatives have become more reliable

The costs required to operate the Forest generally decrease over time (i e , from Decade 1 to Decade 5) for all alternatives because less capital investments are needed for new roads. Projections are that most of the system will be in place by 2030. Under all alternatives, local road construction would decrease from Decade 1 levels by 85 percent or more in Decade 5

TABLE II-10: Average Annual Cash Flows and Noncash Benefits in the First and Fifth Decades by Alternative (Million Dollars - 1982)
(First decade planned, subsequent decades projected)

Alternative (Ranked in order of decreasing PNV)	Decade 1 Net Receipts	Total Costs	Total Receipts	Noncash Benefits to Users	Decade 5 Net Receipts	Total Costs	Total Receipts	Noncash Benefits to Users
Max PNV (w/MRs)	13 9	14 0	27 9	6 3	18 5	13 6	32 1	8 3
NC (No Change)1/	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B-Mod	10 3	19 3	25 3	6 3	17 5	16 8	34 3	9 0
F	11 2	16 0	27 2	6 0	19 1	15 2	34 3	8 2
A (No Action)	10 1	15 2	25 3	5 8	17 4	15 2	32 6	7 5
I (Preferred)	7 7	15 9	23 6	5 8	13 6	14 5	28 1	8 2
C-Mod	5 2	12 3	17 5	5 6	4 1	11 6	15 7	8 4

1/The No Change Alternative is based on the 1979 Timber Resource Management Plan This plan was not an integrated resource management plan and not all resource uses and outputs were valued Consequently, there are differences in economic assumptions underlying the present net value calculations of the No Change Alternative and all other alternatives

3 Major Tradeoffs Among Alternatives

This section summarizes the relationships among the economic and social effects discussed in this chapter and the responses of the alternatives to the issues discussed in Chapter I and Appendix A The purpose is to highlight major tradeoffs or differences among alternatives Further discussion of differences is found in the previous sections of this chapter and in Chapter IV

To provide a framework for assessing tradeoffs, the long-term National, Regional, and Local resource demands or needs are briefly summarized (more detail is provided in Chapter III) The responses of the alternatives to the issues are displayed in Table II-11, and selected economic values and indicators of responsiveness to the issues are displayed in Table II-12 The differences and similarities among individual alternatives are then summarized

a *National, Regional, and Local Overview*

The Environmental Impact Statement for the 1985 Resources Planning Act Program estimates that total National demands will rise for all outputs of the National Forests At the same time, there is a strong demand to protect and enhance the quality of the environment

The Regional Guide for the Pacific Northwest Region estimates that demands for all outputs of National Forests will rise in Oregon and Washington Recreation use is expected to increase as the population increases and its characteristics change, with the bulk of recreation use coming from residents of the region Demand for wilderness recreation is expected to exceed the supply within the Region's Wilderness Preservation System. Demand could be met, in the near future at least, by utilization of undeveloped lands outside wildernesses Development of these lands would intensify pressure on the designated wildernesses

Demand for hunting and sport fishing is expected to increase by one-third between 1985 and 2000. Nonconsumptive uses of wildlife and fish are also expected to increase.

The demand for minerals is significant on a Local and National basis. On the Forest, gold and silver are of the highest interest for their speculative value. However, chrome and cobalt deposits could be of interest in the future

The National demand for timber is expected to rise faster than timber supply over the planning period (i e , 50 years) As demand nears or exceeds supply levels, stumpage prices will increase

The National Forests of the Pacific Northwest are the National Forest System's primary timber producer, with almost one-half of the current National Forest harvest coming from this region. The quantity of timber demanded regionally in 2000 is expected to be about one percent greater than the 1976 demand level The stumpage price of timber, however, is expected to rise substantially.

The local situation is similar to that of the Region, with a few important characteristics specific to the Malheur National Forest Zone of Influence. Local demand for wilderness is strong; however, population pressures from outside the local area have not created and are not expected to create demand which would exceed supply for that resource (assuming undeveloped areas will contribute to supply) The supply of dispersed and developed recreation opportunities would exceed the demand throughout the planning period in all alternatives, primarily due to the Forest's distance from population centers

The local demand for Forest timber is expected to be strong throughout the planning period because of the Forest's dominant supply position in the area, historical trends in local industry, and the high quality of the Forest timber inventory (i e , old-growth ponderosa pine) However, projections (See Chapters III and IV) show that timber supply from the Forest could meet demand under some alternatives if adjacent supply sources maintain near-historic output levels and local milling capacity does not grow abnormally The alternative which emphasizes amenities would not meet long-term local demand.

Though periodic fluctuations in employment will occur, current employment patterns are expected to continue in the local communities because timber-based employment opportunities would exist for the majority of alternatives The remote location of the Forest has resulted in less tourism and recreation than neighboring Forests in the Region; thus, the tourism industry has contributed to the local economy, but the primary industrial base has been commodity production-oriented. Although growth is expected in the tourism industry due to increased recreational use of the Forest, employment in commodity production enterprises (i.e , wood manufacturing, ranching) is expected to continue to be an important factor in community stability and growth. Those employed in local and regional commodity production enterprises will also comprise a substantial portion of the increase in recreation demand

b *Responses to Major Issues, Concerns, and Opportunities*

The issues provided the basis for formulating all alternatives except the No Change Alternative, this alternative is based on the 1979 Timber Resource Management Plan. The following table displays the responsiveness, in narrative terms, of each alternative (including the No Change Alternative) to the issues using selected indicators of responsiveness. The results are presented in words to assist in interpretation of the alternatives. Each of the issues also has a set of quantitative indicators of responsiveness that are presented in Table II-12, immediately following Table II-11 (issues)

In reviewing the public comments, additional key issues were identified as having importance to the forest planning process. In particular, road management is noted to have become of special concern to a great number of public respondents.

As a result, Alternative I (Preferred) has been developed to address these public concerns Road management as an identified issue is discussed in Chapter I of this Final Environmental Impact Statement (Section L) Chapter V of this Final Environmental Impact Statement (Section C) contains a summary of the comments received concerning road management and the Forest Service response to these public concerns Road management also appears as a key issue in Table II-ll and in Table II-12 in a display of the relationship between the indicators of response and each alternative.



TABLE II-11: Comparison of Issue and Concern Resolution by Alternative

Alternatives by Decreasing Vegetation Management	ISSUES Economic Stability[1]	Timber Management	Big Game Management
Alternative NC[2] (No Change)	Provides the highest increase in employment and income of all alternatives Payments to counties were not calculated in a strictly comparable manner and hence cannot easily be related to the other (viable) alternatives	Provides a potential yield of 40 2 million cubic feet (269 7 million board feet) in the first decade The potential yield is 117 percent of the programmed harvest level in the 1979 Timber Resources Plan Suitable acres are higher than any amounts for viable alternatives	The wildlife habitat managem ent goal is to manage all wildlife emphasis areas to benefit associated wildlife species The big game management goal is to provide an adequate distribution of cover and forage within wildlife emphasis areas, managed to retain 66 percent of the carrying capacity that existed in 1978 (not comparable to other alternatives)
Alternative B-Mod	Provides the highest increase in employment and income in the first decade Over the long term, income and employment opportunities would be highest of (viable) alternatives, due to increasing timber harvests Payments to counties remain the highest (excluding Alternative NC)	Has the highest allowable sale quantity in the first and later decades First decade harvest is 114% of the 1979 Timber Resource Plan programmed harvest level, 21 2 million cubic feet (121 million bd feet) of ponderosa pine is offered annually for harvest in the first decade Suitable timber acres are the highest of all alternatives (excluding the NC Alternative)	The big game habitat management goal is to provide at least 5% satisfactory cover in both summer and winter ranges across the forest Total cover amounts would be near optimum across the forest by the fifth decade, although the cover distribution would be suboptimal due to timber harvest patterns Elk habitat would be at 63% of capacity by the end of five decades
Alternative F	Provides the second highest increase in employment and income in the first decade Payments to counties are second highest in decade 1 and the highest in decade 5 (excluding the NC Alternative)	Has the second highest allowable sale quantity in the first decade and subsequent decades (106% of Timber Resource Plan programmed harvest level) 19 6 million cubic feet (112 million bd feet) of ponderosa pine would be offered for harvest in the first decade Suitable acres are second highest of all alternatives	The big game habitat management goal is to provide at least 5% satisfactory cover in both summer and winter ranges across the forest Total cover amounts would be above the optimal levels by the fifth decade Cover distribution would be suboptimal due to timber harvests Elk habitat would be at 66% of maximum capacity by decade 5
Alternative A (No Action)	Provides the base level for income and employment in the first decade However, timber harvests increase in the third decade which would result in some increase in employment and income in third and later decades Payments to counties are the third highest in decade 1, and in decade 5 (excluding the NC Alternative)	Has the third highest allowable sale quantity in the first decade (100% of Timber Resource Plan programmed harvest level), and third highest Allowable Sale Quantity in subsequent decades 18 5 million cubic feet (106 million board feet) of ponderosa pine will be offered annually for harvest in the first decade Suitable acres are third highest of alternatives	The big game habitat management goal is to provide at least 10% satisfactory (previously "thermal") cover in both summer and winter ranges (where possible) Total cover amounts would be above optimum levels by the fifth decade, with distribution suboptimal due to timber harvest placement Elk habitat would be at 66% of capability by the end of the five decades
Alternative I (Preferred)	Results in a slight decrease from base level employment and income in first decade, modest reductions from average historical employment levels occur (1980-89) Payments to counties are the fourth highest in first and fifth decades (excluding the NC Alternative)	Has the fourth highest allowable sale quantity of all alternatives (90% of Timber Resource Plan planned harvest level) and subsequent decades 16 1 million cubic feet (92 million board feet) of ponderosa pine is offered annually for harvest in the first 10 years Suitable acres are the second lowest of all alternatives	The big game habitat management goal is to provide at least 10% satisfactory cover in winter ranges (where possible) and 12% in summer ranges Wildlife emphasis areas would have at least 15% satisfactory cover Total cover amounts would be near optimum levels, with less than optimal distribution due to timber harvests Elk habitat would be at 72% of capability by the end of decade 5
Alternative C-Mod	Results in the greatest reduction in historical employment opportunities and income generated of all the alternatives Payments to counties are the lowest of all alternatives in the first and subsequent decades	Produces the lowest allowable sale quantity of all alternatives (66% of Timber Resource Plan planned harvest level) 12 2 million cubic feet (70 million board feet of ponderosa pine will be offered annually for harvest in the first decade Suitable acres are the lowest of all alternatives	The big game habitat management goal is to provide at least 15% satisfactory cover in both summer and winter ranges (where possible) Total cover amounts would be above optimal levels forest-wide, with distribution ranging from near-optimum to cover-excessive due to less timber harvesting Elk habitat would be at 71% of capability by the end of five decades

1/ Base employment and income is based on average annual Forest outputs from the 1980-89 period Unless stated otherwise, changes in employment and income are for the first decade, and are based on annual Forest outputs (i e , timber, range) proposed by the various alternatives considered Note only historical levels of job changes are considered in this analysis Any developments that occur outside of the traditional economic sectors of the local area are not indicated here and would invalidate this analysis

ISSUES		
Road Management	**Riparian**	**Roadless Areas**
No addtional road closure policy or goals other than the 564 miles of seasonal road closure that exists at the current time Road densities on the forest would be the highest of all alternatives Existing road densities of roughly 4 0 miles per section would continue to increase over time, as road closures would remain at 564 miles overall across the forest	Anadromous fish production potential would increase slowly through the planning horizon	Maintains 30 percent of the Forest's inventoried roadless areas in an undeveloped condition Pine Creek is assigned to timber and range emphasis Timber management is deferred, however
The road management goal is to limit open road densities to approximately 3 0 miles per square mile (section) across the forest Of the 9400 road miles existing across the forest at the end of the first decade, approximately 2900 miles would be closed, either by seasonal or permanent measures This alternative would continue to construct the greatest amount of roads of any viable alternative, although open road mileage would be limited to 6500 miles for the entire planning horizon (next five decades)	Anadromous fish production potential would increase by about 125 percent by the end of the second decade, and by more than 150 percent by the fifth decade	Maintains 7 percent of the Forest's inventoried roadless areas in an undeveloped condition Pine Creek roadless area is available for development
The road management goal is to limit open road densities to roughly 2 5 miles per section by the end of the fifth decade Total open road mileage would be limited at 5400 miles by the end of the planning horizon This alternative builds the second highest amount of new roads over the forest of any (viable) alternative	Anadromous fish production potential would increase by about 80 percent by the end of the second decade, and by about 140 percent by the fifth decade	Maintains 37 percent of the Forest's roadless areas in an undeveloped condition Pine Creek roadless area is available for development
The road management goal is to limit open road densities to roughly 2 5 miles per section by the end of the fifth decade Total open road mileage would by limited at 5400 miles by the end of the planning horizon This alternative builds the third highest amount of new roads over the forest of any (viable) alternative	Anadromous fish production potential would increase by 25 percent within two decades Production potential would increase by 35 percent by the fifth decade	Maintains 33 percent of the Forest's inventoried roadless areas in an undeveloped condition Pine Creek roadless area remains undeveloped
The road management goal is to limit open road densities to approximately 2 1 miles per section by the end of the fifth decade Total open road mileage would be limited at 4550 miles by the end of the planning horizon This alternative builds the fourth highest amount of new roads over the forest of any (viable) alternative	Anadromous fish production potential would increase by about 100 percent by the end of the second decade, and by about 180 percent by the fifth decade	Maintains 44 percent of the Forest's inventoried roadless areas in an undeveloped condition Pine Creek roadless area is available for development
The road management goal is to limit open road densities to approximately 2 1 miles per section by the end of the fifth decade Total open road mileage would be limited at 4550 miles by the end of the planning horizon This alternative builds the least amount of new roads over the forest of any (viable) alternative	This is the alternative with the highest potential anadromous fish production Anadromous fish production potential would increase by about 150 percent by the end of the second decade, and by nearly 200 percent by the fifth decade	Maintains 100 percent of the Forest's inventoried roadless areas in an undeveloped condition Pine Creek roadless area is recommended for and managed as wilderness

2/The timber management plan upon which the No Change Alternative is based was developed in 1979 The plan was not an integrated resource management plan, and consequently did not address all resource uses and outputs The missing information in this table cannot be reasonably estimated, since the original plan was based on yield tables and resource relationships which do not reflect the latest scientific technique or information, the standards in NFMA regulations, or are otherwise inappropriate Unit plans developed during 1978 provided new standards and management objectives which are best represented in Alternative A - No Action (Current Direction) Some of these standards and management objectives were incorporated in the timber management plan, and adjustments made in timber potential estimates to reflect them However, unit plans were not prepared for the entire Forest, so the timber management plan figures are only partially accurate, and some Forest-wide information or data is unavailable Consequently, the timber potential yield estimates may not be feasible to implement

Quantitative indicators of response can be used to gauge the effectiveness of the alternatives' responses to the issues The indicators of response presented in Table II-12 are

***Economic Stability Indicators:**

Projected annual payments to counties in the first decade.

Projected change in employment levels in the first decade.

Projected change in income levels in the first decade

***Timber Management Indicators:**

Average annual allowable sale quantity (ASQ), million cubic feet in the first and fifth decades, and million board feet in the first decade.

Acres of suitable timber land available for timber management activities.

Average annual allowable sale quantity offered as ponderosa pine, millions of board feet, in the first decade.

Average annual acres receiving clearcut timber harvest prescriptions in the first and fifth decades.

Average annual acres receiving overstory removal timber harvest prescriptions in the first and fifth decades

Average annual acres receiving uneven-aged management selection harvest prescriptions in the first and fifth decades.

Average diameter of harvestable timber in the first, fifth and tenth decades and average diameter harvestable over a 150 year planning horizon.

***Big-game Habitat Indicators:**

Habitat Effectiveness Index (HEI) in the first and fifth decades.

Potential summer elk populations in the first and fifth decades

Potential winter elk populations in the first and fifth decades

Big game cover quality in the first and fifth decades

Annual Wildlife-and-Fish-User days (WFUDs) produced by habitat management in the first and fifth decades

Acres in winter range enhancement.

Acres in winter range maintenance

Miles of road remaining open, in first and fifth decades

***Riparian Area and Fisheries Habitat Management Indicators:**

Livestock grazing strategies proposed for unsatisfactory riparian areas

Average annual animal unit months of livestock grazing permitted in riparian areas.

Expected increases in anadromous fish production (thousands of pounds)

Smolt habitat capability index (steelhead) in first and fifth decades

***Undeveloped Area Management Indicators:**

Acres of unroaded areas retained in an unroaded condition (i e., semiprimitive, motorized and nonmotorized management areas)

Management of Pine Creek Further Planning Area

***Road Management Indicators:**

Miles of timber purchaser road construction in the first and fifth decades

Miles of open roads in the first and fifth decades.

Total miles of system roads in the first and fifth decades

In addition to local issues and concerns, the Nation has an interest in ensuring that the Forest is managed in an economically efficient manner Other economic indicators included in Table II-12 are

Present Net Value (Present Net Value - millions of 1982 dollars).

First decade net receipts (average annual cash flows - millions of 1982 dollars).

c *Differences and Similarities of Individual Alternatives*

The alternatives are displayed in order of decreasing present net value in Table II-12, they are discussed below in the same order The alternatives are displayed in this manner to make it easy to see incremental changes in economic values as indicators of response change

All alternatives (except the No Change Alternative) would meet Management Requirements and other multiple-use and sustained yield requirements. Within these limitations, the goal of each alternative is to emphasize addressing one or more issues. To achieve this, other resource outputs must be limited or "traded off" (i e , what potential benefits would be foregone to respond to the issues emphasized in that alternative?)

Some groups of alternatives are similar in terms of benefits and tradeoffs involved, this is because some resources (examples include timber, forage, and economic efficiency) are strongly complementary Riparian areas and watersheds, fish habitat, wilderness, undeveloped recreation, and visual protection are another group of strongly complementary resources Alternatives A, B-Modified, and F tend to result in higher levels of market outputs, with varying strategies for nonmarket resources, whereas Alternative C-Modified tends to favor amenity values Alternative I appears to be an intermediate alternative The No Change Alternative continues the policies and practices (primarily timber management practices) of the 1979 Timber Resource Management Plan, and applicable management practices specified in various Unit Plans

TABLE II-12 Indicators of Response of Alternatives to Planning Issues and National Concerns (Average Annual Outputs)

Indicators of Response	Alternatives (In order of decreasing present net value) Max PNV[1/] (W/MR)	No Change NC	B-Mod	F	A	Preferred I	C-Mod
Economics							
Present Net Value (Millions of Dollars)	472 6	381 7	350 5	328 3	300 2	256 6	126 4
Economic Stability[2/]							
Payments to Counties (Millions of Dollars)							
Decade 1	7 0	6 0	7 4	6 8	6 3	5 9	4 4
Decade 5	N/A	N/A	8 6	8 6	8 2	7 0	3 9
First Decade Change in Employment (Jobs)	+554	N/A	+235	+ 96	0	-161	-573
First Decade Change in Income (Million Dollars)	+14 0	N/A	+ 7 8	+ 3 2	0	-5 3	-18 9
Timber Management							
First Decade Annual Allowable Sale Quantity							
Millions of Cubic Feet	47 7	N/A	44 0	40 9	38 6	34 8	25 5
Millions of Board Feet	273 0	N/A	252 0	233 7	220 6	200 0	146 0
Fifth Decade Annual Allowable Sale Quantity							
Millions of Cubic Feet	47 7	N/A	44 0	40 9	39 0	34 8	25 5
Suitable Timber Lands (Thousand Acres)	996	1,117	957	920	898	836	770
Allowable Sale Quantity Offered as Ponderosa Pine (Millions of Board Feet)							
First Decade	149 6	N/A	121 0	112 0	106 0	92 0	70 0
(Millions of cubic feet)							
First Decade	26 2	N/A	21 2	19 6	18 5	16 0	12 2
Fifth Decade	N/A	N/A	18 0	18 8	17 9	15 2	9 4
Suitable Timber Lands under Ponderosa Pine Management (Thousand Acres)	N/A	N/A	316	311	311	454	482
Harvest Methods, Clearcut (1,000 Acres)							
1st Decade	3 0	N/A	4 3	2 8	2 7	3 3	2 2
5th Decade	10 3	N/A	8 0	5 3	5 5	4 5	4 1
Acres Overstory Removal (1,000 Acres)							
1st Decade	22 3	N/A	10 5	9 6	8 6	6 3	5 8
5th Decade	0 2	N/A	0	0	0	0	0
Acres Uneven-aged Mgmt (1,000 Acres)							
1st Decade	N/A	N/A	4 1	5 2	5 7	6 4	5 0
5th Decade	N/A	N/A	4 4	5 8	6 1	6 8	5 7
Size of Average Tree Harvested (dbh, inches)							
1st Decade	N/A	N/A	22	22	22	22	22
5th Decade	N/A	N/A	16	16	16	16	15
10th Decade	N/A	N/A	14	14	14	16	16
Average over 150 year planning horizon	N/A	N/A	16 9	17 1	17 0	17 5	17 8

1/The Max PNV benchmark (with Management Requirements) is not a viable alternative, so is not directly comparable to the detailed alternatives Benchmarks were not updated to current technical and legislative changes which would change most resource outputs slightly If the Max PNV (with MR) benchmark was updated to 1990 conditions, it is estimated that ASQ and PNV outputs would be reduced by approximately 3-4 percent However, this benchmark remains suitable for making generalized comparisons to other alternatives

2/Changes in jobs (+515) and income (+$13 0 MM) for the No Change Alternative were projected assuming the potential yield (269 7 MMBF) displayed in the 1979 Timber Resource Plan would be harvested Jobs and income estimates were calculated in a comparable fashion to the other alternatives The 1979 Timber Resource Plan projected an increase of 266 jobs and $5 9 million, these estimates were generated employing different economic assumptions and methodology, and are not comparable to the jobs and income estimates presented for all other alternatives

TABLE II-12 (continued) Indicators of Response of Alternatives to Planning Issues and National Concerns (Average Annual Outputs)

Indicators of Response	Alternatives (In order of decreasing present net value) Max PNV (W/MR)	No Change NC	B-Mod	F	A	Preferred I	C-Mod
Big-Game Habitat							
Big-Game Use (Thousands of Wildlife and Fish Users Days)							
1st Decade	N/A	N/A	121 7	119 8	117 9	121 7	115 3
5th Decade	N/A	N/A	121 7	128 7	128 7	139 6	137 0
Habitat Effectiveness Index (Elk)							
1st Decade	N/A	N/A	56	55	54	56	53
5th Decade	N/A	N/A	56	59	59	64	63
Summer Elk Populations (1,000 Elk)							
1st Decade	N/A	N/A	13 4	13 2	13 0	13 4	12 7
5th Decade	N/A	N/A	13 4	14 2	14 2	15 4	15 1
Winter Elk Populations (1,000 Elk)							
1st Decade	N/A	N/A	5 7	5 6	5 5	5 7	5 4
5th Decade	N/A	N/A	5 7	6 0	6 0	6 5	6 4
Big Game Cover Quality (Index 0 5 low, 1 0 high)							
1st Decade	N/A	N/A	62	62	62	64	64
2nd Decade	N/A	N/A	56	59	61	66	70
Winter Range Enhancement (1,000 Acres)	0	0	0	0	0	0	35 1
Winter Range Maintenance (1,000 Acres)	0	0	76 6	194 1	0	177 4	115 8
Road Management							
Miles of Timber Purchaser Road Construction							
Decade 1	N/A	74	81	80	81	62	49
Decade 5	N/A	N/A	9	4	5	9	7
Miles of Open Roads							
1st Decade	N/A	N/A	6,500	6,500	6,500	6,500	6,500
5th Decade	N/A	N/A	6,500	5,400	5,400	4,550	4,550
Total Mileage of System Roads							
Decade 1	N/A	N/A	9,381	9,370	9,380	9,188	9,059
Decade 5	N/A	N/A	10,111	10,002	9,953	9,729	9,413
Riparian Areas and Fisheries							
Permitted Grazing Use in Riparians (1000 AUMs)							
Decade 1	N/A	N/A	23	23	36	22	18
Decade 5	N/A	N/A	23	23	36	22	21
Grazing Strategies Proposed for Unsatisfactory Riparian Areas - Shrub Utilization	N/A	67% Entire Pasture	0-20% Within Stream Corridor	0-20% Within Riparian Pasture	67% Within Unsat Pasture	0-35% Within Riparian Pasture	0-40% Entire Pasture
Anadromous Fish Harvest in First Decade (Thousands of Pounds)	N/A	N/A	40 1	34 4	26 8	37 0	44 9
Smolt Habitat Capability Index (1000s of smolt)							
Decade 1	N/A	N/A	196	168	131	181	219
Decade 5			297	277	154	326	399
Roadless Area Management							
Unroaded Areas Assigned to Unroaded Management (Thousands of Acres)	0	54 2	13 3	67 0	59 2	79 9	193 1
Management of Pine Creek FPA	Developed	Roadless	Available for development	Available for development	Roadless	Available for development	Wilderness Recommendation

Maximum Present Net Value Benchmark
Present Net Value: $472.6 million
Opportunity Costs: None This benchmark serves as a reference point.

The Maximum Present Net Value Benchmark identifies the mix of goods and services with market and assigned values that results in the largest excess of discounted benefits over discounted costs Management Requirements ensuring resource protection are met, and a high level of timber harvest on a nondeclining flow schedule is produced This benchmark is included as a reference point only

All economic indicators are higher than any of the alternatives. Similarly, timber management indicators are higher than any of the alternatives The big-game indicators are near the level of many of the alternatives Permitted grazing is higher than any of the alternatives, and other riparian and roadless indicators are lower than any of the alternatives.

No Change Alternative
Present Net Value: $381 7 million
Opportunity Costs: $ 90 9 million

The No Change Alternative is based on the 1979 Timber Resource Management Plan. This plan was not an integrated resource management plan, and not all resource uses and outputs were valued or considered Consequently, there are differences between this alternative and all other alternatives which make tradeoff comparisons invalid.

Present net value for this alternative was based on calculations included in the 1979 Timber Resource Management Plan; consequently, differing assumptions (both economic and the modeling of resource management strategies) underlying the formulation process for this alternative and all other alternatives make strict comparison of the various indicators unreliable.

Employment opportunities in the first decade (based on annual harvest of the 1979 TRP potential yield) would be the highest of all alternatives Payments to counties (calculated in the 1979 TRP) would be similar to Alternative A, the No Action Alternative; however, if the economic assumptions were comparable, the No Change Alternative may have higher payments to counties, reflecting the high level of timber harvest.

This alternative would continue the management policies and practices of the 1979 Timber Resource Management Plan, and applicable management practices specified in various Unit Plans Under this alternative, suitable timberlands would be higher than any other alternative, similarly, the timber harvest (i e , potential yield) would be the highest of all alternatives in the first decade Permitted grazing levels and acres of unroaded area retained in an unroaded condition are slightly higher than the levels proposed by Alternative A, No Action

Alternative B-Modified
Present Net Value: $350 5 million
Opportunity Costs $131 1 million

Alternative B-Modified has the highest present net value of any alternative except No Change Alternative B-Modified generates the highest amount of total discounted benefits of all alternatives through extensive investments in all aspects of Forest management, the discounted costs of this alternative are also higher than any other alternative

Employment opportunities are the highest of all alternatives in the first decade (excluding the NC Alternative), and over the planning period (50 years) this alternative would result in more employment opportunities than any other alternative Payments to counties would increase over time to be the highest of all alternatives.

The most significant tradeoff associated with Alternative B-Modified is the amount of unroaded area retained and the acres of suitable timberland available This alternative retains less area in an unroaded area than any other alternative Alternative B-Modified has the most suitable timberland of all alternatives, and correspondingly, the highest timber output by the fifth decade Anadromous fish outputs (commercial fish harvests and sportfishing use) are the second highest of all alternatives because of habitat improvements which support higher populations. This alternative results in the lowest amount of old growth retained, this occurs because of the development of most unroaded areas, and the large number of acres harvested in timber management activities

Selected Increased Benefits Compared to the Max PNV Benchmark

1. Commercial anadromous fish harvests, first decade (+8,000 pounds of fish)
2 Permitted grazing, first decade (+36,000 animal unit months)
3. Unroaded areas assigned to unroaded management (+13,300 acres)

Selected Decreased Benefits Compared to the Max. PNV Benchmark

1 First decade jobs (-319)
2 Allowable sale quantity, first decade (-3 7 million cubic feet)
3. Suitable timber lands (-39,300 acres)
4 Present Net Value (-$122 1 million)
5 First decade net receipts (-$3 6 million)
6 Ponderosa pine offered, first decade (-28 6 million board feet)

Alternative F

Present Net Value $328 3 million
Opportunity Costs $122 3 million

Present net value for Alternative F is $22 2 million less than Alternative B-Modified, and it also has lower discounted benefits and costs

Alternative F adds a moderate number of jobs to the local employment base through a sustained increase in timber outputs over historical levels (levels supported by 1980-89 outputs). Payments to counties in the first decade would be the second highest of all alternatives, and only 8 percent less than Alternative B-Modified

When compared to Alternative B-Modified, Alternative F shows reductions in almost all outputs An exception is the increase in unroaded areas assigned to unroaded management

Selected Increased Benefits Compared to Alternative B-Modified

1 Unroaded areas assigned to unroaded management (+53,700 acres)

Selected Decreased Benefits Compared to Alternative B-Modified

1 Present Net Value (-$22.2 million)
2 Suitable timber lands (-37,100 acres)
3 Permitted grazing (-3,000 animal unit months)
4. First decade jobs (-139) and income (-$4 6 million)
5. Allowable sale quantity, first decade (-3 1 million cubic feet)
6. Ponderosa pine offered, first decade (-9 0 million board feet)
7 Commercial anadromous fish harvests, first decade (-5,700 pounds of fish)

Alternative A

Present Net Value $300 2 million
Opportunity Costs: $120.8 million

Alternative A has lower present net value, discounted benefits and discounted costs than Alternative F.

Since Alternative A continues the existing direction of management, there is no significant change in the level of local employment

Withe the exception of permitted range use, most outputs from this alternative are somewhat less than Alternative F Range use is higher because of the higher permitted utilization standards in the existing direction

Selected Increased Benefits Compared to Alternative F

1. First decade permitted range use (+14,000 AUM)

Selected Decreased Benefits Compared to Alternative F

1 Present Net Value (-$28 1 million)
2 First decade jobs (-96) and income (-$3 2 million)
3 Allowable sale quantity, first decade (-2.3 million cubic feet)
4. Ponderosa pine offered, first decade (-6 0 million board feet)
5 Commercial anadromous fish harvests, first decade (-7,600 pounds of fish)
6. Unroaded areas assigned to unroaded management (-7,400 acres)

Alternative I

Present Net Value $256 6 million
Opportunity Costs $168 7 million

Present net value for Alternative I is about 14 percent less than the present net value of Alternative A Primary reasons for lower present net value (when compared to Alternative A) are lower annual timber harvests, more selection harvesting (i.e., uneven-aged management), and higher levels of wildlife protection and management programs

Alternative I reduces the number of jobs in the local employment base by 161 and payments to counties are six percent less than Alternative A in the first decade

When compared to Alternative A, the tradeoffs include 1) more intensive riparian area management with an emphasis on improving the condition of unsatisfactory riparian areas; 2) acres allocated to more intensive wildlife emphasis prescriptions, 3) acres allocated to unroaded management status, 4) more extensive use of uneven-aged management, and 5) reductions in timber harvests and permitted grazing (i e., commodity outputs) due to 1, 2, 3, and 4 above Anadromous fish production increases as a result of riparian area management strategies, while permitted grazing declines. Ponderosa pine harvest levels are lower in the first decade, however in contrast to Alternative B-Modified and other alternatives with high harvest levels, Alternative I emphasizes the long-term production of ponderosa pine from most sites currently producing that species More extensive use of uneven-aged management would occur under Alternative I, which maintains the existing characteristics of some visually sensitive areas outside of established visual corridors Some acres would be allocated to wildlife emphasis prescriptions, resulting in wildlife or recreation benefits and varying reductions in timber harvests.

Selected Increased Benefits Compared to Alternative A

1. Unroaded areas assigned to unroaded management (+20,700 acres)
2. First decade Habitat Effectiveness Index (+ 02 on the index)
3. Big Game Use (+3 8 Thousand WFUDs)
4 Decade 5 old growth retained (+18,500 acres)
5 Commercial anadromous fish harvests, first decade (+10,200 pounds of fish)

Selected Decreased Benefits Compared to Alternative A

1 Present Net Value (-$43.6 million)
2. First decade jobs (-161) and income (-$5 3 million)
3 Allowable sale quantity, first decade (-3 8 million cubic feet)
4 Ponderosa pine offered, first decade (-14 0 million board feet)
5. Permitted grazing (-18,000 animal unit months)

Alternative C-Modified

Present Net Value $126 4 million
Opportunity Costs $292 5 million

Present net value of Alternative C-Modified is about 51 percent lower than the present net value of Alternative I, this alternative has the lowest present net value of all alternatives, and the market opportunity costs (i e the value of opportunities foregone) are greater than the present net value When compared to Alternative I, present net value is lower because of reductions in timber harvesting and permitted grazing

Employment opportunities would be reduced from recent levels (80-89 average), more so than any other alternative Payments to counties would be the lowest of all alternatives Unlike any other alternative, this alternative would emphasize the production of open, parklike stands of large, mature ponderosa pine (with resultant losses in economic efficiency) A primary difference between this and any other alternative is that Alternative C-Modified retains all Rare II inventoried Roadless Areas in an unroaded condition. (Pine Creek Roadless Area would be recommended for wilderness designation) The retention of the unroaded areas results in a corresponding loss of suitable timberland, Alternative C-Modified has the lowest amount of suitable timber land available among all alternatives. Another important tradeoff of this alternative is the rapid improvement of Forest riparian areas while permitted livestock grazing use is reduced About 28 percent of the Forest would be unavailable for utilization by cattle in the first 15 years, most areas where cattle would be excluded are pastures containing riparian areas which are currently in less than satisfactory condition Because of the rapid improvement in the riparian areas and accompanying habitat improvements, anadromous fish production would be higher than in any other alternative

Selected Increased Benefits Compared to Alternative I

1 Commercial anadromous fish harvests, first decade (+5,500 pounds of fish)
2 Unroaded areas assigned to unroaded management (+113,200 acres)
3 Minimized use of clearcut harvest regimes, first decade (1 1 thousand acres less per year)

Selected Decreased Benefits Compared to Alternative I

1. Present Net Value (-$130 2 million)
2 First decade jobs (-412) and income (-$13 6 million)
3 Allowable sale quantity, first and fifth decades (-9 3 million cubic feet)
4. Suitable timber lands (-65,600 acres)
5 Ponderosa pine offered, first decade (-22 0 million board feet)
6 Permitted grazing, first decade (-37,000 animal unit months)



Chapter III

Affected Environment

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Chapter III Affected Environment

A. Introduction

This Chapter describes the existing environment that will be affected by implementation of any of the alternatives. It discusses physical and biological characteristics of natural resources existing on the Forest and the demand for those resources. It also describes the social, cultural, and economic setting for the Forest.

1. How This Chapter is Organized

Discussion of the affected environment begins with a description of geological and biological resources of the Forest. This is followed by discussion of development and use of these natural resources and the influences that human activities have had on the ecosystems

The second section of this chapter describes current Forest management of these resources and anticipated use levels Following each discussion of a particular resource management strategy, the relationship between the management of that resource and other resources is described For example, following discussion of timber management, the influence that other resources have on the management of timber is described These interrelationships provide the basis for the effects of alternatives described in Chapter IV

2. Summary of Changes from Draft to Final

Several important changes concerning the affected environment on the Malheur National Forest have occurred since the Draft Environmental Impact Statement was released A summary of changes related to affected environment is listed below

Management Indicator Species This section has been expanded to include several additional species as indicators of management practices Also, three species have been dropped as management indicators for the Malheur National Forest.

Habitat Effectiveness Index (HEI): Use of HEI modeling has replaced the cover/forage ratio descriptions for relating the elk habitat conditions of the Forest. HEI adds to cover/forage modeling by incorporating physical and biological indicators of cover quality and spacing, as well as open road densities to determine quality of big-game habitat.

Soils Update· This section has been expanded to account for a variety of historical events that have affected the soils resource Grazing, logging, road construction and mining impacts are described. Soil conditions on the Forest are described in greater detail

Wild and Scenic Rivers The discussion of Wild and Scenic Rivers was revised after reanalyzing Forest river systems in response to public comments Upon passage of the Oregon Omnibus Wild and Scenic Rivers Act in 1988, the Malheur and North Fork Malheur Rivers were added to the wild and scenic rivers system

Water Resources Update. A detailed discussion of the water resources, water quality monitoring, and the affected environment of the Malheur National Forest is given in this Chapter. Climate, topography, and their interactions are discussed in greater depth, including potential management implications

Riparian Ecosystems Update: This section has been developed more fully since issuance of the Draft Environmental Impact Statement. Riparian zones are defined, their importance emphasized, and riparian management implications are described

Vegetation Condition Update The discussion about current vegetation conditions on the Malheur National Forest has been updated Tree information (including old growth), range, and other nonforested vegetation types are described using current information (1989).

Diversity Discussion Added: A section about "Diversity of Plant and Animal Communities" has been included in Chapter III. This summary describes current diversity concepts at the landscape ecology level and how natural and human-caused activities may influence those patterns.

B Physical and Biological Setting

1 The Malheur National Forest

The Forest is one of 19 National Forests that make up the Pacific Northwest Region, Region 6, of the National Forest System Region 6 includes lands within Oregon and Washington and is headquartered in Portland, Oregon

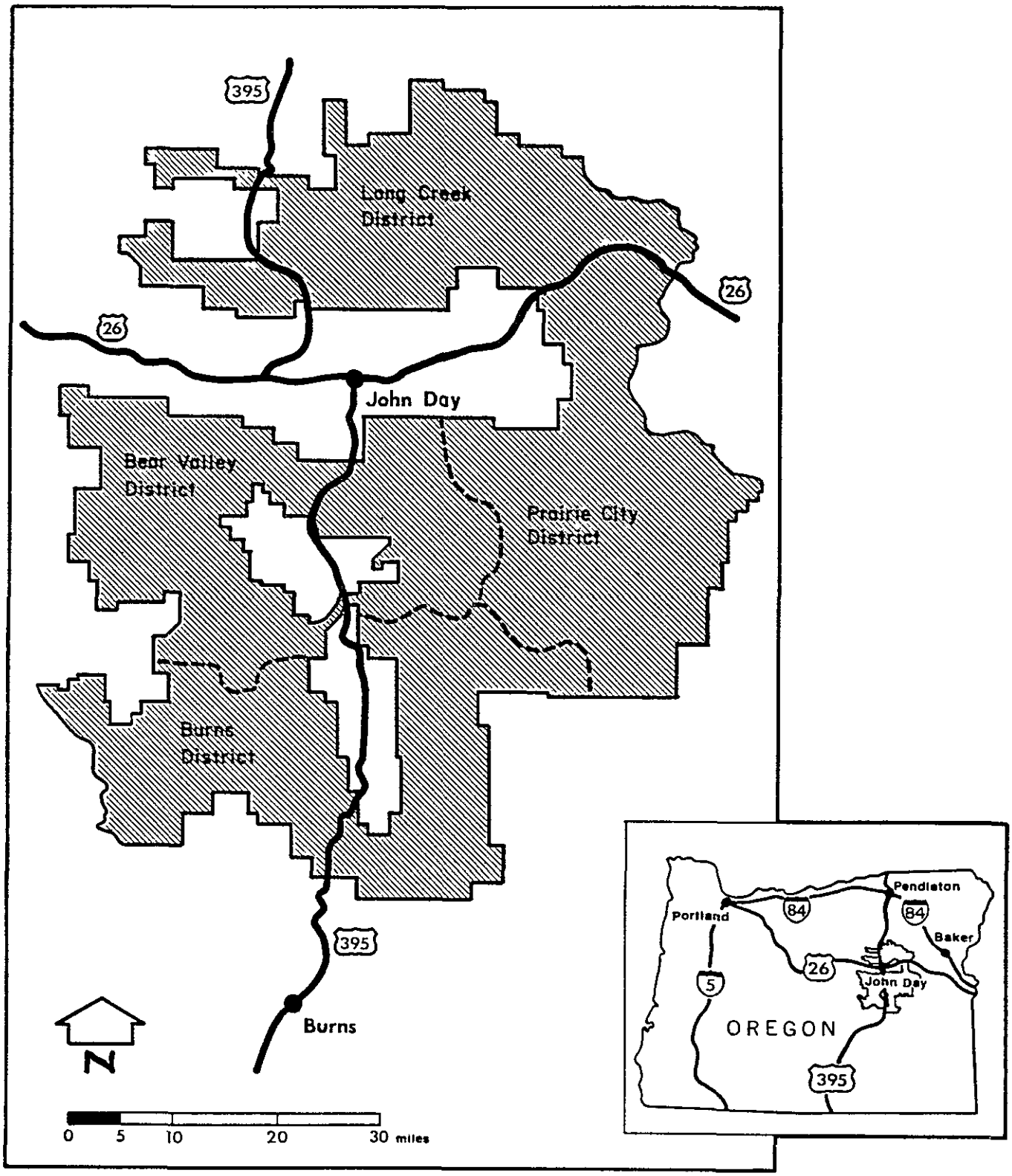
The Forest's 1,459,422 acres are located in eastern Oregon, approximately equidistant from the borders of Washington, Idaho, and Nevada (see Figure III-1.) The Strawberry Mountain Range, part of the Blue Mountains, extends east to west through the center of the Forest The Forest spans an elevational range of 3,300 to 9,038 feet, which results in a diverse and productive landscape of grasslands, sage, and juniper, forests of pine, fir, and other tree species, and mountain lakes and meadows

The northern part of the Forest is drained by the John Day River System into the Columbia River Basin. The southern part of the Forest is drained principally by the Silvies River system into the Great Basin, and by the Malheur River system into the Snake River

Malheur NF lands are in Grant (1,119,161 acres), Harney (293,876 acres), Baker (45,786 acres), and Malheur (599 acres) counties. The Forest is within a day's drive of Portland, Oregon Principal access routes are U S. 26 and U S 395, which are winding, two-lane, rural roads. There are two main population centers the John Day Valley from Dayville to Prairie City, and a 5-mile radius around Burns

The administrative breakdown of the Forest consists of four Ranger Districts Prairie City, with offices in Prairie City, Long Creek, with offices in John Day, Bear Valley, also headquartered in John Day; and Burns, with offices in Hines. The Forest Supervisor's Office is located in John Day. The ties between the Forest and the local communities are described in more detail in Section C, Social and Economic Setting

FIGURE III-1: Malheur National Forest



2. Geology and Topography

To understand the landscape seen across the Forest today, we must look back to the complex geological history of the area

The present Forest landscape is the result of a long and complex geologic history dating back to the Paleozoic Era (over 250 million years ago) At that time, northeastern Oregon was off the coast of the North American continent Over the next 100 million years, the continent grew through the accretion of marine sediments and volcanics, and buckled sections of oceanic crustal rocks carried in by plate tectonic processes During the Mesozoic Era, these units were uplifted, intruded by masses of granitic rocks, and erosion processes began carving a rugged landscape Early in the Tertiary Period of the Cenozoic Era, volcanic activity increased, and much of the old topography was covered by layers of volcanic ash and lava flows During the Miocene Epoch, extremely fluid basalts flowed from large fissures in the ground, covering much of the land area in eastern Washington, western Idaho, and northeastern Oregon Continued volcanic activity through the Miocene and Pliocene Epochs produced additional flows and extensive ash and tuff deposits. Regional stresses continued through the Tertiary Period and essentially up to the present, producing folding and faulting and eventually mountains and valleys. Erosional processes, greatly enhanced by Pleistocene glaciation and subsequent meltwater runoff, carved the rugged topography of the Aldrich, Strawberry, and Greenhorn Mountain Ranges. Erosion is continuing, and landslides are common in steep areas where hard, resistant rocks cap soft volcanic ash/tuff units typically having a high clay content

The Strawberry-Aldrich Mountain Ranges split the Forest into two physiographic divisions: the Blue Mountains to the north and the High Lava Plains to the south. Elevations on the Forest range from 3,300 feet along the Middle Fork of the John Day River to 9,038 feet on top of Strawberry Mountain.

Natural erosion and landslides have also affected the current landscape. Hard, resistant basalts erode slowly Ash deposits have already eroded from low, south- facing slopes, although upper elevations and west- and north-facing slopes still retain 8- to 24-inch deposits. Naturally occurring landslides are common "where steep cliffs form in soft rocks capped by hard resistant rocks" (Carlson, 1974)

3. Soils

Productive soils are a basic resource on which people depend for continued existence. The Malheur National Forest intends to maintain, enhance, and, where necessary, restore the long-term productivity of its soils.

The Forest's soils are typically not in a pristine condition They have been affected by more than a hundred years of mining and grazing activity, and more than 60 years of timber harvesting. Many of the adverse mining and grazing impacts occurred before the Malheur became a National Forest. Early sheep and cattle grazing was particularly damaging to meadows and upland range sites, many of which were compacted and eroded. Before the mid 1970's, logging was often indiscriminate and contributed to excessive compaction Many standards and guidelines in the Forest Plan were designed to address past soil problems

Existing problem areas were inventoried (Watershed Improvement Needs - WIN Inventory) and are being systematically corrected as funding permits

The Forest's soils were inventoried in the early 1970's; results were published in 1974 as the Soil Resource Inventory (SRI) There were 90 different mapping units, each with similar soils, landform, and vegetation The SRI has interpretative tables which present hazard ratings for each soil type, including ratings for surface erosion and compaction.

Forest soils originate from basically two sources underlying bedrock material and volcanic depositions Volcanic soils originated from Mt. Mazama, which is known today as Crater Lake Residual soils originate from bedrock and can be highly varied, while volcanic ash is a uniform, silt-loam soil with typically less than five percent coarse fragments.

The SRI classifies soils into one of four general categories loamy and clayey, nonforest soils; loamy, forested soils, clayey, forested soils, and volcanic-ash soils

a. Loamy and Clayey, Nonforest Soils - These are shallow (less than 15 inches deep), residual soils found on upland slopes and around meadows. They often show evidence of surface erosion resulting from overgrazing in the early part of this century. An erosion "pavement" has developed where soil material has been eroded away, leaving a layer of coarse rock on top of the ground Most of these sites are now in a stable condition because overgrazing has been curtailed

b Loamy, Forested Soils - These are residual soils that generally support ponderosa pine stands on southerly aspects Soil depth is typically greater than 12 inches Erosion is a concern on slopes greater than 30 percent, and compaction on slopes less than 30 percent Some of these sites have been eroded by past grazing activities Management practices are routinely mitigated for erosion and compaction on these sites

c Clayey, Forested Soils - These soils support a variety of forest types on a range of slopes and aspects Compaction and puddling are major concerns on these soils. They tend to resist erosion but, when it does occur, clayey, forested soils tend to produce turbidity in downstream water These soils are routinely mitigated for compaction and erosion after implementation of management activities

d Volcanic-Ash Soils - These soils are the most productive on the Forest. They have high water-holding capacity and, when dry, are easily displaced by a disturbance. Erosion is seldom a problem on these soils because of their high infiltration rates and water-holding capacity Depth of the ash layer ranges from 6 to about 24 inches

The Malheur NF has been intensively monitoring the soil impacts of tractor logging since 1981 Monitoring results have identified some instances where excessive compaction has occurred, those situations are being corrected Dedicated skid trails, directional falling, and winching are being used to keep skidding equipment on skid trails and thereby prevent excessive compaction. Soil ripping has been used to alleviate excessive compaction when it occurs The Forest is currently monitoring the effectiveness of soil ripping to assure that mitigation objectives are being met

4 Climate

The Malheur National Forest's climate is influenced by 2 major mountain ranges: the Cascade Mountains about 150 miles to the west, and the Rocky Mountains about 370 miles to the east The result is a high-desert climate with low precipitation and high summer temperatures

Much of the Malheur National Forest receives from 20 to 40 inches of annual precipitation, most of which falls as snow between November and May Dry periods occur annually and vary from one to three months in length

Average daily temperature during the year ranges from 27° Fahrenheit to 50° Fahrenheit Extreme annual temperatures could vary from -56° F to +108° F No month averages over 70° F and freezing conditions can occur in any month Prevailing westerly winds are generally of low velocity

5 Flora and Fauna

A variety of elevations, landforms, and climate results in a diversity of plants and animals. The ecological habitats supporting the Forest's flora and fauna can be divided into five broad life zones (see Figure III-2).

The alpine zone occurs above tree line at the highest elevations on the Forest Where vegetation grows in this zone, it consists primarily of alpine fleeceflower, alpine Idaho fescue, alpine big sagebrush, and alpine sedges This zone provides wildlife habitat for heather voles, water pipits, white-crowned sparrows and pika

The hudsonian (subalpine) zone occurs at high elevations across the Forest Characteristic vegetation consists of subalpine fir and Engelmann spruce stands growing in association with big huckleberry or grouse huckleberry. This life zone provides habitat for pine marten, Clark's nutcracker, and Lincoln's sparrow

The canadian (upper montane) zone occurs on mid- to high-elevation sites across the Forest. Characteristic vegetation consists of true fir stands, and ponderosa pine or lodgepole pine stands on areas with a fire history. Three-toed woodpeckers, snowshoe hares, and golden-crowned kinglets find feeding and breeding habitat in this life zone.

Mixed-conifer stands, consisting primarily of white firs and Douglas-fir, occupy moist, high-elevation sites on the Forest and cover more acreage than pine stands. These tree stands are denser and darker than typical pine stands and usually occur on cool, north- or east-facing slopes.

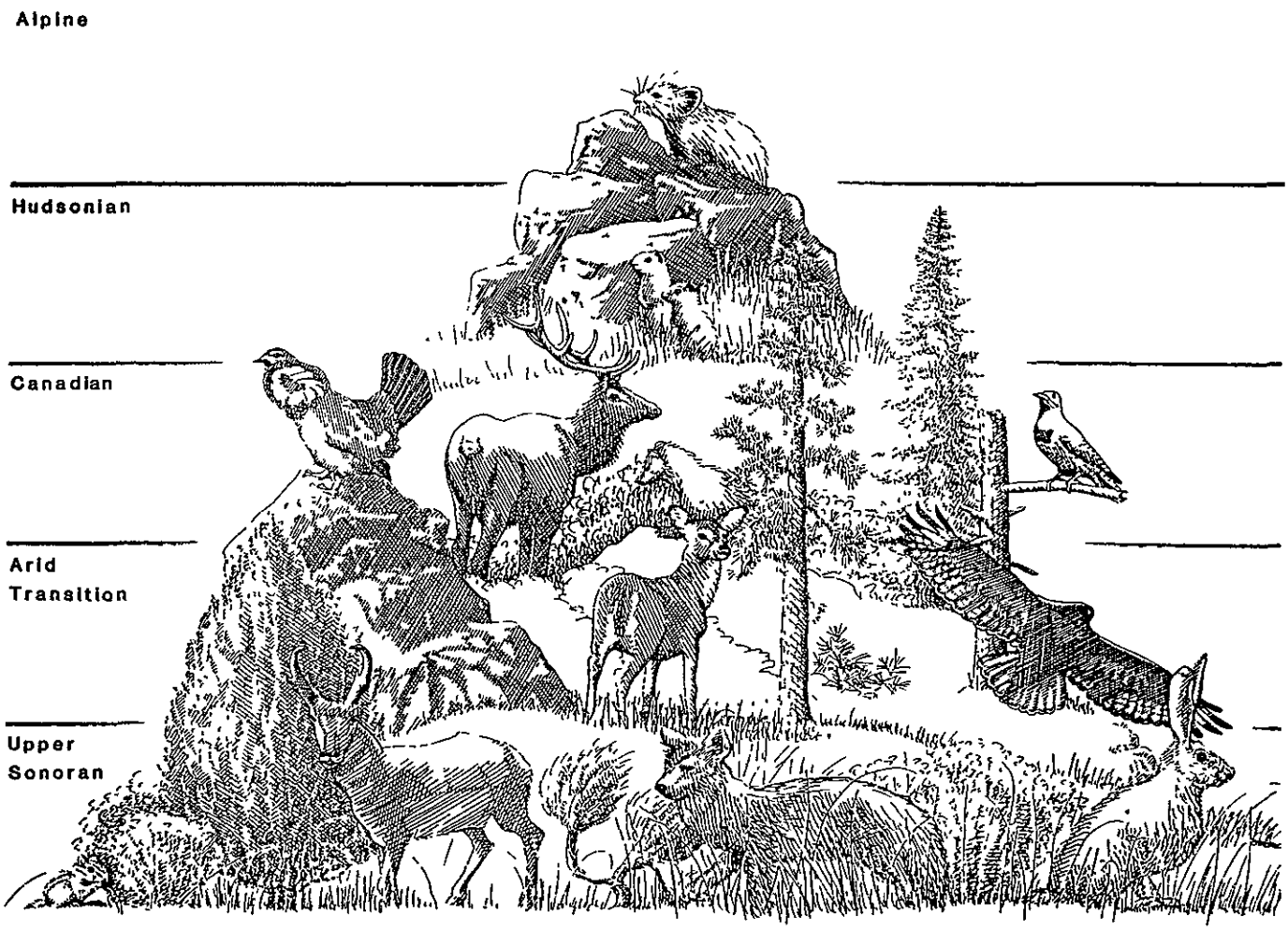
The lodgepole pine type underwent a transformation in the late 1970's due to a mountain pine beetle epidemic Few stands of mature lodgepole pine survive intact today and salvage of the dead material contributed to the Forest's supply of sawlogs, poles, posts, and fuelwood

The arid transition (lower montane) zone includes much of the pure ponderosa pine type on the Forest Common plant communities include ponderosa pine/bitterbrush and ponderosa pine/bunchgrass types Habitat for white-headed woodpeckers, mule deer, and pygmy nuthatch is plentiful in this life zone

Mature ponderosa pine trees are large and have a distinctive, orange-red, plate-like bark. Stands of mature ponderosa pine provide an attractive, open, park-like setting enjoyed by many recreationists Those same stands may also be the preferred raw material for local lumber mills Many pine stands are two- storied, with an overstory of mature trees and an understory of younger regeneration.

The upper sonoran (foothills) zone is characterized by juniper, sage and grassland ecosystems The Great Basin pocket mouse, Ord kangaroo rat, and vesper sparrow find habitat in these plant communities.

FIGURE III-2: Representative Species of Life Zones
on the Malheur National Forest



Meadows, mountain grasslands, and scablands are interspersed throughout these five life zones in response to local changes in topography, soils and aspect. These open areas provide habitat for sandhill crane, upland sandpiper, and pronghorn

Hardwood species consist mainly of willow, quaking aspen, black cottonwood, and alder. These species have little commercial value but provide needed shade and wildlife habitat in riparian zones, which are among the most productive and sensitive ecosystems of the Malheur National Forest.

The variety of landforms and vegetation on the Malheur National Forest supports over 365 wildlife species, including 22 fish, 9 amphibians, 14 reptiles, 235 birds, and 85 mammals.

6. Diversity of Plant and Animal Communities

Diversity involves the distribution and abundance of different plant communities and their associated plant and animal species Wildlife species are adapted to these plant communities (or habitats) for feeding, reproduction, or both (Thomas, 1979). In general, potential diversity of wildlife species is greater whenever the diversity of habitats increases.

Figure III-3 depicts successional stages, the number of acres currently in each stage on the Forest (1980 conditions), and the percentage of the Forest for each successional stage The successional stages add up to 98 percent of the Forest The remaining two percent consists of roads, administrative sites, and water

Plant community diversity on the Malheur National Forest is provided by a complex vegetation mosaic resulting from variations in land form, elevation, aspect, climate, substrate (geology) and soils Natural diversity has been modified by the influence of fire, insects, disease, mining, grazing, logging, and the introduction of non-native plants The capability of various sites to sustain long-term productivity is determined by the extent, severity, and periodicity of site modification, whether human-caused or naturally occurring

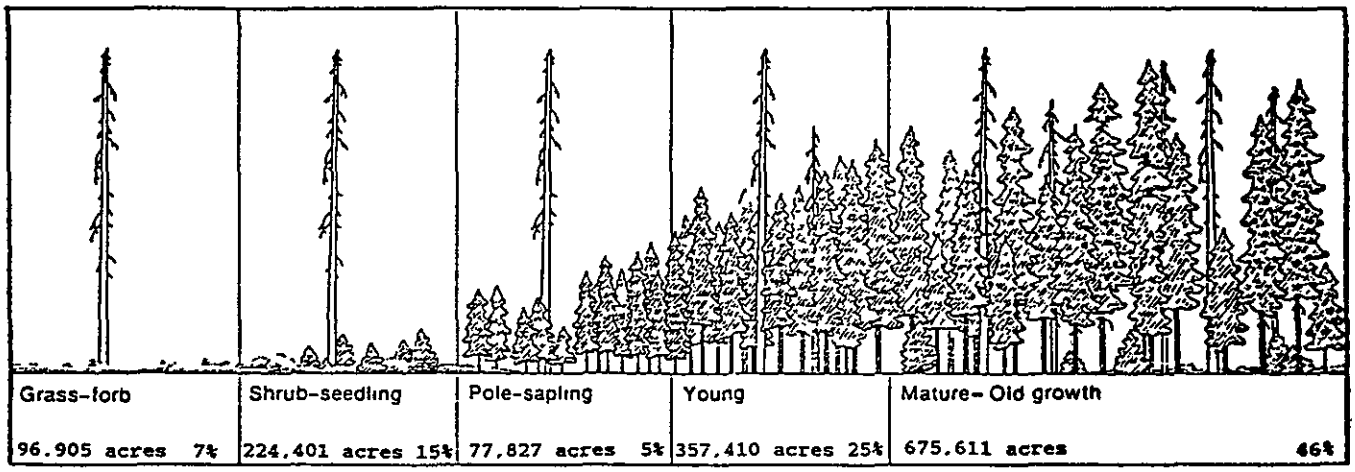
Over time, vegetation patterns may change dramatically, but changes usually result from gradual, long-term events like natural succession Conversely, vegetation changes resulting from human activities may appear quite suddenly Some natural changes may also occur suddenly, such as catastrophic events like wildfires and windstorms. Natural, catastrophic events may create landscape patterns similar to those resulting from timber harvest

Timber harvests, destructive fires, and severe windstorms generally decrease diversity within a stand, but will typically increase diversity between stands. This is often in response to changes in structural composition over time Harvests of large, old trees, thinnings, and establishment of certain species will create landscape patterns that are different than natural conditions As these timber harvests, thinnings, and plantings continue, there is an associated increase in diversity between stands.

Animal communities, both in terms of edge and habitat richness, will change as a result of management activities and natural processes As habitat conditions are modified, the opportunity exists to both positively and negatively affect certain ecosystems and their corresponding value to wildlife Increasing regeneration harvest in mature stands (clearcutting and shelterwood cuts) with an abundance of vegetative cover can increase the amount of edge contrast In areas with little vegetative cover, those same treatments may effectively reduce habitat conditions Recognizing the interactions of management activities is important for understanding their effects on plant and animal diversity Little is currently known about many of these interactions

Maintenance of special habitat conditions, such as unusual vegetation types, Research Natural Areas (RNAs) and sensitive species concentrations, will help perpetuate natural diversity found on the Forest

FIGURE III-3: Forest Successional Stages



The relationship between wildlife and habitat is not solely based on successional stages. Stand size and configuration, edge amounts, and type of plant communities are important as well (see discussion in Section D, "Wildlife") There are also specific habitats which are currently decreasing on the Forest

Aspen habitat is decreasing because of grazing by livestock, elk, and mule deer, conifer encroachment, poor regeneration, and fire suppression Fire suppression and management have also affected the availability and vigor of mountain-mahogany stands, mature sagebrush, bitterbrush, and ponderosa pine stands (see Section A-9 for discussion of the relationship between fire management and vegetation) Forage seeding (primarily grasses) has also affected the habitat provided by native grass-forb communities, yet the extent of that effect is unknown

Snags (standing dead trees) and downed logs are other important habitat components. Timber management and fuelwood harvest activities are reducing the availability of snags and defective trees (see discussion of snag habitat in Section D of this chapter). Downed logs are used for hiding cover and as sites for feeding and reproduction.

7. Old Growth

The most stable forested ecosystem is the successional stage referred to as old growth. Old growth is a vegetation condition characterized by a high number of old trees with structural damage and decay, large and numerous snags, and significant amounts of downed, woody material Production of organic matter is relatively high, and tree mortality is nearly equal to growth rates This favors high levels of nutrient retention and promotes nitrogen-fixing organisms in organic materials accumulating on the forest floor.

The large, old trees found in old-growth stands may offer spiritual and aesthetic values to humans

Mixed-conifer, old-growth stands are multistoried with large-diameter trees commonly

older than 230 years The understory trees are usually shade-tolerant species like white fir, uneven in size and age, and range from saplings to large sawtimber. Although density and closure of individual canopy layers varies considerably, the overall closure is generally high (70-80 percent) because of the layered structure

Old-growth ponderosa pine stands generally have a more open, parklike appearance with overstory trees exceeding 250 years Lodgepole pine stands are characterized by dense stands of even-aged trees with canopy closures exceeding 70 percent and trees generally 70 to 80 years old

Numerous invertebrate and vertebrate species, as well as many plant species, find optimum habitat in old growth. Old growth or late-successional forests are decreasing and species using these areas are threatened by a loss of habitat At least 25 bird and 10 mammal species use large trees, cavities, or cracks in the bark for cover, feeding, or reproduction In addition to wildlife habitat, old growth provides ecosystem diversity and aesthetic values

In 1990, there are approximately 312,000 acres of old growth within the mature/ old growth successional stage on the Forest (see fig III-3) which met the Pacific Northwest Region's criteria for old growth. In 1980, there were approximately 409,000 acres which met the Regional criteria for old growth, since 1980, it is estimated that 97,000 acres of old growth have been harvested Of the three major forest types present on the Forest, old growth is found predominantly in the mixed-conifer type (88 percent), followed by ponderosa pine forests (4 percent) and the lodgepole pine type (8 percent)

8. Research Natural Areas (RNAs)

Parts of the Forest still retain natural, Blue-Mountain ecosystems which are essentially unmodified by human use Some areas contain unique features, but most are simply representative samples of specific plant associations in an untreated condition These areas could be managed as Research Natural Areas (RNAs), a classification used to allocate lands for purposes of research and education. Such management sets them apart from other land classifications having recreational, wilderness, and similar objectives

The Malheur National Forest is committed to continuation and improvement of the Research Natural Area system The Forest currently contains one designated RNA, the Canyon Creek Research Natural Area In addition, several other candidate research natural areas have been identified on the Forest Of these, six were identified as best suited for complementing the range of ecosystems included within the RNA system (Dyrness, et al , 1975)

The six candidate research natural areas are McClellan Mountain, Baldy Mountain, Antelope Valley, Dugout Creek, Shaketable Mountain, and Dixie Butte. These areas are compatible with RNA recommendations for other Forests in northeastern Oregon Descriptions of each candidate RNA follow

Baldy Mountain, located between Pine and Indian Creeks in the Strawberry Mountain Wilderness, displays a good example of forested communities on serpentine soils. It also contains a reproducing stand of limber pine and a type of fern listed as sensitive by the Pacific Northwest Region.

McClellan Mountain RNA has stiff sagebrush communities in good condition. Also present on McClellan Mountain are subalpine big sagebrush, mountain mahogany, and western juniper The north slope contains spruce-fir communities and some whitebark pine stands.

Antelope Valley is a low-elevation, valley meadow with good examples of native sedge-grassland communities Meadow plant communities are well represented, as are the silver

sage and mountain big sage types Antelope Valley has high suitability as a research natural area, although much of the valley is in private ownership

Shaketable Mountain is a broad, gentle plateau with abundant acreage of low sage/bunchgrass and stiff sage/bunchgrass communities Additionally, juniper and bitterbrush savannahs are present in the area

Dugout Creek, near the North Fork Malheur River, includes mixed conifer/pinegrass communities on moderate slopes with ash soils. Forested sites feature old-growth ponderosa pine in the overstory, with ponderosa pine, Douglas-fir, and white fir in the understories Ground vegetation is dominated by pinegrass and elk sedge.

Dixie Butte represents an alpine sedge community, with examples of subalpine sage, subalpine Idaho fescue, and alpine fleeceflower This candidate RNA is at the top of Dixie Butte cone, where it provides good examples of vegetational differences caused by aspect changes

No aquatic or "rare and endangered" animal communities are located in these areas.

9 Natural Changes

The ecosystems of the Forest are constantly changing When one plant community is replaced by another one and the change wasn't caused by a catastrophic disturbance, it is called succession In temperate, coniferous ecosystems, succession often begins with pioneer species like aspen or ceanothus, which in turn are replaced with various conifer species, primarily Douglas-fir and white fir An intermediate species in this successional sequence is ponderosa pine

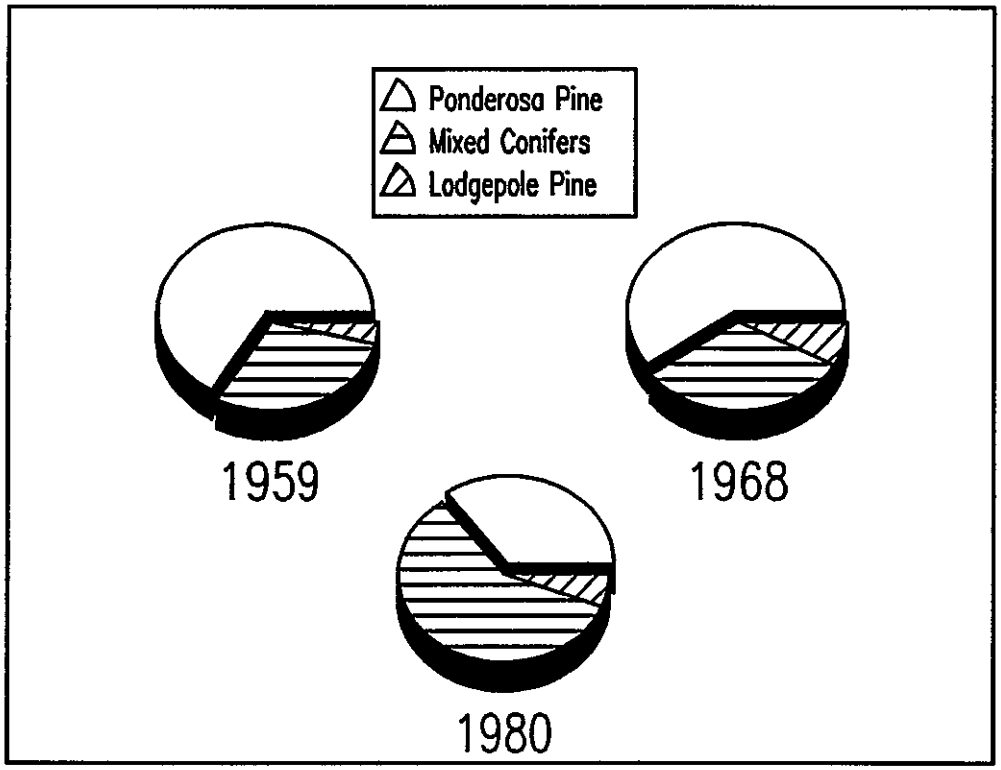
Prior to initiation of fire control in the western United States, fire played an important role in ecosystem development These natural fires occurred as one of two types high-intensity, conflagration fires, or low-intensity, ground fires

High-intensity fire areas are now dominated by plant communities of western larch, lodgepole pine, or a western larch/fir mixture These fires tended to occur on northerly or easterly slopes because they are cool and moist These slopes were not very susceptible to low-intensity, ground fires and seldom burned Fuels built up until a drought year occurred, when they were then dry enough to be ignited. High-intensity fires probably did not occur more than once every 15 to 25 years, but were devastating to large acreages of forest and range

Low-intensity, ground fires had a totally different effect on the forest environment. Ground fires often burned across ponderosa pine/pinegrass sites, where fire scars indicate that they occurred on an average of every 10 years These fires resulted in nonselective thinning of young ponderosa pine, selective elimination of white fir and Douglas-fir, and rather open stocking on the site

By suppressing natural ground fires since about 1900, land managers in the western United States have inadvertently been exchanging ponderosa pine type for mixed- conifer stands Figure III-4 shows how the area of each forest type has changed since 1959. Obviously, ponderosa pine's share of the Forest's landbase has declined steadily over the last 30 years Drops in ponderosa pine type have occurred not only because of fire suppression, but also as a result of the Forest's timber harvest program Figure III-5 shows that ponderosa pine has provided a disproportionate share of the Forest's harvest volume since 1970

FIGURE III-4: Historical Forest Type Changes, Malheur National Forest
(Data from previous 3 timber inventories)

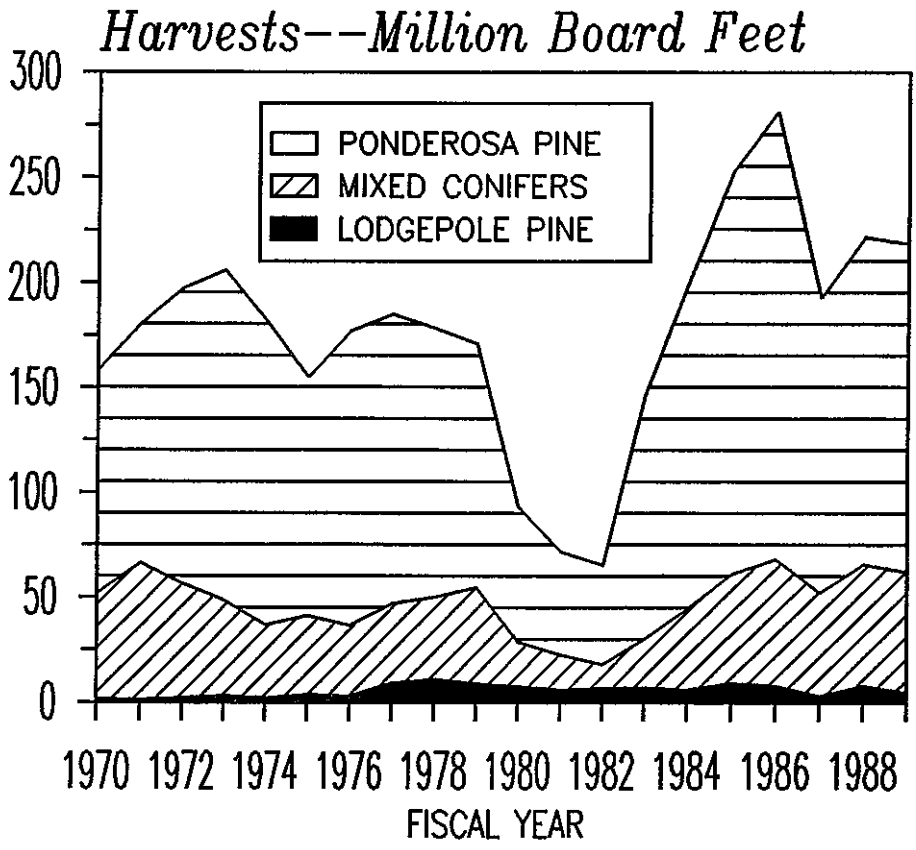


10. Prehistoric Human Activity

Human activity on the Forest has occurred in three chronological eras: prehistoric, historic, and current. Evidence indicates that hunter-gatherer peoples occupied the Forest and used its resources for the past 10,000 to 12,000 years. The Northern Paiute are more recent occupants of the area. Archaeological and other evidence indicates that these people migrated into the northern great basin over the centuries The principal residents of the area at the time of contact were the Northern Paiutes, a cohesive society integrated by kinship, warfare, and other factors Small groups were distributed widely and often shifted from band to band.

These fluid populations often became affiliated with neighboring groups. Territorial overlapping of both group and tribal boundaries occurred during seasonal migrations following food sources. The Umatilla, Cayuse, Tenino, Nez Perce, and Walla Walla tribes ranged southward from their Columbia River and Grande Ronde camps to the Paiute's northern boundary (approximately the John Day River) Evidence of prehistoric and protohistoric human activity remains on the Forest today and is managed as a cultural resource (see discussion of cultural resource management in Section D of this chapter).

FIGURE III-5: Historical Harvest (Cut) Volumes, Malheur National Forest



There was little human influence on the natural ecosystems of the Forest Vegetation and wildlife were largely governed by the occurrence and distribution of fire, as well as the climatic and physical characteristics discussed earlier

11. Historic Activity

Initial European contact with the area and the Indians living here was a result of the expanding fur trade in the early 1800's. The trails left by the trappers and explorers soon opened the country to immigrants.

The first large influx of prospectors and settlers coincided with the discovery of gold in Canyon Creek in 1862 Within 10 days, over 1,000 miners had arrived and that number soon swelled to 5,000 The town of Canyon City was laid out in July 1862.

Settlement of the area and development of the Forest's resources occurred at a time when National Forests in the West were being created to prevent abuse of the nation's natural resources The Blue Mountain Forest Reserve was established in 1907 amid a longstanding debate about the proper amount of public land to be preserved, and appropriate use of natural resources A year later, the Blue Mountain Reserve was divided and a Malheur National Forest created in June 1908

Timber played an important role in the development of early settlements by supplying building materials, fuel, fence posts, and mine timbers The first commercial sawmill in the area was the Oregon Lumber Company mill, built at Bates, Oregon, in 1917 With

the development of this mill, the annual timber cut reached 2 8 million board feet. The annual timber cut increased again in the 1930's to 64 million board feet after construction of a sawmill at Hines, Oregon. Both annual timber harvest and local mill capacity have continued to increase since that time

Along with logging activity came the beginning of the Forest's transportation system Railroad lines were laid and haul roads built to move timber from the forest to the mills In later years, railroad lines were abandoned and, in many instances, the railroad grades became roads.

Although gold mining was the major factor in settling the area, grazing and farming began to increase as the population grew and the agricultural potential of the area was recognized. The number of livestock on Forest ranges increased from 1906 to 1921, primarily for the following reasons (1) homesteading eliminated much of the previously open range, and (2) World War I created high beef prices and an increased demand for range. In 1921, there were 35,168 cattle and horses and 90,245 sheep and goats grazing on the Forest. From 1921 to the late 1940's, the number of grazing animals gradually declined, mostly because of economic crises after World War I. Sheep have not grazed on the Forest since the 1960's Early grazing was uncontrolled and unrestricted, resulting in some detrimental soil impacts Heavily-damaged sites are still recovering from severe erosion.

Social and recreational uses of the Forest developed in association with settlement of the area Improved access into the Forest through mining, lumbering, and grazing also provided an opportunity for people to explore and enjoy the area The potential for the Forest to provide a unique, high-quality recreational experience was recognized as early as 1922 when a Forest Service report recommended the preservation of Strawberry Lake for recreational use.

In 1931, there were five improved campgrounds on the Forest. During the 1930's, with the help of the Civilian Conservation Corps (CCC), improved campgrounds were increased to a total of 24, and other improvements were made for increasing numbers of recreationists Much of the increase in recreational use was due to an influx of deer hunters from other parts of the State

Natural fire frequencies of 5-15 years in ponderosa pine and 25-70 years in mixed conifer stands were once prevalent Pine stands typically received low intensity fires due to light fuel accumulations through frequent underburning. Heavier fuel accumulations in mixed conifer stands accounted for more intense fires, often resulting in total stand destruction Due to fire suppression during the past 80 years, the natural ecological cycles involving nutrients, energy, and vegetation dynamics have been altered As a result, formerly open pine stands are being replaced by a mosaic of closed canopy, multistoried stands These stands are highly flammable and are more susceptible to destruction by wildfire than the natural fire-maintained open stands that existed previously

Human uses of the Forest continue to affect its resources, altering and shaping the forest we see today The following section describes those resources as they currently exist, their importance to human use, and the ways in which management of natural resources are interrelated Social and economic ties of the local area to the Forest are examined in detail in Section C (Social and Economic Setting)

C Social and Economic Setting

1 Forest Zone of Influence

The Forest zone of influence, established early in the planning process (1981), is considered to be Grant and Harney Counties Some respondents to the DEIS suggested that the Forest's zone of influence should be expanded to include adjacent counties (e.g., Baker, Umatilla, Wallowa, etc) After evaluating the criteria which were used to determine the zone of influence, Grant and Harney Counties are still considered appropriate and the Forest's zone of influence will not be changed in this Final Environmental Impact Statement In future planning efforts, the zone of influence will be re-evaluated and revised, if necessary, to reflect any changes in long-term, socioeconomic patterns.

The Forest's zone of influence is an area of magnificent scenery, remote, small communities, and a rural, western lifestyle found in few parts of the country today. Located in the Blue Mountains of eastern Oregon, Grant and northern Harney Counties cover an area of over 6,500 square miles, and are approximately 5 hours by car from Portland, Oregon, and 3 hours from Boise, Idaho, the two nearest metropolitan areas (Patterson, 1981).

Population of the area under consideration is about 15,000 The largest towns are Burns, John Day, Hines, and Prairie City with 1980 populations of 3,579, 2,012, 1,632, and 1,106, respectively Other communities in the area are hamlets of several hundred or fewer people, and these are separated from each other by rather large distances The nearest interstate highway, railroad passenger service, and airport with scheduled air service are over 2 hours away The nearest scheduled bus service is located in Burns and Baker, each about 2 hours from John Day

Over 60 percent of Grant County's population lives in the John Day Valley, within a 15-mile radius of John Day This is the area where several major lumber mills are located and is considered to be the trade center for the county Similarly, over 60 percent of Harney County's population resides in a 10-mile radius around the county's largest community, Burns

Population growth has been generally slow but steady Severe fluctuations have occurred in the past, and very recently These fluctuations often parallel the health and viability of the national timber market Population projections for the area indicate a future growth rate averaging less than 2 percent per year

The economy is heavily resource-based, with logging and ranching as the principal sustaining industries Federal, State, and local governments are also major employers in the area More than half the area under consideration is publicly owned, and the majority of that is National Forest Thus, the Malheur National Forest's resource use and management decisions can have a major effect on the economic welfare of the area

a *Communities and Lifestyles*

There are 11 incorporated communities within the zone of influence in Grant and Harney counties The largest of these are Burns (3,579) and John Day (2,012)

Institutions and establishments normally associated with small, western, ranching and logging communities are in evidence Most towns have a post office, cafe, bar, grocery store, service station, equipment dealership, elementary school, and several churches Many have several of the above establishments

Each town's post office, grocery store, cafe, or bar (or a combination of the above) serves as not only a dispensary of mail, food, and drink, but also as a social center and meeting place for citizens in the area.

Several larger communities have, in addition to the already-mentioned establishments, such specialized institutions as police stations, government offices, high schools, libraries, museums, nursing homes, professional offices, motels, and a variety of other business establishments But since the largest town has only about 3,500 people, there are few urban amenities

Community structure in most towns in the area–especially the smaller ones–is generally cohesive, traditional, conservative, family-oriented, and based on primary groups Usually each community is small enough that most residents know each other. Informal social control is strong, and law enforcement is minimal and needed infrequently Community life often approximates that of a folk culture, with face-to-face contacts and personal interaction the dominant way of conducting personal and business transactions Different occupational and socioeconomic groups exist and their members interact, especially in larger communities.

The number of people belonging to racial and cultural minorities in the two counties is small The major exception to the predominantly Caucasian population is the tribe of Harney Valley Northern Paiute Indians living on a reservation north of Burns, and also in the community of Burns These people are descendants of Native Americans who lived in the region for centuries and who traditionally hunted, gathered food, created tools, and lived in much of the Forest area

While fewer of the local Paiutes continue these practices than they did in the past, such activities are symbolic of their heritage and are of considerable importance to them

Other tribes (Middle Oregon, Walla-Walla, Umatilla, and Cayuse Tribes) located along the Columbia River and in Central Oregon also used portions of the Forest Their interests remain similar to those described for the Paiute Tribe.

Since the mid-1850's there have been various treaties, executive orders, statutes, court decisions, and commission adjudications granting certain rights and privileges to American Indian citizens These rights include such things as hunting, fishing, and gathering roots and berries. A summary of these significant actions directly or indirectly associated with reservations, and treaty rights and privileges, is contained in Appendix H.

The American Indian Religious Freedom Act ensures that the right to practice traditional religions and gain access to religious sites will not be infringed upon. It does not convey exclusive use nor does it grant free use of Forest products. Protection of these rights and management of the Forest remain a concern to the Forest Service and the various tribes

As members of local communities and area residents, these people share the same interests in, concerns about, and ties to the Forest as other local residents

b. *Attitudes, Beliefs, and Values*

Residents of the area retain many social values characteristic of the early American West These values include an affinity for the outdoors, independence, and freedom from control and regulation. These deep-rooted values were forged during an era of abundance and unrestricted use of natural resources Values and economic history of the area have a strong bearing on local attitudes toward use and management of the public lands and natural resources.

At times, the Forest Service may be seen as a relative newcomer to the area, interfering with past practices, promoting change, and brandishing the power of the Federal Government At other times, the National Forests are seen as great assets to the area

Many newcomers to the area share the values held by native residents This is reinforced by the employment opportunities that are generally limited to occupations in agricultural and timber industries. Newcomers with professional occupations, and others not moving

to the area for employment in these industries, value the small-town, rural lifestyles and values present here

Others, "nontraditional immigrants," generally reject the commodity-production philosophy toward use of the Forest's resources held by the local majority. They tend to value these resources primarily for what they provide in nonconsumptive attributes, rather than in terms of consumptive goods

As the local majority and power structure, the native residents tend to stress the concept that Forest activities should be primarily influenced by the needs and desires of the local majority The opposing view holds that management of the Forest should be more responsive to national needs and values These views tend to reflect influence centers with which each group is familiar and successful.

Local disagreements about practices and resource management stemming from deeply held beliefs and values will continue in the future How disruptive those disagreements will be depends on the advocates' ability to find a common ground for agreement, compromise, and mutual understanding.

All points of view are represented by local residents and there is more commonality than is often perceived It is just as wrong to place all native resident or members of specific occupational groups on the extreme commodity- production end of the land use scale as it is to place all "nontraditional immigrants" on the extreme preservationist end of the scale.

In general, local communities, while adjusting to change, are cohesive, sharing a common consciousness of hard work, independence, control over one's life, and an intimate relationship with the outdoors

2 Economic Setting

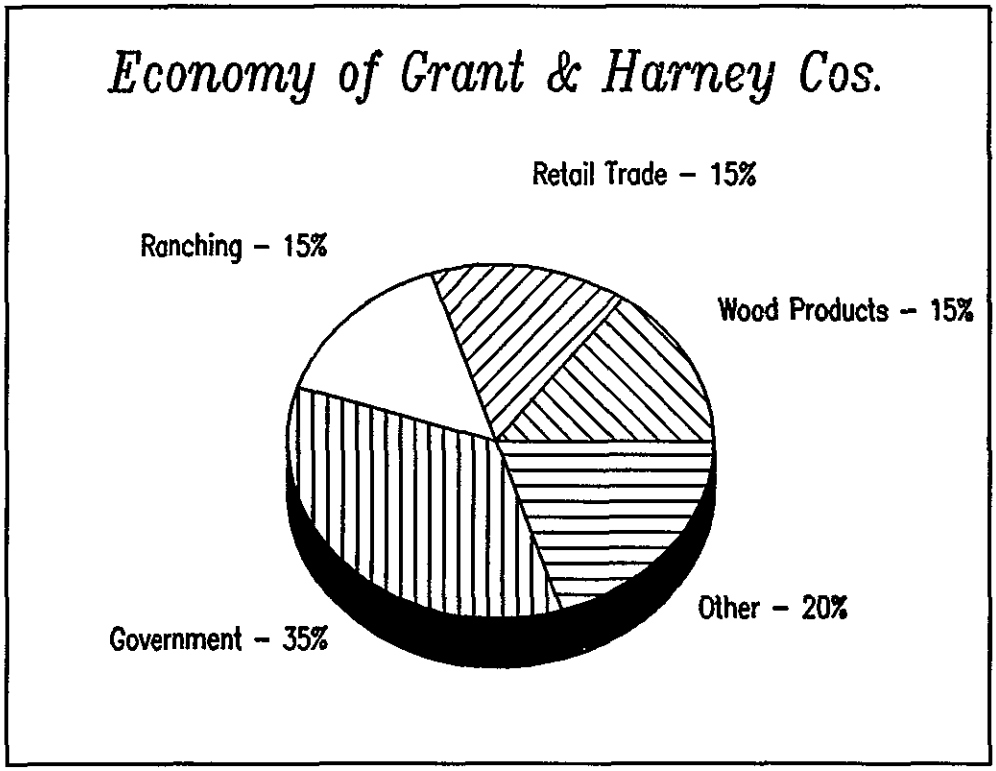
The principal private sector industries in Grant and Harney Counties are timber, livestock, and retail trade These three sectors account for approximately 45 percent of total area employment. The other major sector of the economy is government (local, State, and Federal), accounting for 35 percent of the area's employment (see Figure III-6).

a *Timber Industry*

The lumber and wood products sector is a major contributor to the economic welfare of the area, providing about 15 to 20 percent of total area employment Many local businesses derive a large portion of their sales from timber industry employees and their families

The timber industry is subject to severe fluctuations in the timber market Recent events serve to illustrate local economic hardships which can occur as a result of depressed timber markets, excess inventories, and high interest rates

FIGURE III-6: Estimated Percent Employment, by Economic Sector, for Grant and Harney Counties



Unemployment rates in Grant and Harney Counties have been chronically high in the recent past (early 1980's), primarily due to a depressed timber market. Unemployment rates in both counties have at times been above 20 percent annually during the past 8 years However, current monthly unemployment rates (1989) are currently much lower, at 4.2 percent (Harney County average for August 1989) and 3 5 percent (Grant County average for October 1989). This displays the abrupt changes that have occurred in the timber markets over the past several years. Current employment in timber-related jobs is virtually at a historic high level

A major factor affecting stability of the lumber and wood products work force in the Forest's zone of influence is the level of ponderosa pine harvests Ponderosa pine lumber is not closely tied to the housing market and does not have to compete with dimension-type lumber imported from Canada The continued availability of ponderosa pine from the Forest is believed to be strongly tied to the continued economic viability of many local mills

Information pertaining to local mill capacities and historical cut-and-sold volumes is presented in the Timber Demand section of this Chapter

b *Retail Trade*

The retail trade sector provides year-round employment slightly less than in the lumber and wood products (15 percent). To some extent, it is broader based than might be normally found elsewhere No community is large enough to support a large discount chain, so many independent merchants are required to provide goods and services Total sales and profits in this sector are highly dependent on other sectors of the local economy.

c. *Livestock Industry*

Livestock grazing on the Forest is a long-established use. Area ranches provide steady, year-round demand for many basic goods and services offered by local businesses.

During the past 10 years, a national trend toward fewer ranches and lower agricultural employment, in conjunction with increasing herd sizes on the remaining ranches, has occurred. But in Grant and Harney Counties, approximately one-half of all ranches have less than 200 cattle. Small operations prevalent in the zone of influence are more susceptible to downward trends in the livestock industry. Consequently, some smaller operations are being purchased by larger, more efficient operations

At the present time, the livestock-producing sector accounts for approximately 15 percent of total area employment and 10 percent of total wage and salary income.

The agricultural industry, primarily ranching, has a stabilizing influence on local communities Effects of the ranching sector on local economies may be found more in terms of social stability and local leadership than in terms of significant economic benefits

d *Government*

The largest segment of the area's economy is government (local, State, and Federal), accounting for about 35 percent of area employment and income Future levels of Federal government expenditures and employment are highly unpredictable, with reductions in both being a distinct possibility. Declines in the government sector could have a significant impact on the area's economy

The Malheur National Forest plays an important role in the fiscal health of Grant County. Malheur National Forest "25 Percent Fund" payments account for 35 to 40 percent of Grant County's total budget

Malheur National Forest payments to Harney County are much less significant, comprising approximately 5 percent of that County's total budget

e *External Influences*

While activities on the Forest do not directly affect daily lives of people beyond the Forest's zone of influence, they are important for various reasons There are three major activity-oriented groups likely to be impacted by management decisions firewood gatherers, big-game hunters, and recreationists

Certainly, these activity groups also include local residents, however, they represent the main types of activities on the Forest engaged in by people from other areas

Nonlocal firewood gatherers come principally from the Vale/Ontario (Oregon) and Nampa/Caldwell/Boise (Idaho) population centers, approximately 180 miles distant Nonlocal hunters tend to come from the Willamette Valley in Oregon This is particularly true of mule deer and elk hunters

Recreationists can be divided into three groups dispersed, nonmotorized recreationists, dispersed, motorized recreationists, and wilderness advocates Motorized recreationists tend to be local residents The other two categories include almost half local residents and about half other-Oregon residents, with only a few visiting from southeast Washington and California and even fewer from other states

3 State and County Planning

City and county comprehensive management plans in Oregon are designed to carry out Statewide planning goals One purpose is to incorporate the plans and programs of various governmental units into a single management tool for the planning area The State governmental body responsible for reviewing county comprehensive plans is the Oregon Land Conservation and Development Commission

County plans recognize the National Forest as "Primary Forest," "timber grazing," or similar designations Although counties do not have responsibility for regulating use on Federal lands, the Forest Service and county governments coordinate planning efforts

to avoid conflicts The alternatives discussed in the Final Environmental Impact Statement are generally compatible with local governmental plans (see further discussion in Chapter IV).

Following are pertinent Statewide planning goals (paraphrased) to which county plans must adhere (Oregon, State of, 1980):

Goal No. 1	"To provide for citizen involvement in planning "
Goal No. 2:	"To establish a planning process and policy framework."
Goal No. 3:	"To preserve agricultural lands."
Goal No. 4:	"To conserve forest lands for forest uses "
Goal No 5·	"To conserve open space and protect natural and scenic resources "
Goal No 6:	"To maintain and improve the quality of air, water, and land resources in the State "
Goal No. 7	"To protect life and property from natural disasters and hazards "
Goal No. 8:	"To satisfy the recreational needs of the citizens of the State and visitors "
Goal No 9.	"To diversify and improve the economy of the State "
Goal No 10:	"To provide for the housing needs of citizens of the State "
Goal No 11:	"To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development."
Goal No 12.	"To provide and encourage a safe, convenient, and economic transportation system "
Goal No. 13	"To conserve energy "
Goal No. 14:	(Not applicable to the Malheur National Forest)
Goal No. 15:	"To provide for an orderly and efficient transition from rural to urban land use "

Cooperation and coordination with State and local weed control organizations was accomplished through development of the Malheur National Forest Noxious Weed Control Plan, which the Forest Plan will adopt The objective of the plan is to cooperate with Federal, State, and local agencies, organizations and individuals to achieve effective management of noxious weeds, including inventory, control measures, and program monitoring The plan should place noxious weed management emphasis on those areas where cooperative efforts are underway, such as organized weed control districts. Efforts are directed to those infestations where management actions will be the most effective in preventing or reducing the spread of noxious weeds considered to be the greatest threat to economic, environmental, social, and other values. The Forest will cooperate fully with State, County, and Federal officials in implementing regulations and laws and, within budgetary constraints, to control, to the extent practical, noxious farm weeds on all National Forest System lands

Following are pertinent goals addressed in the Malheur National Forest Noxious Weed Management Plan:

Goal No. 1	Cooperate in control of plants identified as pests by Oregon Department of Agriculture and local weed control districts.
Goal No. 2:	Coordinate control programs with State and Grant, Harney, Baker, and Malheur County control agencies.
Goal No. 3:	Identify, by species, the priority for control
Goal No 4	Finance the noxious weed program through multifunctional funding

D Management of the Affected Resources

In this Section of the chapter, current management of the Forest's resources is described, along with anticipated use levels More information about supply and demand of specific resources is available in the "Management Situation Summary Chapter" of the accompanying Forest Plan The general interactions of resource management on this Forest are also discussed here Resource interactions are the basis of alternative effects described in Chapter IV

1 Timber

When people think of a forest, they think of trees Forested land is important for wildlife habitat and provides beautiful scenery. Forests provide a setting for a variety of recreational activities Trees are also important to the economic well-being of local communities and play a role in Regional and National economics as well.

There are three important types of commercial timber on the Forest ponderosa pine, mixed conifer, and lodgepole pine Table III-1 gives information about successional stages for these three types (Successional stages for both forested and nonforested lands are illustrated in Figure III-3) As Table III-1 indicates, the typical stand of trees on the Forest today is a two-storied stand which can be found in three different successional stages mature, young, and pole-sapling The overstory consists of large, mature trees, while the understory contains a variety of tree species of various ages

An immediate effect of timber harvest is an increase in age-class diversity as the abundance of two-storied stands and mature trees are converted to early successional stages. But as this trend continues, diversity decreases because the Forest will have an abundance of early to mid-successional stages

TABLE III-1: Available and Suitable Timber Inventory by Species Group (1980).

Species Group	Thousands of Acres	Million cubic feet	Million board feet[1/]
Ponderosa Pine:			
Regeneration	4.5		
Seed and sapling	0.7		
Immature sawtimber	68.4	75 2	384 1
Two-story stands	232 8	326 2	1,888 9
Mature sawtimber	19 7	34 4	203 2
TOTAL	326 1	435.8	2,476 2
Mixed Conifer.			
Regeneration	5 0		
Seed and sapling	0.1		
Immature sawtimber	69 6	96 7	519 7
Two-story stands	530 2	1,195.6	6,970 0
Mature sawtimber	21.1	46.1	262 2
TOTAL	626.0	1,338 4	7,751.9
Lodgepole Pine:			
Regeneration	25 8		
Seed and sapling	1 4		
Immature sawtimber	19.2	13 2	72.9
Two-story stands	14 9	17 5	96.9
Mature sawtimber	2 3	2.6	14 1
TOTAL	63 6	33.3	183 9
Low Sites:[2/]	24 2	22 8	129.3
TOTAL	1,039.9	1,830.3	10,541 3

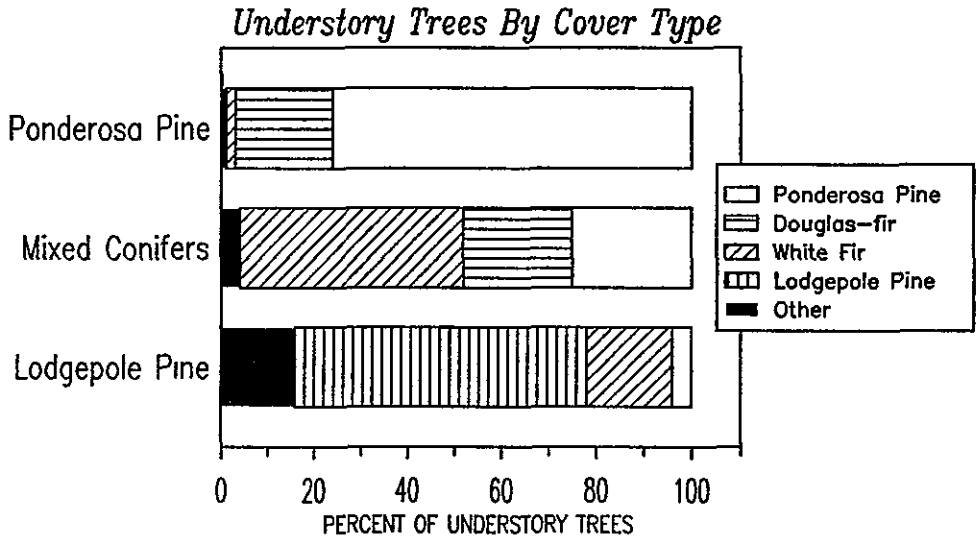
1/ Based on live trees 9-inches DBH and larger to a 6-inch top diameter (Regional Office empirical yield table values, updated to 1987 volumes)

2/ Low-site volumes are based on low-site ponderosa pine yields from Ochoco N F

Figure III-7 displays the typical understory species composition for the three major forest types. What is not readily apparent in figure III-7 is a recent change in forest types (see figure III-4 for type change information)

For existing ponderosa pine stands, ponderosa pine represents about 70 percent of the overstory composition, but it has recently comprised about 90 percent of the timber volume harvested This is because ponderosa pines are currently the largest overstory trees. As the understory is managed in the future, the mixed- conifer species will make up more of the volume harvested Mixed-conifer species represent roughly one fourth of the trees in the understory, and they have the highest potential growth rate Once these stands are regenerated, the overall species mix will be about 83 percent ponderosa pine, with the actual harvest volume being about 90 percent ponderosa pine over the length of the rotation.

Figure III-7: Understory Tree Composition by Forest Type 1/



1/ Based on the number of trees, by species, less than 14 inches DBH in the understory of a typical stand for each of the three major forest types

On mixed-conifer sites, ponderosa pine is about 20 percent of the overstory but it has contributed about 50 percent of the volume harvested This occurred because ponderosa pines are the largest trees available for harvest and they are preferred by the wood products industry In the future, mixed-conifer species will make up more of the harvest volume because they have faster growth Once mixed-conifer stands are regenerated, the overall species mix will be about 25 percent ponderosa pine, with the actual harvest volume being about 36 percent ponderosa pine over a rotation This effect from mixed-conifer stands is even more significant because they cover the majority of the Forest's acreage (see Table III-1)

This means that as the overstory is removed from mixed-conifer stands, the relative proportion of ponderosa pine available for harvest or habitat is reduced While the total volume of wood fiber will still be available, the species mix and size of trees will have changed Although it varies by alternative, a general trend is that ponderosa pine volume will first decrease from about 50 percent in the first decade to 35 percent in the fourth decade, then increase to 60 to 70 percent again after the tenth decade Harvest diameters will decrease from 24 inches to 16 inches by the fifteenth decade These changes reflect harvest preferences for ponderosa pine and historic fire suppression

The change in forest types from ponderosa pine to mixed conifers is accompanied by increased susceptibility to insects and diseases. These pests are not new to the Forest, but as their host type increases, their severity could also increase.

a. *Land Classification*

The Malheur National Forest produces resources from a land base of 1,459,422 acres, 1,174,878 acres are forested and 1,039,868 acres have been identified as tentatively suitable for timber production. The results of this classification process are shown in Table III-2

Current management direction for the Malheur National Forest is derived from three Unit Plans (John Day Unit, Silvies-Malheur Unit, and South Fork Unit) and the existing Timber Resource Management Plan These four management plans provide resource management objectives for the Forest The Timber Resource Management Plan (1979) provides specific direction for achieving the greatest volume of wood fiber from available lands, on a continuing basis, within the guidelines of the three unit plans

A variety of silvicultural techniques for harvesting, timber stand improvement, commercial thinning, and reforestation are combined with other management objectives to achieve the resource objectives for a specific project or area. The way in which timber resources are currently being managed is described in the No Action Alternative (see discussion of alternative A in chapter II)

b *Pest Management*

Insects and diseases are a natural part of the forest environment. They cause change in the forest, primarily by thinning stands and recycling nutrients Insects and diseases are usually found at endemic (low) levels, which have little adverse impact on healthy trees. But once a tree becomes stressed by drought, old age, or physical damage, an insect or disease pest can easily kill it. Whenever stress conditions affect large areas, insect or disease populations can expand until they are out of control, a condition called an "epidemic" Two recent examples are the 1972-1978 mountain pine beetle epidemic in lodgepole pine, and the 1980-1989 western spruce budworm epidemic in mixed-conifer stands.

Dead trees provide homes for birds, insects, and other animals The insects themselves are a food source for birds and mammals It is often overlooked that some bird species exert significant control on insect populations Recent research indicates that birds can reduce budworm populations by as much as 72 percent in a single summer (Langelier and Garton 1986). The following birds occur on the Malheur National Forest and are effective at regulating budworm levels

American Robin	Golden-Crowned Kinglet	Swainson's Thrush
Cassin's Finch	Hammond's Flycatcher	Townsend's Warbler
Chipping Sparrow	Mountain Chickadee	Western Tanager
Dark-eyed Junco	Pine Siskin	Yellow-rumped Warbler
Evening Grosbeak	Red-breasted Nuthatch	

The western spruce budworm is a defoliator found in Douglas-fir, white fir, and grand fir stands throughout the west In 1980, spruce budworm populations began building throughout eastern Oregon. By 1986, budworm populations were at epidemic levels throughout the Blue Mountains, despite repeated attempts to control it with both chemical and viral insecticides

TABLE III-2: Land Suitability for Timber Production

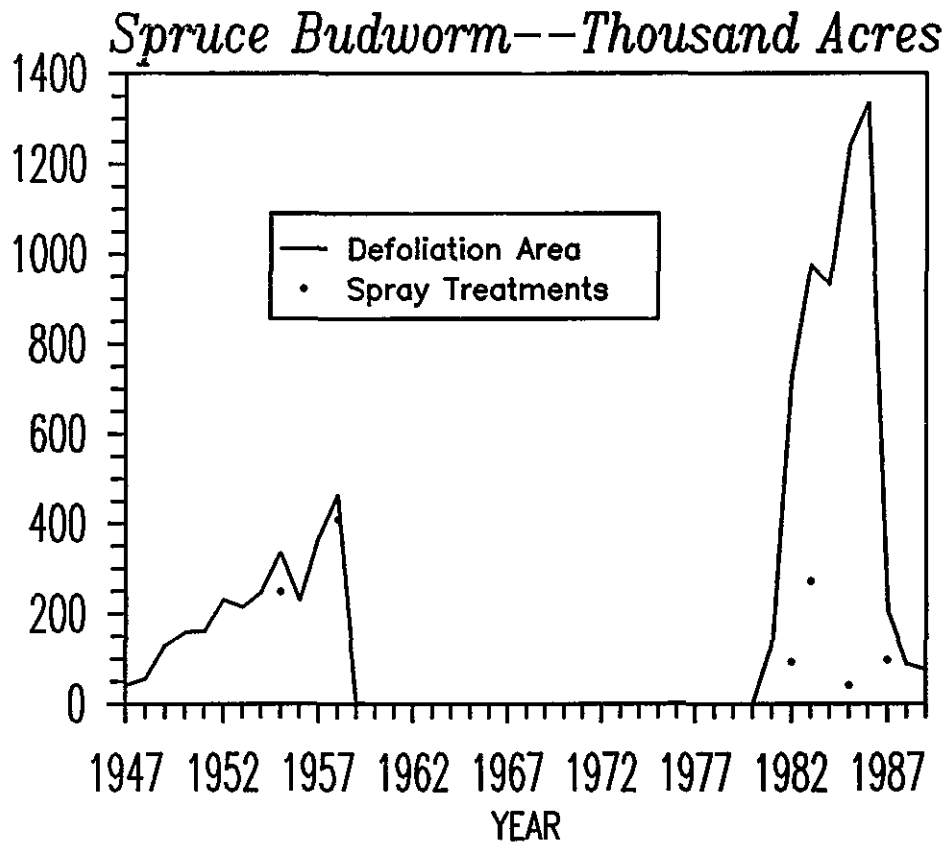
	Acres Not Suited For Timber Production	Total Acres
I. Total National Forest Area		1,540,119
A. Other Ownerships	80,690	
II Net National Forest Area		1,459,422
A Water	3,052	
B Nonforest (not stocked with 10 percent tree cover)	254,398	
C Lands developed for other than timber production purposes (crops, improved pasture, residential, administrative areas, improved roads, powerline clearings)	27,094	
III. Forested Lands		1,174,878
A. Withdrawn from scheduled timber production		
1 Wilderness	66,226	
2 Research Natural Areas	0	
3 Other (e g, Wild & Scenic Rivers, Experimental Forests)	2,147	
SUBTOTAL	68,373	
B Lands growing less than 20 cubic feet/acre/year		
1 Lands classified unsuitable	50,596 1/	
2. Lands classified suitable		(24,307) 2/
3. Lands classified separate suitability component	0	
SUBTOTAL	50,596	
C. Irreversible resource damage	0	
D. Regeneration Difficulty		16,041
E. Regeneration Difficulty (classified as a separate suitability component)	0	
IV. Forested Lands Not Suitable for Timber Production	135,010	
V. Lands Tentatively Suitable for Timber Production		1,039,868
VI Total National Forest Lands Not Suitable for Timber Production	419,554	
VII. Land Status Under Current Timber Management Plan	257,040	1,200,985
	Noncommercial Forest Land	Commercial Forest Land

1/ Lands producing less than 20 cubic feet/acre/year, unsuitable because of regeneration difficulty

2/ Lands producing less than 20 cubic feet/acre/year that are suitable for production.

Figure III-8 provides a history of budworm outbreaks on the Forest, and spray treatments completed during attempts to control it. Figure III-8 shows that the 1980-1989 epidemic did not last quite as long as the 1946-1959 outbreak, but it affected considerably more area and was much more severe

FIGURE III-8: Western Spruce Budworm History, Malheur National Forest

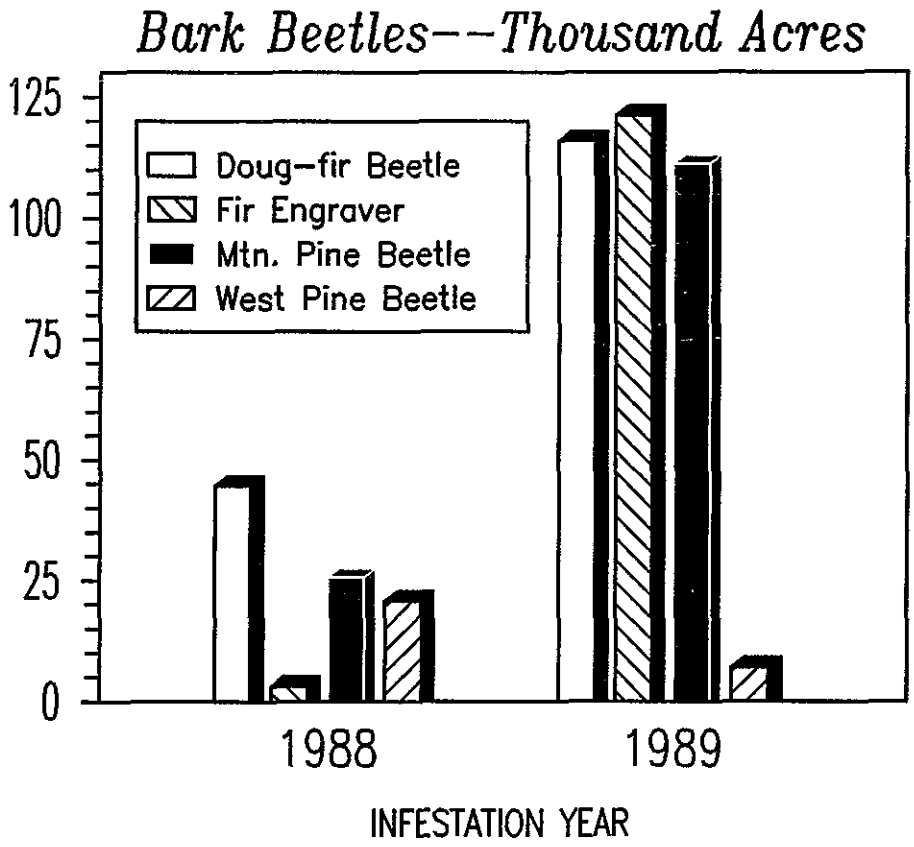


A Douglas-fir tussock moth outbreak occurred on the Burns Ranger District from 1963 to 1965, where it affected 65,000 acres before being controlled with a chemical insecticide Future tussock-moth outbreaks are likely because of an increasing amount of white fir and Douglas-fir host type on the Forest

The Douglas-fir tussock moth and western spruce budworm will remain a serious threat if the Forest continues to favor mixed-conifer stands by removing ponderosa pine overstories and managing the fir understories The potential for future damage from these defoliators may gradually decline as more fir stands are intensively managed (Brookes 1985)

In 1988, a major increase in bark beetle problems began on the Forest Mountain pine beetle was active in both lodgepole pine and ponderosa pine stands, especially those weakened by a 1985-1988 drought in the Blue Mountains. Douglas-fir beetles and fir engravers were causing widespread mortality in mixed-conifer stands, particularly those damaged by the 1980-1989 budworm epidemic Figure III-9 shows major bark beetle infestations in 1988 and 1989

FIGURE III-9: 1988-1989 Bark Beetle Infestations, Malheur National Forest



Surveys conducted on the Fremont and Ochoco National Forests (Buffam 1985) in southeastern Oregon showed that root diseases are causing serious losses in the true fir types While no widespread surveys have been conducted, project-level analyses show that the same root diseases are causing damage here on the Malheur National Forest

Stem decays, especially Indian paint fungus, are quite damaging in true-fir stands on the Forest (Burns 1983) Dwarf-mistletoe infections also occur in Douglas-fir, pine, and western larch Damage is most severe in Douglas-fir stands, with almost half of those stands infected (Hadfield 1984, Twardus et al , 1984). Table III-3 provides information about important insect and disease pests of the Forest

Pocket gophers and porcupines are two animals that damage trees They cause the most damage in tree plantations Pocket gophers destroy newly-planted seedlings by eating their juicy, young roots They prefer the robust root systems of nursery-grown trees Porcupines kill or damage young trees by chewing the bark on their trunk Activity by these animals can destroy a plantation or produce a large number of deformed trees

TABLE III-3: Important Forest Pests of the Malheur National Forest

***** BARK BEETLES *****

Douglas-fir Beetle (*Dendroctonus pseudotsugae*)
TREES AFFECTED Douglas-fir and western larch.
DAMAGE CAUSED Tree mortality
IMPACTS AND EFFECTS: Attacks trees weakened by disease, drought, defoliation, fire or other stress, very active after the 1980-1989 budworm epidemic and the 1985-1988 drought, affecting 44,600 acres in 1988 and 115,888 acres in 1989.
CONTROL MEASURES: Salvage attacked and susceptible hosts, manage green slash to prevent population buildups.

Fir Engraver Beetles (*Scolytus ventralis*).
TREES AFFECTED· White fir and subalpine fir
DAMAGE CAUSED· Top-kill and tree mortality.
IMPACTS AND EFFECTS. Attacks trees weakened by drought, defoliation and root disease; very active after the 1980-1989 spruce budworm epidemic and the 1985-1988 drought, affecting 3,190 acres in 1988 and 121,088 acres in 1989.
CONTROL MEASURES Improve host vigor, treat root diseases and other stressful agents over which we have some control, salvage damaged and susceptible hosts

Mountain Pine Beetle (*Dendroctonus ponderosae*)
TREES AFFECTED Lodgepole pine and ponderosa pine.
DAMAGE CAUSED: Tree mortality, blue-staining of sapwood.
IMPACTS AND EFFECTS. Killed millions of lodgepole pines in the Blue Mountains from 1972-1978, very active after the 1985-1988 drought in both lodgepole and ponderosa pine types–affected 25,580 acres in 1988 and 111,057 acres in 1989.
CONTROL MEASURES Stocking-level control, chemical insecticides or attractants (pheromones) are occasionally used

Pine Engraver Beetles (*Ips* spp)
TREES AFFECTED. Ponderosa pine and lodgepole pine.
DAMAGE CAUSED Top-kill and tree mortality.
IMPACTS AND EFFECTS. Populations build in slash and then attack living trees. May escape from thinning slash to kill leave trees in thinning units.
CONTROL MEASURES· Create enough green slash to prevent killing of leave trees

Western Pine Beetle (*Dendroctonus brevicomis*)
TREE AFFECTED Ponderosa pine
DAMAGE CAUSED. Tree mortality, blue-staining of sapwood.
IMPACTS AND EFFECTS Attacks stressed, high-risk trees, fairly active after the 1985-1988 drought, affecting 9,770 acres in 1988 and 5,721 acres in 1989
CONTROL MEASURES Sanitation and salvage, stocking-level control; replace old-growth with young, vigorous trees.

***** DEFOLIATORS *****

Douglas-fir Tussock Moth (*Orgyia pseudotsugata*)
TREES AFFECTED White fir and Douglas-fir
DAMAGE CAUSED: Severe top-kill; reduced radial growth; tree mortality.
IMPACTS AND EFFECTS Cyclic–recorded outbreaks occurred in 1928-29 (Seneca), 1937-39 (80,000 acres near Rudio Mountain), 1947-48 (1,500 acres near Snow Mountain and Gold Hill), 1963-65 (Antelope Mountain and King Mountain), and 1973 (1,200

acres near Ironside, just east of the Malheur NF) The 1963-65 epidemic affected almost 65,000 acres before being suppressed with DDT.
CONTROL MEASURES Spray with insecticides, favor non-host species and mosaics of host and non-host stands.

Larch Casebearer (*Coleophora laricella*)
TREE AFFECTED· Western larch
DAMAGE CAUSED Defoliation, growth reduction, branch die-back, tree mortality.
IMPACTS AND EFFECTS Sporadic Generally affects small areas at one time, but damages can be severe in infested stands
CONTROL MEASURES. Chemical insecticide for individual trees; natural parasites are also effective for large areas

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Western Spruce Budworm (*Choristoneura occidentalis*)
TREES AFFECTED White fir, Douglas-fir, subalpine fir, and Engelmann spruce
DAMAGE CAUSED Reduces radial and height growth and seed production, prolonged defoliation will kill trees
IMPACTS AND EFFECTS Cyclic epidemics are common – Malheur NF most recently affected from 1945-1959 (463,500 acres), and 1980-1989 (1 34 million acres)
CONTROL MEASURES Spray with insecticides, favor seral, non-host trees during stand management, create single-story stands when dealing with pure host type, create host/non-host mosaics over large areas Parts of the recent Malheur NF epidemic were sprayed with carbaryl or b t. in 1982, 1983, 1985 and 1987

***** DWARF-MISTLETOES *****

Douglas-fir Dwarf-Mistletoe (*Arceuthobium douglasii*)
TREE AFFECTED Douglas-fir
DAMAGE CAUSED Top-kill, reduced growth, deformed stems, brooms; mortality
IMPACTS AND EFFECTS A severe pest–42 percent of the Douglas-fir type on the east side of Region Six is infected Causes extensive mortality on poor sites
CONTROL MEASURES Regenerate mature stands, leave buffers between infected trees and uninfected seedlings, quickly remove infected trees in partial cuts.

Larch Dwarf-Mistletoe (*Arceuthobium laricis*)
TREES AFFECTED Western larch, lodgepole pine and subalpine fir (occasional)
DAMAGE CAUSED Reduced growth, seed output, lumber defect; brooms; mortality
IMPACTS AND EFFECTS Our most serious larch pest – 47 percent of host type in the Northwest is infected Kills trees faster than most dwarf-mistletoes.
CONTROL MEASURES Regenerate mature stands, leave buffers between infected trees and uninfected seedlings, quickly remove infected trees in partial cuts

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Lodgepole Pine Dwarf-Mistletoe (*Arceuthobium americanum*)
TREES AFFECTED Lodgepole pine and ponderosa pine (occasional)
DAMAGE CAUSED Reduced vigor and growth, stem cankers, mortality.
IMPACTS AND EFFECTS Severe–42 percent of host type in Northwest is infected.
CONTROL MEASURES Clearcut mature stands; sanitize young stands by removing infected trees, prompt removal of infected overstory trees in partial cuts.

Western Dwarf-Mistletoe (*Arceuthobium campylopodum*)
TREE AFFECTED. Ponderosa pine
DAMAGE CAUSED Reduced vigor, growth, seed production, cankers, mortality.
IMPACTS AND EFFECTS Common–26 percent of host type in Northwest is infected.
CONTROL MEASURES Regenerate mature stands, sanitize young stands during thinnings, promptly remove infected overstory trees from partial cuts

*** **Root Diseases** ***

Annosus Root Disease (*Fomes annosus*)
TREES AFFECTED White fir, lodgepole pine, ponderosa pine and subalpine fir.
DAMAGE CAUSED. Butt decay and tree mortality.
IMPACTS AND EFFECTS· Fairly common in mixed-conifer stands, especially those with a history of repeated partial cutting
CONTROL MEASURES Favor tolerant and resistant trees; use short rotations and fewest possible entries, remove infected stumps or treat them with borax while still fresh (immediately after felling)

Armillaria Root Disease (*Armillaria ostoyae*).
TREES AFFECTED Douglas-fir and white fir–severe, pines–moderate
DAMAGE CAUSED. Reduced growth; butt decay; windthrow, tree mortality
IMPACTS AND EFFECTS. Widespread in mixed-conifer stands; probably the most damaging root disease of the Malheur National Forest
CONTROL MEASURES Favor tolerant and resistant trees; avoid frequent entries and wounding, sanitize during thinning, stump removal in special situations

Black Stain Root Disease (*Ophiostoma wageneri* var *ponderosum*)
TREES AFFECTED Ponderosa pine and lodgepole pine.
DAMAGE CAUSED Reduced growth and tree mortality
IMPACTS AND EFFECTS. Usually spread by root-feeding bark beetles and weevils, recently found in the ponderosa pine type on Prairie City Ranger District.
CONTROL MEASURES Favor tolerant and resistant species, minimize tree injuries and site disturbance, schedule precommercial thinning to avoid insect vectors

Laminated Root Rot (*Phellinus weirii*)
TREES AFFECTED· Douglas-fir and white fir–severe, Engelmann spruce, subalpine fir and western larch–moderate
DAMAGE CAUSED Reduced growth, root and butt decay, windthrow; tree mortality
IMPACTS AND EFFECTS Causes heavy mortality on infected sites Can survive for long time periods in infected stumps and roots
CONTROL MEASURES Favor tolerant and resistant species, remove infected stumps from disease centers (only used in special situations like recreation sites)

*** **RUSTS and ROTS** ***

Comandra Blister Rust (*Cronartium commandre*)
TREES AFFECTED Ponderosa pine and lodgepole pine
DAMAGE CAUSED Kills branches, tops and entire trees
IMPACTS AND EFFECTS· Often minor, but some mortality occurs over small areas
CONTROL MEASURES Favor non-host trees, remove infected trees during thinning, clearcut mature, infected stands

Indian Paint Fungus (*Echinodontium tinctorium*)
TREE AFFECTED. White fir
DAMAGE CAUSED Stem decay.
IMPACTS AND EFFECTS Widespread in old-growth, mixed-conifer stands, most important stem decay organism on Malheur National Forest.
CONTROL MEASURES Maintain vigorous stands, use short rotations; avoid bole wounding; avoid managing advanced regeneration more than 50 years old

Red Ring Rot (*Phellinus pini*).
TREES AFFECTED Most conifers
DAMAGE CAUSED: Stem decay.
IMPACTS AND EFFECTS Common in old-growth, especially on steep, rocky slopes.
CONTROL MEASURES Salvage infected trees, avoid wounding of host trees, replace old-growth with young, vigorous trees

Western Gall Rust (*Peridermium harknessii*).
TREE AFFECTED Lodgepole pine
DAMAGE CAUSED. Stem deformity, breakage, tree mortality
IMPACTS AND EFFECTS: Widespread in host type, but damage seldom severe except in young stands.
CONTROL MEASURES Remove damaged trees, leave rust-free trees in partial cuts

c *Regional Timber Demand and Supply Projections*

The principal projections used in developing 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 a long time period (50 years) and do not necessarily recognize short-term, Regional fluctuations A summary of those RPA projections (year 2030) for timber supplies follows

Hardwoods:

The current balance between wood growth and its removal show that the hardwood forests and eastern softwood forests can support additional timber harvests, but this balance will change, and future harvests, particularly in the decades beyond 2000, could vary over a wide range Nonetheless, if commercial timberland owners continue to respond to price and inventory changes, then timber harvests can be increased substantially in most geographic regions during the next few decades The largest hardwood increases will be in the south, which is expected to rise from about 3 4 billion cubic feet in 1980 to 9 4 billion in 2030 (RPA 1984)

Softwoods:

Total softwood harvests would rise 24 percent from 9 6 billion cubic feet in 1980 to 11 9 billion cubic feet in 2030 Though the outlook is for increased softwood harvests nationally, there are important differences among the major softwood- producing regions.

In the Douglas-fir subregion, projected annual harvest from 1980 to 1990 is about 2.3 billion cubic feet It then declines slightly to about 2 billion cubic feet per year This level is maintained through the rest of the 50-year projection period (RPA 1984)

In contrast, the other major source of softwood timber is the south Harvest level is projected to rise from about 4 1 billion cubic feet in 1980 to 7 3 billion in 2030. However, many recent forecasts are now showing a downward trend in the rate of economic supply. This may indicate that the south could be expected to shift to a slower growth rate until the year 2030 Much of the current expansion in the south with softwoods, as well as hardwoods, is due to the fact that its production of wood products has become more diversified as compared to other regions of the country

d *Short-Term and Long-Term Demand Trends*

Over the next 10 years, timber demand from the Pacific Northwest geographic region will grow slowly Although there is a backlog of unfulfilled housing demand, the future will depend primarily on continuing strength in personal income and the availability of affordable housing and financing In addition, export projections for Pacific Rim

countries show stable or declining economic growth. The analysis acknowledges there will be a decline in the construction sector. Structure replacement, rather than new construction, will characterize their market. The projections for demand increases may be described as considerably restrained and cautious (Nomura 1981).

The long-term outlook for solid wood-products industries contains a number of challenges Evaluation of recent information indicates that timber demand is showing a strong increase when compared with the slowdown of the early 1980's.

The ability to sustain this increase over a long time period is linked to the critical issue of costs 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 (Adams and Haynes 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 their costs in order to compete with wood substitutes (Schallau 1985 and 1986)

Although current timber supply levels in the Pacific Northwest Region 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 subregion to supply the various kinds of wood needed

A vision of the future that features stable wood supplies and a progressive perspective on wood fiber management would allow the Pacific Northwest Region to grasp an opportunity to increase exports to international markets To achieve this, the forest products industry will need to learn a different market system and provide more products in the form demanded (Campbell, 1983). In addition, actions by industry, such as modernizing facilities, adopting current technology, reducing costs, and diversifying into other production sectors (similar to what the southern region has done) could help revitalize the wood- based sectors of the region (Schallau 1985).

e. *Private and Public Land Interrelationships*

Currently, part of the timber formerly supplied by the Pacific Northwest Region is now being supplied by the south and Canada However, the situation with Canada can be expected to change as there are indications that economic supplies may begin dropping off within 6 to 15 years The projected change indicates a potential drop in supply capability of 30 to 50 percent from current levels The south should be able to maintain harvests, or show a slow increase, 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 for other sources, the growth of wood fiber on private lands in the Pacific Northwest would again be reaching its capability. Private lands in the Pacific Northwest could then become a major softwood supply source 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 for a relatively stable supply of wood fiber (Schallau 1985)

f. *Projections for Forest Supply and Demand*

The following discussion includes supply and demand projections to the year 2018. Projections beyond this time were not undertaken because of unreliable information and probable revision of the Forest Plan and policies prior to that period

Theoretical supply levels have been calculated for the Forest. The supply potential under *varying management strategies was presented in the Forest's Analysis of the Management* Situation (AMS) Current management direction would result in a potential supply of about 45 million cubic feet annually through 2018; a high-investment strategy (modeled in FORPLAN) could generate an annual supply of about 50 million cubic feet through 2018. Important assumptions underlying these supply projections are. 1) many of the Forest's two-storied stands have a manageable understory, and 2) the species composition of the raw material supplied by the Forest will change from mostly ponderosa pine to mixed conifer This change will occur due to faster potential growth rates in mixed conifer stands, enabling higher annual timber harvests; and 3) conversion ratios to board foot volumes have no effect on supply/demand projections No attempt has been made to account for varying board foot/cubic foot conversion ratios that will be realized in future years

There are three major influences on the potential supply level the number of acres available for harvest, the intensity of management on those acres, and the harvest flow schedule (nondeclining flow or departure) Acreage available is the most significant influence, since large changes in standing timber volume are directly related to land management Departure from nondeclining flow can increase harvest levels temporarily, but entails a decrease sometime in the future. Intensive timber management practices influence the supply level by affecting the growth rate of trees The most effective practices for increasing growth are planting improved stock (genetics) and stocking-level control (precommercial thinning)

In recent years (1980-87), an average of 248 million board feet of National Forest timber has been harvested annually (includes Umatilla and Ochoco National Forests harvests within Grant and Harney counties, based on Oregon State Department of Forestry Annual Harvest Reports) Six major sawmills are presently located within the Forest's zone of influence and several sawmills in adjacent counties purchase Malheur National Forest timber (varying levels) To put the Forest supply potential in the context of its relationship to the timber industry in the Forest's zone of influence, the entire timber supply picture must be considered In the past and at present, demand for wood products has been the primary determinant of the health of the local timber industry; the raw material supply has been abundant and supported the industry However, an important concern is the continued supply of raw material for the timber industry Enough is known about current stand conditions to draw some general conclusions about future supply trends Table III-4 summarizes current conditions on timber lands in the Forest zone of influence.

As displayed in Table III-4, the National Forests (Malheur, Umatilla, and Ochoco) contain most of the forest land (and correspondingly, the standing timber inventory) in Grant and Harney Counties Although there are other sources of supply locally (private or industrial landholdings), the most desirable material (based on size and density of material) is currently located on the National Forests In Table III-5, projections are displayed for *potential timber harvests on lands other than National Forests Also displayed are past* harvests over the recent 17 years In recent years, the volume harvested from the National Forests has been proportional to the relative amount of forest land. (National Forest harvests have run about 83-90 percent of total harvest from all sources, compares with National Forests comprising 87 percent of all forest land in the counties.)

Presently, the potential supply of Malheur National Forest timber and other wood fiber exceeds recent harvest levels from the Forest (1980-87 average) But there have been pressures from local and outside sources to increase timber sale levels so they approach the Forest's potential supply level Therefore, it can be assumed that there will be a demand increase for products from the Malheur National Forest With this increased interest from local and outside sources, it can be assumed that all volume offered for sale by the Forest will be purchased

TABLE III-4: Timber Stand Conditions, Grant and Harney Counties[1/]

Ownership Class	Forest Land Acres (1,000)	Percent of Total	Stand Conditions
National Forest[2/]	1,752	87.2	Relative abundance of large sawtimber stands (over 50 percent of commercial acreage).
Bureau of Land Management (BLM) and Others	50	2 5	Some holdings include substantial amounts of large sawtimber (BLM). However, other public lands (State) have been cut over or are of marginal quality
Forest Industry	100	5.0	Very small holdings of large sawtimber remain (about 7 percent). Most holdings range from small sawtimber to advanced reproduction stages.
Other Private	103	5.1	Some holdings of suitable growth are presently available; however, management practices are highly variable, as are stand conditions.

1/ Consolidated from several Forest Service and State of Oregon supply studies, and personal knowledge of industrial specialists

2/ Includes Ochoco and Umatilla National Forest land in Grant and Harney Counties Also, assumes small portions of the Malheur National Forest in other counties (Malheur, Baker, etc) which have no effect Similarly, a small portion of the Wallowa-Whitman National Forest in the Malheur National Forest zone of influence counties is not considered

TABLE III-5: Projected Potential Timber Harvest, Grant and Harney Counties
(Harvest In Million Board Feet Per Year)

Period	BLM & Other Public	Forest Industry	Other Private	Total Non National Forest	National[1/] Forest	Total
1970 - 1979[2/]	5	22	15	42	282	324
1980 - 1987[2/]	2	12	14	28	248	276
1989 - 1998	4	15	15	34	3/	
1999 - 2008	4	15	15	34	3/	
2009 - 2018	5	15	10	30	3/	

1/ National Forest harvests in Grant and Harney Counties were generated from the Malheur, Umatilla, and Ochoco National Forests

2/ Historical harvest information obtained from Oregon State Department of Forestry Annual Harvest Reports

3/ Projected harvests in these periods from National Forest are analyzed by alternative in Chapter IV under Effects on Cumulative Timber Supply

Several conclusions can be drawn from the preceding discussion and tables Perhaps foremost, the timber industry in Grant and Harney Counties has been, and will continue to be, extremely dependent upon timber supplies from the Malheur National Forest Secondly, adjacent National Forests in Grant and Harney Counties have an important role in the overall supply of timber in the Malheur's zone of influence, and must be considered. Because of the Forest's dominant supply position, the timber industry must adapt to changes in National Forest supply (changes in size or species offered) unilaterally, with no apparent way to generate other sources of raw material Finally, the actions of National Forests outside the Forest's zone of influence could result in demand changes for timber supplies in Grant and Harney Counties

The demand pattern for Malheur National Forest timber, while not as complex as other National Forests, is contingent upon several factors Included are (1) the product demand of local timber industry, which is fairly reflective of the national market, (2) the supply actions of adjacent National Forests (i e , their timber harvest levels), and (3) to a lesser degree, the supply actions of other forest landholders in Grant and Harney Counties

In recent years, harvest levels of National Forest timber in the Forest's zone of influence have been quite variable As shown in Table III-5, the average annual timber harvest level dropped 12 percent in the period 1980-87 when compared to 1970-79 average annual harvests The periods of comparison reflect two different states in the timber industry The earlier period, 1970-79, was a time of substantial inflation, speculation, and growth. Demand for raw material was strong, prices were generally reflective of strong demand, accompanied by speculation that inflation would continue The latter period, however, included some mill closures and a severe slump in the housing construction market (but in recent years, the market has staged a substantial recovery)

Although an attempt to quantify the future demand for Forest timber is highly uncertain, such an estimate is useful for relating alternative Malheur National Forest harvest levels to the overall supply/demand situation in Grant and Harney Counties Therefore, projections were made of the possible demand range for National Forest timber in future decades (see Table III-6) Demand projections are based on the following assumptions·

a Historically, the timber industry has been cyclical For prediction purposes in this analysis, the harvest level during the 1980-87 period is assumed to be the lower bound of probable future demand and the harvest level during the 1970-79 period is assumed to be the upper bound of probable future demand

b Demand in the 1990-99 period will gradually increase (from the 1980-87 level) to a point 50 to 100 percent of the range between the low and high demand levels developed above (i e , an increase of 24 to 48 million board feet) This reflects continuing recovery of timber demand, as exhibited by annual harvests from 1984 to 1987, in the local and regional area From 2000 on, demand will continue to grow at a rate of 3 to 5 percent per period through the year 2019 (the end of the analysis period) This growth in demand for products from the Forest is expected to be driven by growth in industry and technology, and potential reductions in supply sources adjacent to the Forest's zone of influence

c Demand for National Forest timber can be projected by subtracting estimated non-National Forest harvest from estimated demand for final products In this context, "demand" is defined as the volume of available National Forest timber that would be purchased by mills in response to demand for final products, and supply of timber from other sources

d. Portions of the demand for National Forest timber in Grant and Harney counties' zone of influence will be supplied from the Umatilla and Ochoco National Forests The portions supplied from these Forests will be based on their current annual harvest levels,

and no increases in harvest levels over time will be assumed. Each Forest's contribution will be proportional to its ratio of acres within the zone of influence.

TABLE III-6: Projected Demand for National Forest Timber
(Million B.F Per Year)

Time Period	Estimated Total Demand	Non-National Forest Harvest	Demand for National Forest Timber
1990 - 1999	300 - 348	20 - 40	280 - 328
2000 - 2009	309 - 365	20 - 40	289 - 345
2010 - 2019	318 - 383	20 - 40	298 - 363

The projections given above represent estimates of the timber volume that would be purchased if it were available Assuming a relatively stable flow of timber from National Forest sources (as specified in the existing Timber Resource Management Plans), the interaction of current and projected demand with estimated future supplies may result in additional market pressure on the Forest The pressure may be expressed as demand on the Malheur National Forest to increase timber supplies.

Refer to "Effects on Cumulative Timber Supply" in Chapter IV for a complete comparison of the timber supply by individual alternatives, and more analysis of probable supply/demand interactions in the local area.

g *Efficiency of Forest Timber Program*

Overall efficiency of the Malheur National Forest timber sale program is very favorable, with a substantial net cash flow However, even with a positive cash flow overall, there are some individual timber sales that cost more to prepare, sell, and administer than is returned to the Treasury from that sale These sales are usually small or have a large volume of low-value products, such as lodgepole pine or cull logs Examples of such sales are post and pole sales, firewood sales, small salvage sales, wood fiber sales, and small commercial thinnings There are also benefits which result from these sales, such as the improved vigor and increased growth of trees remaining after commercial thinning, the salvage of insect-killed trees, or the value of providing a labor-intensive product like posts and poles

Timber value on a particular sale is primarily determined by the species present and the size of the logs. Species such as ponderosa pine have historically had much more value than species such as Douglas-fir and white fir Larger trees are more valuable than smaller trees because they produce a higher percentage of clear wood (free from defects like knots)

The costs related to a particular timber sale can vary widely Factors that affect costs include roading, logging system alternatives, harvest unit size and shape, volume per acre, distance from a manufacturing facility, environmental constraints, and mitigation measures. These factors affect the appraised value, which is the minimum that the Government will accept for a sale when it is sold.

A review of timber sale costs and receipts for the period from 1979 through 1985 (Table III-7) reveals that the Forest had a positive cash flow in each of those years from the sale of National Forest timber Table III-7 displays the volumes and value of timber sold during 1979-1985 in the first two columns The second two columns display the volume and value of timber harvested during those same years Timber harvested was generally sold in previous years. The last column displays costs of the timber sale program during each of those years, excluding road costs which are shown in Figure III-10.

Some argue that the cost of permanent roads built in conjunction with a particular sale should be charged against the value of the timber in that sale. Others argue that these roads are a capital investment and their cost should be assigned to all timber sales that will utilize the road in the future Roads are often considered a long-term asset, not a short-term cost, because their objective is to provide access for several cycles of management activity Roads also increase access for administration of other programs, for Forest protection, and for Forest users

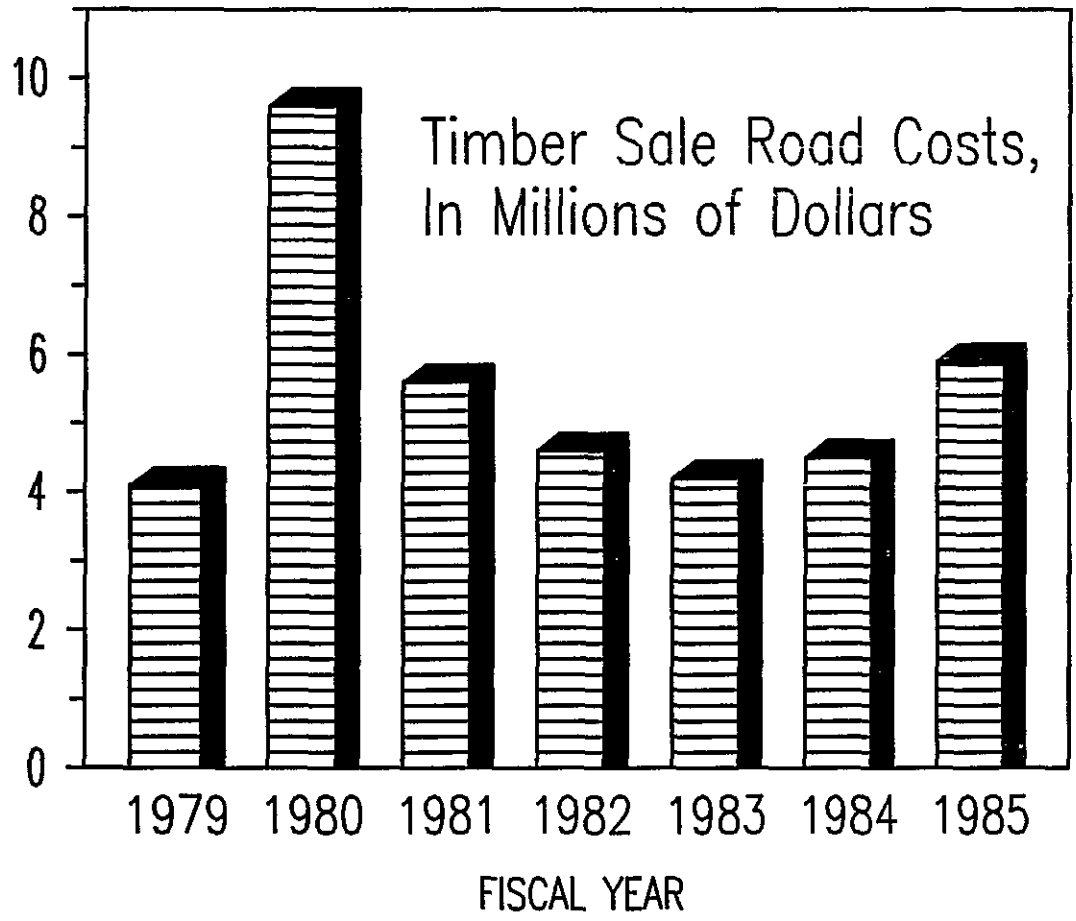
In the sale appraisal process, timber value is reduced by the estimated cost of permanent road development It would be inappropriate to consider road construction as a sale cost without incorporating road benefits as a sale value If road construction is considered a cost rather than an asset (see fig III-10), the timber program produces positive cash flows for four of the seven years.

For example, the Forest's 1985 timber sale program cost $5,577,000, the value of the timber harvest was $28,362,000. This was a positive return of $22,785,000 If road construction was added to timber sale program costs, the total annual cost was $11,485,000 In that instance, there would have been a positive cash flow of $16,877,000 for the 1985 sale program

TABLE III-7: Timber Sale Costs and Receipts

	Timber Sold		Timber Harvested		Program Cost
Fiscal Year	Program Sell Volume (Million Board Feet)	Program Sell Receipts (Million Dollars)	Harvest Volume (Million Board Feet)	Harvest Recripts (Million Dollars)	Net Timber Program Volume Program Volume Cost Before Road Costs (Million Dollars)
1979	162	26 454	178	22 152	2 693
1980	223	22 307	104	10 008	2.986
1981	206	23 204	83	5.030	3 797
1982	177	9.880	73	5.104	3.722
1983	197	18 247	151	9 011	3 208
1984	238	26 481	205	20 071	5.284
1985	220	20.679	264	28.362	5 577

FIGURE III-10: Timber Sale Road Costs



Further analysis work done in 1987 and 1988 showed that the Forest had net receipts of 19.8 million dollars from its 1987 timber program. The analysis also showed a present net value of 4 7 million dollars for future activities on the same acres, when future management activities were considered (1987, Timber Sale Program Information Reporting System, Malheur National Forest) These two analyses indicate that present and future management activities will continue to provide positive returns from the Forest's timber program

h *Relationship Between Forest Management and Trees*

The most obvious effects of timber management activities are on trees As the Forest's Allowable Sale Quantity increases, the area of trees being managed also increases. Some important effects include changes in the age-class diversity of trees, the vigor and growth of remaining trees, and the tree species present.

Intensive timber management includes many different activities, including the use of herbicides, prescribed fire, fertilization, precommercial thinning, and others (Pacific Northwest Region, 1981, and Pacific Northwest Regional Guide) Herbicide use on the Forest has not been widespread in the past; its use is expected to decline in the future There should be little or no effect on intensive timber management if herbicide use is not allowed in the future Thinning and other cultural practices create stands of healthy, rapidly-growing trees which are fairly resistant to insects and disease. Intensively-managed stands of ponderosa pine and lodgepole pine have few risks from insects and diseases White fir and Douglas-fir are more resistant to insects and diseases when intensively managed, although they remain more susceptible than the pines

Silvicultural systems which harvest the mature timber and then start a new stand (clearcuts and shelterwoods) tend to retain the current species mix now found on the Forest (50 percent ponderosa pine volume, 50 percent mixed-conifer volume) Silvicultural systems which harvest the mature trees and then manage the existing understory result in a shift to the potentially faster-growing fir species (70 percent mixed-conifer volume and 30 percent ponderosa pine volume) after 30 years Depending on how the stand is regenerated, the species mix usually returns to the current 50/50 volume mix on a Forest-wide basis There will be a change in age-class distribution under both of these systems Existing stands being regenerated will change from 150 years (and older) to trees up to 10 years of age. When an overstory removal occurs and the existing understory is managed, the resulting stand will average about 90 years old. Under either silvicultural system described above, there will be a change in harvest diameters Harvest diameters will have decreased from around 24 inches in 1980 (20-22 inches diameter in 1990) to approximately 15 inches after about forty years.

The most significant effect on old-growth trees is the harvest of mature, two- storied stands on the Forest. This reduces the acreage of both existing and potential old-growth trees

Riparian areas are stream-oriented, variable-width corridors Riparian areas of Class I, II and III streams comprise about 4 percent of the Forest Management of these areas typically involves practices which minimize disturbance, perpetuate tree cover, and provide large-diameter trees for fish and wildlife objectives This management scheme favors shade-tolerant species like fir, which will become prevalent over time Brush and hardwoods also tend to increase over time.

In certain areas like wilderness, timber management will not occur and trees progress gradually through several stages of natural succession unless interrupted by a fire, insect epidemic, or windstorm These areas often have diverse, multistoried vegetation with large, old trees, interspersed with openings There is often a gradual change from ponderosa pine to mixed-conifer species in areas where pine is not the climax species

There is also an effect on trees in developed recreation areas Dangerous, diseased trees are removed for the safety of recreationists Soil can be compacted and eroded in developed sites, which exposes tree roots and affects tree vigor Concentrated recreation use reduces or eliminates vegetative ground cover

The effect of cultural resource management on trees is related to its effect on timber management When a cultural resource site is avoided, the trees and other vegetation around it remain in their natural state and continue through natural succession. Other measures which reduce impacts to cultural resources (such as designated skid trails, over-the-snow logging, or directional felling) may also reduce damage to residual vegetation.

Road surfaces eliminate land from timber production Currently, 26,721 acres of the Forest are dedicated to road use.

Mining may also temporarily remove lands from timber production because a mining claimant has a statutory right to mine, to clear land for mining purposes, and to use the timber from the claim area to support mineral development

Areas managed for scenic quality would receive specific vegetative treatments to improve or maintain existing visual conditions These treatments would generally include individual tree selection or group selection harvests This will improve the vigor of remaining trees Age classes of trees in visual corridors will be very diverse There will be about five large-diameter trees per acre which will gradually die and provide snag habitat There will be some increased potential for mistletoe and root rot, especially in mixed-conifer stands

Areas managed for roaded natural recreation would receive specific vegetative treatments designed to improve or maintain existing visual conditions for viewing from a motor vehicle. These treatments would generally include standard timber harvest procedures, but with extended rotations to produce the desired sizes and numbers of trees (50 percent of the stand will be 24 inches in diameter or greater before final harvest could occur). Tree vigor increases early in the rotation and then declines slightly in latter years – ponderosa pine stands retain 90 percent of their full growth potential at 140 years, whereas mixed-conifer stands would probably fall below that level in the same time period

2. Forage

The Forest is not a continuous landscape of trees, forested areas are interspersed with meadows, openings around springs and along streams, and dry, juniper/ bunchgrass and sagebrush-covered hillsides These nonforest areas comprise about 20 percent of the Malheur National Forest.

Rangelands provide habitat and food for many species of wildlife, both game and nongame, and currently support a summer population of about 6,600elk on the Forest. They also provide scenic diversity and are the most productive grazing land for livestock, which is important to the social and economic welfare of local communities

Forested areas at all elevations furnish summer range for cattle and big game The forage yields from these areas depend on density of the tree canopy. Low-elevation areas are used as winter range by Rocky Mountain elk, mule deer, and wild horses (see discussion of wildlife)

The most extensive and valuable forested community for livestock grazing is ponderosa pine In prime condition, it is an open forest which produces considerable green forage with good protein content during the hot season. Because of this, the ponderosa pine/bunchgrass type is more valuable than low-elevation bunchgrass range late in the grazing season. Livestock grazing has been heavy for many years in ponderosa pine forests and on the interspersed openings, meadows, and streamside zones which cattle favor.

a *Land Classification*

The Forest produces forage from a land base of 1,459,422 acres Of these, 1,351,255 acres are available for cattle grazing. Forest lands not available for cattle grazing include:

a. Original Strawberry Mountain Wilderness, 33,000 acres
b. Long Creek and Canyon City Municipal Watershed, 610 acres
c Administrative Sites, 607 acres
d Roads, 26,721 acres
e. Water (outside Wilderness), 112 acres
f Not included in grazing allotments, 35,445 acres
g Rockland, 11,672 acres

b. *Livestock Use of Forage*

Suitable rangelands on the Forest need uniform grazing distribution to maintain long-term productivity. Proper stocking rates, effective grazing systems, water development, fencing, vegetation treatment, and permittee cooperation are important parts of an overall management plan which improves livestock distribution

Currently about 25,000 cow/calf pairs graze on the Forest during late spring, summer, and early fall. Most of the cattle operations using the Malheur National Forest are commercial cow and calf operations The average grazing permit is 150 cow/calf pairs. Grazing permits supply summer forage for those livestock operations. Approximately two-thirds of a brood cow's yearly diet is from grazed forage. During the winter months, cattle are fed hay produced on irrigated lands Further discussion about the livestock industry can be found in the "Social and Economic Setting" portion of this chapter.

Livestock forage use is managed by grazing permits Permits provide individuals, organizations, or other entities with permission to place livestock on National Forest System land under management of the permittee This use is further administered by development and use of allotment management plans or coordinated resource management plans. These plans govern activities on a site-specific basis and will be updated to implement management practices contained in the approved Forest Plan

Cattle prefer to graze low-lying areas such as draws, streamside zones, and meadows, but make only limited use of slopes greater than 35 percent They also graze near perennial streams because of easy access to water and shade The majority of these areas are in satisfactory condition

Areas in unsatisfactory condition occur on all grazing allotments on the Forest. They are small areas usually associated with water and other features that cattle prefer These areas comprise 3 to 5 percent of the Forest and are difficult to manage because of their strong appeal to livestock Opportunities to correct unsatisfactory conditions include development of upland water sources, seeding of forage species, better herd management to distribute cattle throughout an allotment, and better use of forage resources

The capability to increase herbaceous vegetation and thereby improve range condition exists Additional range improvements needed to achieve these goals would require increases in Forest and permittee financing Grazing potential on the Forest using intensive range management practices is 194,000 AUMs annually over the next 10 years. This potential could increase to 274,000 AUMs by the end of a 50-year planning horizon.

Actual use of National Forest forage by livestock is currently 109,000 animal-unit months (fiscal year 1985 use data), permitted use for that same year was 117,000 animal-unit months Nationally, the demand for red meat has decreased for the past several years A downward trend in national demand for red meat (i e , beef) is reflected in a number of ranches which have been for sale in the area over the past several years Similarly, permittees electing to take nonuse rather than utilize the available forage on their allotments also indicates some decrease in the demand for meat But the demand for grazing permits remains strong and could increase over time because the permit adds value to the base ranch property

c *Wild and Free-Roaming Horses*

In Oregon, early explorers described vast herds of wild horses ranging from the Ochoco Mountains to the Snake River. These horses were commonly rounded up by individuals and often provided a continuing supply for domestic use These herds were also subject to much misuse and exploitation

Congress, responding to national concerns, enacted Public Law 92-195 which recognized the wild, free-roaming horses and burros as "living symbols of the historic and pioneer spirit of the west," and directed that, "they be protected from capture, branding, harassment, or death." The law also directed that these animals be maintained by managing native habitats where the herds were located.

A Wild Horse Management Plan for the Murderers Creek-South Fork John Day River herd, later known as the Murderers Creek Wild Horse Territory, was developed, approved, and implemented by the USDA Forest Service and USDI Bureau of Land Management in 1975 The plan's goal was to provide protection, management, and control of wild, free-roaming horses in a herd averaging 100 animals to maintain a balance with other resources

d *Relationship Between Forest Management and Forage*

Timber management activities affect plants other than trees These understory effects include the production, composition, and vigor of herbaceous forage and brush species Intensive timber management activities are designed to reduce tree canopy and basal area per acre to optimize tree growth. Pinegrass, elk sedge, and most forage species

will increase in amount and vigor due to increased amounts of sunlight reaching the forest floor. These understory species may compete with tree seedlings (either planted or natural) for nutrients and water. Timber management activities may reduce ground vegetation during attempts to establish a new tree stand

Ponderosa pine/pinegrass communities typically produce 500 to 600 pounds of forage per acre with 50 percent tree cover. As pine is replaced by fir, tree cover increases significantly; when combined pine/fir cover reaches 80 percent, forage production is reduced to 50 to 100 pounds per acre and heartleaf arnica (*Arnica cordifolia*) becomes abundant.

Natural fire, and the use of fire as a silvicultural tool, affects understory vegetation. Pinegrass and elk sedge evolved with natural fire and can withstand burning better than plants which did not Some plants in the plant community, such as a shrub called snowbrush ceanothus, need fire to trigger germination Because of fire control, many stands of snowbrush ceanothus have not regenerated

Bitterbrush and certain other shrubs may be killed by fire and are not generally capable of sprouting unless soil moisture was high when an area burned Their seeds are not stimulated by a fire's heat

On forested areas which receive timber management treatment, the soil is disturbed during tree harvest and slash disposal Those areas are suitable for seeding of nonnative forage species like orchard grass and intermediate wheatgrass. In harvest areas, there will be a mix of natural and introduced grasses. Grazing animals also remove vegetation which competes with regenerating tree stands Certain range management activities like fencing and upland water developments result in improved cattle distribution and forage utilization.

Wildlife management activities vary from old-growth retention to site-specific improvement projects Site-specific improvement projects have only short-term, localized effects on forage
Old-growth stands currently found in wilderness, roadless areas, and visual corridors will continue a natural succession cycle until a fire or insect epidemic sets them back to an earlier, successional stage

Wilderness visitors using pack stock also affect vegetation by trampling, damaging fragile alpine meadows, and tying stock to trees

Vegetation resources generally do not affect mineral-related activities. Minerals development may clear away the vegetation, and trees from the claim area can be used to support development Reclamation activities could improve forage

Currently, 26,721 acres of the Forest are dedicated to road use. Roads provide access for timber sales, range improvement seedings, or other vegetation management activities which affect vegetation These effects are described under each resource Roads provide a seedbed for some noxious weeds and may contribute to their rate of spread. Road surfaces eliminate land from vegetation production

3. Wildlife

The diversity of vegetation types, landforms, and plant successional stages on the Forest provides a variety of wildlife habitats These habitats support over 365 species, including 22 fish, 9 amphibians, 14 reptiles, 235 birds, and 85 mammals (Thomas, 1979).

Some of these habitats are considered special or unique Table III-8 (Guenther and Kucera, 1978) lists these habitats and the type of use they receive

a *Special Habitat*

Old-growth tree stands and their undisturbed environments, including snags and fallen trees, represent a stage in ecological succession which provides unique habitats for certain species of plants and wildlife.

Minimum levels of old growth and mature forest necessary to satisfy the NFMA requirements for viable wildlife populations have been established for the Malheur National Forest (See Appendix G) In establishing these minimum levels, it is assumed that all of the old-growth units will be occupied More old growth in the ponderosa pine and mixed-conifer types is available than the identified minimum levels This is not the case for old-growth lodgepole pine

TABLE III-8: Wildlife Use of Special and Unique Habitats on the Malheur National Forest

Habitat	Mammals	Birds	Amphibians and Reptiles	Total
Old Growth	37	80	13	130
Riparian	52 (8)	145 (14)	17 (4)	214 (26)
Snags	21	57 (27)	16	94 (27)
Down Woody Material	39	25 (4)	7	80 (4)
Cliff & Rim				
Caves & Burrows	59	6 (1)	13	78 (1)
Talus	32 (2)	17	6	55 (2)

NOTE Numbers in parentheses are the number of species which depend on the habitat Numbers without parentheses are the total number of species which use the habitat, including the dependent ones

A mountain pine beetle infestation in lodgepole pine reached epidemic proportions in the late 1970's. The unit plans approved in 1978 called for harvesting this beetle-killed lodgepole pine within 10 years This has been accomplished on the roaded portions of the Forest. In unroaded areas, the mature stands of lodgepole pine have also been killed, and no longer provide suitable old growth Within three decades, some stands which are now in the pole or sapling size classes will begin to reach old-growth condition. The amount of old-growth lodgepole pine will increase from the third through the fifth decades, but very little will be available in the first two decades

Standing dead trees provide habitat for 21 mammals and 57 bird species, including 27 birds which depend on these snags for survival (e g., woodpeckers).

Cavities in snags provide nesting, roosting, or escape habitat Snags support nests and are used as perches. Under their loose bark, bats roost and invertebrates live and provide food for higher-order animals. Mosses, lichens, and fungi grow on their decayed wood Snag-dependent birds and mammals often play an important role in forest insect control (Thomas 1979) Many studies of cavity-nesting, insectivorous birds show that forest insect populations may be regulated in some part by cavity-nesting bird species (Kendeigh 1947, Franz 1961, Morris et al 1958, Morris 1963; Solomon and Morris 1971) Timber harvest and fuelwood gathering can have an adverse effect on the availability of this cavity-nesting habitat

Dead and downed woody material has important ecological implications in terms of mineral cycling, nutrient immobilization, nitrogen fixation, fire, and wildlife habitat. Management activities that affect this resource range from debris creation by logging, to removal of woody materials by slash treatment.

b. *Unique Habitat*

Three types of unique habitats have been identified in the Blue Mountains: cliffs, talus, and caves. Although these habitats comprise a small part of the total land area, they lend diversity to an environment otherwise dominated by plant communities

Cliffs are steep, vertical, or overhanging rock faces. They are essential for survival of some raptorial birds as secure places to nest, and rear their young. Other species also require high cliffs.

Talus is the accumulation of broken rocks at the base of cliffs or other steep slopes It is especially important for the protection of some species during reproduction and hibernation.

Caves are natural underground chambers that reach the ground's surface. They provide shelter from extreme weather conditions, darkness, solitude, stable internal environments, and physical protection from predators

Unique habitats concentrate and support a unique animal complex Adjacent plant communities provide a food source for the animals, and snags along the tops of cliffs are essential perches for raptors. These adjacent plant communities should remain stable to provide needed cover and food Little can be done to improve these habitats, but they can easily be destroyed

c *Threatened, Endangered, and Sensitive Species*

The Endangered Species Act of 1973 (as amended in 1978) requires all Federal agencies and departments to conserve "threatened and endangered species," Sensitive Species and *their habitats, to aid in population recovery*

Habitat is known, or expected to exist, for the American peregrine falcon and bald eagle, which are federally listed as "endangered" and "threatened," respectively. Bald eagles roost in trees along the southern edge of the forest during winter months. Consultation with the United States Fish and Wildlife was done in accordance with the Section 7 Interagency Cooperation Regulations (50CFR 402) and the Endangered Species Act of 1973, as amended. A letter for the United States Fish and Wildlife Service dated April 7, 1987, concurred with the determination of no effect on the Threatened bald eagle (*Haliaeetus leucocephalus*) and Endangered American peregrine falcon (*Falco peregrinus*) A second letter from the United States Fish and Wildlife Service, dated August 10, 1987, stated that habitat for the American peregrine falcon may exist in the Strawberry Mountain Wilderness Area, but the birds did not occur on the Forest A letter from the United States Department of Interior, Office of Environmental Project Review, dated November 23, 1987, stated there are no Endangered or Threatened fish on the Malheur National Forest and directed attention at two category 2 candidate fish species, redband trout (*Oncorhynchus spp.*) and the Malheur mottled sculpin (*Cottus bairdi ssp.*)

There is potential nesting habitat and seasonal migratory use of the Forest by American peregrine falcon These birds are recorded each spring and fall as a migrant species. There are no known nests on the Forest, but two areas within the Strawberry Mountain Wilderness have been identified as potential nesting habitat. The Pacific Coast Recovery Plan for the American peregrine falcon (1982) assigned a goal of one breeding pair to the Malheur National Forest.

Bald eagles use roosts on the southern edge of the Forest during the winter months Approximately 4,040 forested acres containing 2 known, and 13 potential, winter roosts have been identified on the Burns Ranger District. All roosts are in mature stands of ponderosa pine along streams Active roost sites are managed jointly with the Bureau of Land Management

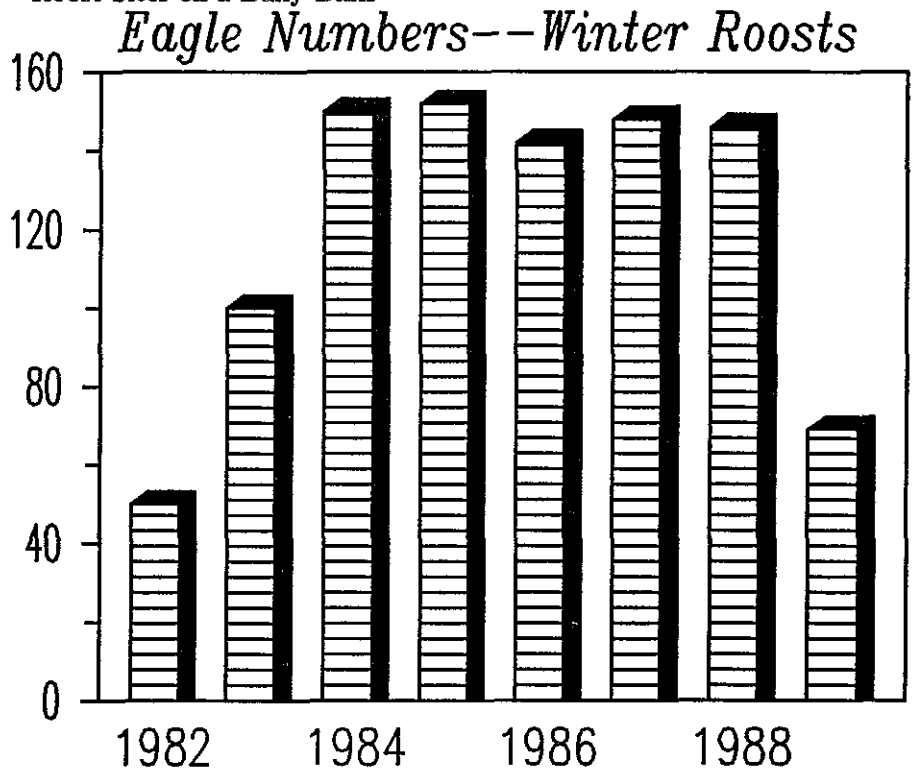
In addition to winter roosts, bald eagles use most river drainages for movement during winter months. Figure III-11 summarizes peak bald eagle numbers observed during

one morning's flight from active winter roosts These peaks correspond to maximum waterfowl occurrence, which is the eagle's prey, in the Harney Basin.

Direction for management of bald eagles is provided by the United States Fish and Wildlife Service's "Recovery Plan for the Pacific Bald Eagle" (1986) The plan assigned three "targets" to the John Day River and the Malheur River, both of which have their headwaters on the Forest The North Fork of the Malheur River and the Malheur River may contain potential bald eagle nesting habitat

There are three fish species which are known to occur on the Forest, or expected to occur there, that are included on the Regional Forester's sensitive species list of July 22, 1987. These three species are also listed in the 1985 Federal Register Notice of Review as "category 2 species," which are those that "need further information to confirm the appropriateness of proposing the taxon to the list of Endangered or Threatened species " These species are the redband trout (*Oncorhynchus spp.*), the bull trout (*Salvelinus confluentus*), and the Malheur mottled sculpin (*Cottus bairdi ssp.*)

FIGURE III-11: Peak Numbers of Bald Eagles Observed Using Active Winter Roost Sites on a Daily Basis



NOTE In 1989, eagles stayed closer to the Malheur National Wildlife Refuge, feeding on dead carp resulting from a cold winter

The taxonomy of the redband trout and inland populations of rainbow trout is not established It seems apparent from a management standpoint that these fish are adapted to warmer water temperatures than coastal rainbow trout Since rainbow trout occur throughout the Forest, the current philosophy is to establish management standards using their habitat needs because they would be more constraining than standards based on redband trout, which has a higher temperature tolerance.

Populations and habitat conditions will be monitored for rainbow and redband trout. When taxonomic and habitat differences are resolved, it may be necessary to revise some Forest Plan standards

The bull trout is known to occur in some headwater streams of the Malheur and John Day River Systems. It is proposed as a management indicator species for monitoring riparian and fish habitat conditions in those streams.

The Malheur mottled sculpin probably occurs in only a few scattered streams in the Harney Basin The headwaters of many streams in the Harney Basin are on the Forest. An identified information need is a survey of these streams to determine the distribution and habitat characteristics of this species, so that a monitoring plan for the species can be prepared. Modifications of Forest Plan standards to protect this species may be appropriate at that time

Sensitive animal species known to occur on the Malheur National Forest are listed in Table III-9. Similarly, sensitive plant species are listed in Table III-10

TABLE III-9: Threatened, Endangered and Sensitive Animals and their Habitat

Scientific Name	Common Name	Habitat
Oncorhynchus spp.	redband trout	warm-cool streams
Salvelinus confluentus	bull trout	cool-water streams
Cottus bairdi ssp	Malheur mottled sculpin	Harney Basin
Rana pretiosa	western spotted frog	rivers and valleys
Gavia immer	common loon	large water, migration
Buteo swainsoni	Swainson's hawk	sagebrush-juniper
Haliaeetus leucocephalus	bald eagle	south forest edge-pine
Falco peregrinus anatum	American peregrine falcon	cliffs
Centrocercus urophasianus	western sage grouse	sagebrush-juniper
Grus canadensis tabida	greater sandhill crane	meadows, wetlands
Numenius americanus	long-billed curlew	sage-grass, wetlands
Bartramia longicauda	upland sandpiper	meadows
Sorex preblei	preble's shrew	forests, meadows
Plecotus townsendii	Townsend's western big-eared bat	low elevations, caves, buildings
Gulo gulo luteus	California wolverine	high elevations
Ovis canadensis californiana	California bighorn	cliffs, talus, high elevations

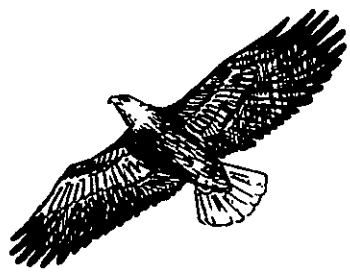


TABLE III-10 Sensitive Plant Species and General Habitat

Scientific Name	Candidate*	Habitat
Allium brandegei	no	gravelly meadows
Allium campanulatum	no	dry soils at medium, high elevation
Allium tolmiei var. *platphyllum*	no	Rocky or clayey soils, sparse cover
Astragalus atratus var *owyheensis*	no	grassland-sagebrush
Astragalus diaphanus var. *diaphanus*	yes	riverbanks, gravel bars, alluvial
Astragalus diaphanus var. *diurnus*	no	lower John Day Valley
Astragalus tegetarioides	yes	ponderosa pine, juniper
Bupleurum americanum	no	rock outcrops, meadows, grasslands
Cymopterus bipinnatus	no	cliffs, talus and rocky slopes
Dryopteris filix-mas	no	mesic forest, streambanks
Geum rossii var *turbinatum*	no	subalpine areas
Lomatium oreganum	yes	high-elevation, rocky areas, talus
Luina serpentina	yes	serpentine soil, pine-juniper (Grant County)
Lupinus biddlei	yes	sagebrush, Harney and Malheur Co
Lupinus cusickii	yes	grass-sagebrush
Lycopodium annotinum	no	mesic forest, rocky-timberline
Mimulus washingtonensis	no	wet, open places, low elevation
Penstemon eriantherus var. *argillosus*	no	dry, open places, low elevation
Penstemon spatulatus	yes	high elevation, cliff, rocky slopes
Pleuropogon oregonus	yes	wetlands, Union and Lake Co
Polystichum lemmonii	no	open, rocky-timberline, serpentine
Ranunculus oresterus	no	valleys and lower meadows
Silene scaposa var *scaposa*	yes	ponderosa pine-juniper-sagebrush
Thelypodium eucosmum	yes	ponderosa pine-juniper, lower areas

* Federal candidate species for listing as Threatened or Endangered, 1985 Notice of Review Other species ("no") are listed as rare, threatened or endangered in the Oregon Natural Heritage data base

d *Big-Game Habitat*

The most abundant and popular big-game species occurring on the Forest include mule deer and Rocky Mountain elk Public use of the Forest is significantly higher during the big-game hunting seasons Traditionally, management of big-game herds has been the responsibility of the State of Oregon, Department of Fish and Wildlife (ODF&W), with the habitat managed by the USDA Forest Service Now that the Forest Service has definite responsibilities for wildlife items like identification of indicator species, a close partnership between ODF&W and the Forest Service is crucial These agencies cooperate closely The Malheur National Forest lies within 7 ODF&W Game Management Units (GMUs) and accounts for 19 percent of the total land in those units (see Table III-11).

Mule deer populations have fluctuated during the past 40 years and currently are in a downward trend in two of the seven GMUs associated with the Forest Prior to 1970, elk populations were low but relatively stable Since then, populations have steadily increased to a current summer population of about 6,600 elk (Greg Hattan, ODF&W, personal communication, August 1986). There are approximately 2,865 elk wintering on the Malheur National Forest Current annual Rocky Mountain elk harvest is estimated to be about 2,000 animals The demand for elk, and the number of elk hunters, is expected to continue increasing

TABLE III-11: Total area of Oregon Department of Fish and Wildlife Game Management Units (GMU), and Percent of GMU area on the Malheur National Forest (MNF)

Game Management Unit	Total Area (Acres)	Percent On MNF	Total Area On MNF (Ac.)
Desolation	455,860	16%	74,299
Northside	697,600	34%	234,335
Murderers Creek	734,080	58%	425,365
Silvies	1,151,360	15%	178,522
Malheur River	1,799,680	16%	287,322
Beulah	1,748,480	13%	234,532
Sumpter	969,600	3%	25,037
TOTAL	7,556,660	19%	1,459,422

Mule deer are an important big-game species on the Malheur National Forest, but are not included as an indicator species because it is assumed that habitat requirements for elk are more restrictive and that elk management will also achieve mule deer objectives It is recognized that mule deer use different forage and somewhat different winter ranges, and do not require as much cover as elk These differences in habitat preferences are assumed to be insignificant

Summer elk habitat is the predominant component of the Forest acreage scheduled for timber harvest Big-game habitat and timber management are interrelated. Habitat quality for big-game animals is determined by cover, summer forage, and road density (disturbance) factors Cover is provided by timber stands that meet size, spacing, and quality requirements for elk Thermal cover is available when stands have certain ranges of tree height and canopy closures It is a very important component of the summer range for elk. Forage is provided in natural openings, open timber stands, and recently regenerated timber stands.

e *Big Game Range*

Big-game winter range on the Forest has been identified for elk but not for mule Winter deer. The assumption is that management of elk winter range will provide for the needs of mule deer. A total of approximately 300,000 acres of elk winter range was identified on the Forest in cooperation with ODF&W. There are 14 separate winter range areas varying in size from 6,000 to 96,000 acres In addition to these areas, a significant portion of the winter range is on private lands

Calculating a Habitat Effectiveness Index (HEI) for elk on the Malheur National Forest (Thomas et al 1988) suggests that the overall forest-wide HEI condition is 0.51, which results from total cover of 56 percent (13 percent satisfactory and 43 percent marginal) Habitat effectiveness is less than this on some winter ranges. Most winter range has more than enough grass and grass-like forage to support the present number of livestock and wintering elk, but browse is heavily used by deer, elk and livestock. Elk herds on the Forest have been increasing Forage to carry larger wintering elk herds may not be available after livestock use on certain winter ranges. Monitoring winter ranges to determine forage quality and quantity for big-game will be necessary.

f *Other Big Game*

Pronghorn populations occur in Bear Valley, Murderers Creek, and throughout the southern part of the Forest, utilizing areas where juniper-bunchgrass-sagebrush habitat adjoins ponderosa pine forests Pronghorn have had an increasing population, with current estimates ranging from 200 to 250 animals

California bighorn sheep were introduced in the Strawberry Mountain Wilderness in 1971, when 21 animals were released. After an initial increase, the population has dwindled to less than 10 animals because of rugged terrain and a lack of adequate winter range. A second transplant occurred near Aldrich Mountain in 1978 when 14 animals were initially released In 1982, 4 additional sheep were added to the Aldrich herd. Excellent summer range and adequate quality winter range have contributed to a current estimated population of 85 sheep for Aldrich A third bighorn release was made in early 1988 when 15 sheep were introduced in the McClellan Mountain Roadless Area

Other game species known to occur on the Forest are the black bear and mountain lion The white-tailed deer has been documented as occurring on the Forest, but it is considered rare

g *Management Indicator Species*

Since the Forest provides habitat for over 365 wildlife species, each with varying habitat needs, it is not possible to monitor the impacts of habitat management on every species. Therefore, management indicator species (MIS) have been selected to monitor the effects of management activities Table III-12 provides a list of management indicator species, and the habitat requirements of management indicator species are further described in Appendix G.

Eleven species (all woodpeckers) were selected as indicators for dead and defective tree habitat because they primary cavity excavators, that is, they create their own nesting holes in dead and defective trees The holes which they create are in turn used by over 30 other species By providing habitat for these woodpeckers, we are also providing habitat for the other cavity-dependent species.

h *Future Projections*

Projected demands for wildlife-related recreational use, both consumptive and non- consumptive, are expected to increase in the next decade. Nonconsumptive use is expected to increase approximately 20 percent, while consumptive use is expected to increase 17 percent or more (State of Oregon, 1983) This growth trend is expected to influence demand for Rocky Mountain elk more than demand for mule deer Big-game herds are projected to increase under current Forest management. Present elk populations are close to Oregon Department of Fish and Wildlife objectives and these population objectives are expected to be maintained



TABLE III-12: Management Indicator Species

Species	Reason for Selection and/or Habitat
Rocky Mountain elk	species commonly hunted
pileated woodpecker	old growth
pine marten	old growth
three-toed woodpecker	old growth
Lewis' woodpecker	primary cavity excavator; dead & defective habitat
yellow-bellied sapsucker	primary cavity excavator, dead & defective habitat
red-breasted sapsucker	primary cavity excavator; dead & defective habitat
Williamson's sapsucker	primary cavity excavator; dead & defective habitat
downy woodpecker	primary cavity excavator; dead & defective habitat
hairy woodpecker	primary cavity excavator; dead & defective habitat
white-headed woodpecker	primary cavity excavator; dead & defective habitat
three-toed woodpecker	primary cavity excavator; dead & defective habitat
black-backed woodpecker	primary cavity excavator; dead & defective habitat
northern flicker	primary cavity excavator, dead & defective habitat
pileated woodpecker	primary cavity excavator, dead & defective habitat
steelhead	anadromous riparian
bull trout	non-anadromous riparian
cutthroat trout	non-anadromous riparian
rainbow/redband trout	non-anadromous riparian

The need for continued cooperation with the Oregon Department of Fish and Wildlife to provide adequate wildlife habitat, and obtain joint population and habitat inventories, will increase, especially for balancing herd sizes with utilization standards.

i. Relationship Between Forest Management and Wildlife

Forest management affects the structure, size, shape and juxtaposition of plant communities, which in turn affects animal species richness and population numbers Increasing the amount of edge when designing harvest units generally increases plant and animal diversity. Timber harvest with deliberately spaced and distributed clearcuts or shelterwood cuts will benefit species which respond positively to increased edge habitat and early successional stages Species which depend more on vertical habitat diversity instead of horizontal diversity will benefit by habitat available in unmanaged and uneven-aged stands

Loss of dead and down material, cull trees, and snags for firewood, cogeneration fuel, or slash treatment reduces habitat for cavity-nesting species and animals which require dead and down material for nesting and feeding

Harvesting mature or old-growth timber would affect species which depend on older successional stages for breeding and feeding habitat Conversely, retaining dedicated mature/old-growth areas will continue to provide habitat for those wildlife species

The principal range improvement activities which affect big-game habitat are upland water development, fencing, and range forage seedings. These activities, designed to provide better distribution of livestock, also increase the quality and quantity of forage available for big-game herds. Salting is also used to improve livestock distribution, and big-game animals will use the salt sources too Conversion of sagebrush to grass provides short-term benefits by increasing forage for elk. Such changes may decrease mule deer habitat.

Structural range improvements like fences can interfere with big-game movements and travel routes Fences on the Forest are built to a standard which allows big game to go

under the bottom wire Range water developments benefit wildlife by providing water where none existed before (as in guzzler improvements) or by making the water more accessible (troughs and ponds). Stock tanks can be a trap for small animals, so escape ramps are provided

The existence and production of wildlife is directly related to habitat quality and quantity. Habitat improvement projects are designed to either maintain or increase the dispersal or populations of a given species. The Forest has the potential to improve habitat conditions for a wide variety of wildlife species But an improvement project for one species may be a detriment to another

Developed and dispersed recreation facilities may adversely affect wildlife, fisheries, or sensitive plants when located in riparian areas, big-game winter ranges, or in habitats used by threatened, endangered or sensitive species The facilities and their use by people discourage use of these areas by many wildlife species. Location of recreation sites in areas favored by wildlife, such as riparian zones, can increase the impact on wildlife species. Habitat losses from facility development include loss of ground cover, snag trees, downed, woody material, and burrowing animal habitat due to compaction and human disturbance

Each year on the Forest, recreational hunting results in the harvest of deer, elk, bear, cougar, and grouse Harvest levels are managed by the Oregon Department of Fish and Wildlife

The management of scenery is often compatible with wildlife management goals Vegetation diversity promotes visual variety and produces forage for wildlife Riparian areas, cliffs, rims, caves and talus slopes, snags, large, old trees, and openings are often visually attractive and they also provide a home for wildlife

Wilderness designation protects existing wildlife habitats from human modification and leaves them vulnerable to natural modification The wilderness areas provide spring, summer, and fall habitat for mule deer and Rocky Mountain elk During big-game hunting seasons, the wildernesses provide escape areas for bucks and bulls. Bear, coyote, and cougar also inhabit the areas Pileated woodpecker, pine marten, and other species which utilize old growth also occur in the areas

Minerals exploration and development often interfere with wildlife use patterns Migration, mating, and parturition habits may be disturbed Mining-related road construction and development result in at least temporary loss of habitat for some species Development of rock quarries is particularly threatening to wildlife which depend on talus slopes and cliffs Conversely, abandoned mine shafts do provide some of the habitat needs of cave-dwelling species

Increasing tree cover as a result of fire suppression has changed ground vegetation Pinegrass and elk sedge, two common native plants, decrease with increasing fir-tree cover. On the other hand, low-intensity fires may have a detrimental effect on bitterbrush and sagebrush, key winter forage species

4 Fisheries

The Malheur National Forest contains a highly diversified fishery resource ranging from coldwater-dependent cutthroat and bull trouts to cool-water smallmouth bass. In addition, the John Day River drainage supports anadromous runs of Columbia River spring Chinook salmon and summer steelhead trout Fisheries habitat ranges from cold, high-elevation headwater streams and lakes to extreme low-flow or intermittent streams in which summer daily maximum water temperatures exceed 80° Fahrenheit.

The Forest encompasses parts of the following major drainages.

North Fork John Day River. Except for the Middle Fork of this river, only headwater areas of a few tributaries to the North Fork reach the Malheur National Forest These Forest streams do contribute somewhat to the resident trout sport fishery, but they are all above the distribution limits of anadromous fish

Middle Fork John Day River: The Middle Fork is a tributary to the North Fork John Day River and supports anadromous runs of spring Chinook salmon and summer steelhead trout as well as resident rainbow/redband trout populations Bull trout are also present in some of the colder tributaries Over half the Middle Fork is on private land But from Big Creek upstream, most of the tributaries are mostly on Forest lands Thus, about 88 percent of the steelhead production in the Middle Fork is on the Forest It is estimated that about 70 percent of the Chinook spawning occurs on the Forest, but again the tributaries add to the relative importance of Forest streams by providing summer rearing for juvenile chinook, which move into these tributaries when water temperatures in the Middle Fork become too warm

Main Stem John Day River: The main stem supports anadromous runs of spring Chinook salmon and summer steelhead trout as well as resident rainbow/redband trout, cutthroat trout, bull trout, and brook trout Only a small part of the main stem is on the Forest, but a major portion of the headwater tributaries are within the Forest boundary Thus, only about 15 percent of the chinook production in the main stem occurs on the Forest, but about 67 percent of the steelhead production is on the Forest

South Fork John Day River· The South Fork supports a run of summer steelhead up to river mile 28, where an impassable barrier exists A major portion of the west-flowing tributaries to the South Fork are within the Forest boundary, which includes about 38 miles of steelhead streams The Izee Falls are located on BLM land, downstream from the Forest. A fish-passage project is planned for these falls If completed, this will provide steelhead access to about 85 miles of stream, 26 miles of which are on the Forest. The South Fork and its tributaries also support a rainbow/redband trout sport fishery

Malheur River (Main Stem and North Fork). The Malheur River is a tributary of the Snake River and formerly supported an anadromous fishery. This fishery was eliminated in the first half of this century by high dam construction on the Snake River. The river system currently supports a resident trout fishery (bull trout, rainbow/redband trout, and brook trout).

Silvies River: The Silvies River flows into the Harney Basin, which has no outlet and acts as a drying basin The drainage supports a resident trout fishery and the only smallmouth bass fishery on the Forest

The potential annual supply of anadromous fish from the Malheur National Forest, expressed as Smolt Habitat Capability Index, is 505,000 smolt by the end of the 50-year planning period This could provide a commercial harvest of nearly 82,000 pounds of fish and a sport fishery of over 60,000 wildlife-and-fish user-days annually. But realizing this potential would involve a moderately-high investment in fish habitat improvements and substantially reduced timber and range outputs

The demand for Chinook salmon and steelhead trout in the Columbia River Basin exceeds supply Extensive efforts are underway along the Pacific Coast to increase the number of anadromous fish available for harvest Commercial fishing operators have experienced decreased catches, shorter seasons, and increased costs. Major court battles have been fought over allocation of ever-dwindling fish stocks between Indian and non-Indian harvest groups Legislation has been passed establishing a 200-mile offshore economic zone to decrease pressure on stocks already depleted by foreign fishing vessels (Report of the Salmon and Steelhead Advisory Commission, July 1984) Sport-fishing seasons for Chinook salmon have been canceled or reduced in many areas due to declining runs. The sport-fishing season for Chinook salmon on the John Day River has been closed since

1977. The increased production achievable on the Forest is a very small percentage of the total increase necessary in the entire Columbia River Basin to meet demand. But any increase in production resulting from National Forest management would be used.

The supply of resident fish-angling opportunities greatly exceeds existing demand Within the planning period, it is unlikely that demand will exceed supply

a *Relationship Between Forest Management and Fish*

Both water temperature regulation and instream organic material provided by trees are important to fish habitat quality Water temperature regulation is discussed under "Water" (see section 5) When a tree falls across a stream it may trap debris and form a small natural dam As water plunges over this dam a pool is scoured out, providing a deep, cool resting place for rearing fish. Good quality spawning gravels with plenty of subsurface water flow for good survival of incubating fish eggs are often found below these scour pools In addition, many invertebrates, which are a source of food for fish, live on large woody material in the stream

If the importance of shade and instream organic material is not accounted for in timber harvest activities, adverse short-term and long-term effects can result The removal of shade is an immediate effect that will last until the remaining, or regenerated stand, provides shade again. The removal of a source of large woody material for the stream channel has a long-term effect, which may not be immediately noticeable. Therefore, the fish habitat management objectives for timber management are to maintain shade and provide for recurring input of large woody material for the stream channel

The greatest effects of livestock management on fish habitat are the removal and suppression of riparian vegetation, especially deciduous woody vegetation. This also applies to big game use of riparian areas Woody riparian vegetation is important as fish habitat for several reasons It provides shade, which helps regulate water temperature, and the root systems maintain bank stability

Shrubs growing along the streambank also provide overhead cover (hiding cover) for fish because some of the branches hang over, or may be partially under, the water Over half the food supply for fish in streams is terrestrial in origin, and deciduous woody vegetation is more productive than conifer or grass/forb vegetation types as a source of fish food.

Both big-game and livestock animals can have an adverse impact on fish habitat by breaking down the streambanks, thus reducing overhead cover for fish (undercut banks), decreasing channel stability, and increasing sedimentation

Range management objectives in riparian areas include protection of woody vegetation, and recovery of this vegetation in areas where it has been reduced by past management activities Different strategies are used to achieve recovery in varying time frames

Beavers and their dams can have positive and negative effects. In some unusual cases, beaver dams could form upstream fish migration barriers which would be detrimental for anadromous fish No such barriers have been identified on the Forest. Beneficially, beaver ponds form additional aquatic habitat which is often very productive for fish rearing These ponds have been found to be particularly beneficial for some species of salmon

Fish populations are directly tied to water quantity, water quality, and the health and vigor of the riparian community But water has other beneficial uses which are often inconsistent with fish production. Demand for irrigation water and other uses occasionally makes it difficult to maintain instream flows

Stream discharge in the John Day Basin is marked by extreme variability in both timing and quantity The problem is not restricted to the main stem John Day, as tributaries

to the system also have low flows during late summer Headwater streams on the Forest will have perennial flow but are diverted to supply irrigation needs off-Forest Some of these streams where this occurs are used by steelhead for spawning. As stream flows are reduced, rearing habitat and juvenile fish are lost. Migration barriers are also created for those fish which try to move into the cooler tributaries from the warmer water temperatures of the larger streams As the flow in higher elevations of the tributaries decreases during late summer, fish will tend to move downstream where there is more flow. If stream flows are reduced on the lower reaches, both downstream and upstream migration is hindered.

Recreational fishing can reduce populations of wild fish, thus creating a need to supplement with hatchery fish. Reducing populations of sensitive species could result in their listing as "threatened or endangered "

Developed recreation sites in riparian areas often result in loss of fisheries habitat. This is due to a number of factors including· (1) bank protection placed to reduce loss of campground areas, and (2) felling and removal of dead wood for recreationist safety and for firewood

Fish habitat management and visual resource management are generally compatible. Because such management also maintains more large, old trees in the timber stand, it provides more source material for instream woody debris than other timber management systems.

The high quality of water from the wilderness areas is beneficial to downstream fisheries. Streams flowing into the upper John Day River drainage support rainbow/redband, cutthroat, and bull trout Streams draining into the North Fork Malheur River and Malheur River support native rainbow/redband and bull trout.

When mineral exploration and development occurs, it usually involves surface or stream gravel-disturbing activities Those activities with the most influence on the fishery resource are suction dredging, road construction, vegetation removal, mineral extraction and processing, waste disposal, and reclamation projects

Suction dredging removes much of the plant life required by insects and may often destroy the insects themselves Since insects are a primary food for fish, such activities may result in displacement of fish until the activities are over Suction dredging may loosen or clean gravel, which could be beneficial, but the fines cleaned from one area will be deposited elsewhere and might be detrimental. It could cause sedimentation of spawning gravel and may cause suffocation of eggs or block emergence of fry. Loosening gravels may result in destruction of pools and upstream riffles, or it may create pools (Martin 1982).

Placer mining conducted out of the river could have additional effects on the fishery resource. Since this type of mining usually involves gravity concentration techniques, water chemistry is generally not changed but water quality could be because of added sediment and increased erosion Because vegetation is removed as part of the mining process, shade may be reduced and water temperatures may rise Vegetation removal may also result in increased erosion and sedimentation problems. Since placer deposits are associated with stream gravels, mining may result in temporary stream channel relocation and cause long-term channel or profile changes All would affect the fishery resource but with proper reclamation, fishery habitat can be restored or even enhanced

Hardrock and leasable mineral mining, milling, extraction, and transport operations may have similar effects on the fishery resource when located near streams, but this type of activity also has the potential to change water chemistry. Extreme precautions are taken to assure that this type of activity does not degrade the chemical characteristics of water and adversely affect the fishery resource.

Fire usually affects fish habitat only by removing vegetative cover In some cases, this may also increase erosion, thus decreasing water quality and adversely affecting fish habitat. Managed fire will generally not have much effect on riparian vegetation or water quality. Thus, the effects of prescribed fire on fish habitat will generally be insignificant.

Roads may have a number of direct and indirect effects on fish. (For a discussion about the effect of roads on fish, see Forest Service General Technical Report PNW-109 "*Planning Forest Roads to Protect Salmon Habitat*") Direct effects include: (1) blockage of upstream migration for resident and anadromous fish due to inadequate culverts and change in streamflow characteristics, and (2) reduction in quantity and quality of available fish habitat due to road location

Indirect effects are mostly due to water quality changes including (1) reduction in vegetative stream cover, (2) increases in sediment (as affected by road design, location and maintenance), and (3) utilization of chemicals on roads Road access disperses anglers and allows utilization of a greater amount of the resource

In wilderness and other unroaded areas, the effects of historical management activities may not be very obvious, but even here the evidence of many years of livestock grazing are apparent in some places In the roaded portions of the Forest, the effects of historical management activities are apparent in most streams and riparian areas The magnitude of these effects varies widely from stream to stream, but the following generalizations can be made Logging activities, including historical railroad logging and the road construction associated with modern timber harvest activities have occurred over most of the Forest Effects of livestock grazing are common Forest-wide, but are more pronounced in the southern part of the Forest than in the northern part Effects of mining activity are concentrated in the Middle Fork John Day River and its tributaries. Only a few streams on the Forest now have resident beaver on a long- term basis Beaver can also be found in some other streams temporarily, that is, for a few years at a time

5 Water

The rivers and streams of the Forest are a valuable resource in northeastern Oregon. These streams and rivers originate in, and flow through, productive and beautiful forests They provide high-quality water for spawning and rearing of anadromous fish, and habitat for resident trout and other native fish species Off-Forest water uses are also very valuable, domestic and industrial uses and irrigation of agricultural lands are the primary downstream uses

Intensive water quality monitoring started on the Forest in 1978 Water quality data has been collected from 41 water quality monitoring stations on 31 different streams Some of these stations have records for only 1 or 2 years while others have been monitored continuously, although at different intensity levels Most of the sampled streams were on the Long Creek Ranger District because it was within the proclaimed study area of the Oregon Range and Related Resources Evaluation Project (EVAL) Special project funding was received between 1978 and 1987 Publishing the results of this study, including the water quality reports, was the responsibility of the Forestry & Range Sciences Laboratory in La Grande, Oregon Water quality monitoring is continuing on the Forest on a limited basis. The water quality information now being collected is water temperature data for selected streams, and a reduced level of data collection for some of the original EVAL stations. Copies of the information are available for review at the Laboratory in LaGrande and at the Supervisor's Office in John Day

Climate, vegetation, and management activities will affect water resources on the Forest. A high desert climate with low precipitation and high summer temperatures results in low humidity and rapid evaporation The Forest's precipitation zones range from 20 inches at low elevations to 40 inches at high altitudes Climate records show great variability in when precipitation occurs and in what form

Generally, the months of June, July, and August are hot and dry, although some years had significant rainfall amounts during that period The snowfall period occurs from November through March Due to the relatively low elevation of the Forest, the snowpack can be gone from low elevations by March. This produces a variable snowmelt/runoff period because by the time high elevations begin to produce runoff, the low-elevation snowpack is gone The amount of high-elevation terrain which holds a snowpack into late spring is very limited on the Forest Only in areas like the Strawberry Mountain Wilderness do small, isolated patches of snow remain into the summer season

The quality of water leaving the Forest varies with the season, geology, land use, and elevation. Sediment concentrations tend to increase during snowmelt runoff, and non-forested lands typically produce higher sediment yields than forests. On upland areas, this is due to shallow soils with low capacities for holding water, and minimal ground cover. Both of those factors increase surface runoff during thunderstorms. Sediment is also generated from streambank erosion and gullies On forested lands, roads and streambanks are the primary sources of sediment.

Concentrations of fecal coliform bacteria, an indicator of animal excrement, vary widely. Although most of the water on the Forest is of acceptable bacterial quality, many streams with heavy livestock concentrations may have conditions offensive to humans.

Water yields vary throughout the year, with peak runoff resulting from snowmelt Annual runoff from the Forest averages just over 600,000 acre feet per year Water yield also varies substantially from year to year. High or low flows for a 10-year period (i e., streamflows which have a 10 percent chance of occurring in any given year) can vary as much as 180 percent from the average annual flow

Assuming streamflow runoff has an average fall of 1,000 feet before leaving the Forest, and if all the potential energy available in that water could be converted to electricity distributed evenly throughout the year, about 72 megawatts would be available. This contrasts with a figure of 194 megawatts for all selected sites on the entire John Day River System, each of which could produce 200 kilowatts or more at least 50 percent of the time (Klingeman 1979)

From a practical standpoint, development of even a few percent of the theoretical potential power generation would be unlikely The fall rate on most large streams is too low for practical power generation without artificially created falls (dams) The power-generating potential of smaller streams west of the Cascade mountain range is so much greater than here (and at a lower cost per kilowatt) that little interest has been shown in hydropower locally Commercial power-generating interests do exist at the falls on the South Fork of the John Day River and at Olive Lake, both of which are near, but outside, the Forest boundary

There is a need to maintain some level of instream flow, both on and off the Forest, to maintain fisheries and other resource values To date, this has been accomplished on a case-by-case basis within the Forest boundary Off-Forest instream flows are of significant interest when they affect fisheries on the Forest. Off-Forest streamflows are the responsibility of the State of Oregon

Water uses on-Forest include administrative use, fire suppression, road construction and dust abatement, recreational facilities, livestock, and instream flow. On lands originally proclaimed as part of the National Forest System, water is "reserved" for timber production and watershed protection Also reserved are water supplies for nurseries supporting timber production or watershed protection plantings

Table III-13 summarizes beneficial uses by subbasin. It reveals that throughout the basin there are certain common denominators for water use. For example, domestic, irrigation, livestock, municipal, and storage uses occur in each of the subbasins. Quantities for uses

other than irrigation, mining, and power are generally very limited. The table shows that the use of water for irrigation accounts for over 80 percent (by volume) of all water appropriated in the basin Mining is the next most dominant use, with 12 percent by volume.

TABLE III-13: Existing Water Rights by Beneficial Use and Subbasin of the John Day River Basin (Cubic Feet Per Second)

Water Use	Lower Main Stem	Middle Main Stem	Upper Main Stem	North Fork	Middle Fork	South Fork	Total
Agriculture			*				*
Commercial				3 7			3.7
Lawn & Garden	0 3	*	0 2	0 1		*	0.6
Domestic	1 2	0 2	1 6	1 2	1.8	0.1	6.1
Fishlife	0 6	0 2	12 8	2 0			15.6
Fire Protection		*	0 2			0.1	0.3
Industrial	0 8	7 3		2 1		2.2	12.4
Irrigation1/	446 3	278 2	927 0	291 5	88.5	97.5	1,067.0
Livestock	2 1	0 5	0 9	1 7	0 8	0 3	6 3
Mining		30 8	40 5	202 2	49 5		323 0
Municipal	16 4	4 4	9 3	3 9	3 1	5 1	42.2
Power			13 9	25 0	0 8		39.7
Quasi-Municipal	5 3						5.3
Recreation	0 2		*	2 0	*		2 2
Storage2/	(1,976)	(3,446)	(681)	(1,898)	(82)	(377)	(8,460)
Temp Control	3 3						3.3
Wildlife	*	*				*	
Other3/		6 5	4 3	7			11.5
Total4/	476 5	328 1	1,010 7	536 1	144 5	105 3	1,522 7

* Less than 0 1 cubic feet per second

1/ Irrigation allowed 6 months per year Figure is adjusted for cubic feet per second over the entire year Total during the irrigation season is 2,129 cubic feet per second

2/ Storage is in acre-feet Storage rights allow no diversion Use of stored waters requires a separate right under the specified use Storage figures are not included in the totals

3/ Represents those rights with uncoded uses in the data base

4/ Total may not agree due to rounding

No major water impoundments exist in the John Day Basin Small farm impoundments and livestock watering ponds form the majority of the storage volume According to Water Resources Department records, there are over 8,400 acre-feet of permitted storage in the basin (Draft John Day River Basin Report, 1986)

Due to natural precipitation variability, coupled with a lack of adequate upstream reservoir storage to capture spring runoff, there will always be periods when demand for water will be greater than supply

The Forest has two small municipal supply watersheds, Byram Gulch (Canyon City) and Long Creek Both watersheds have prior existing agreements between the Forest Service and the above municipalities. Long Creek has had a Water Transmission Special-Use Permit since 1937 covering 130 acres of the approximately 224 acres within the recognized watershed The watershed has been fenced to prevent bacterial contamination by domestic livestock and grazing is not allowed Timber harvest is permitted, but any road building or timber harvest activity must be designed to minimize excavation and protect streams and drainage channels The town of Long Creek currently uses water from the watershed as a domestic supply only during maintenance of their well system or

during emergencies. This has resulted in use of water for this purpose on an average of only 1 day per year. Water from the watershed is used to maintain the sewage level in the town's lagoon during summer and fall, at which time water from the surface streamflow also passes through the system

The Canyon City Municipal Watershed has been used since 1926. Byram Gulch currently supplies 75 percent of Canyon City's needs, the remainder is supplied by a well located east of the city. The total drainage comprises 930 acres, of which 610 acres lie within the National Forest (310 acres within the Strawberry Mountain Wilderness), 150 acres are owned by Canyon City, 130 acres are administered by the Bureau of Land Management, and the remaining 40 acres are owned by four separate landowners. Forest Service objectives are to manage the watershed lands and resources under multiple use principles (recognizing water as the key value) and to regulate use of the area to protect and maintain water resources. Current water quality does not meet Public Health Service standards and must be chlorinated at a rate of 03 parts per million. Due to the location of the watershed, its steep terrain, and relative inaccessibility, conflicts between good watershed management and other resource uses are minimal Cattle grazing is not permitted and the area is withdrawn from mineral entry.

a *StreamClassification*

Streams on the Forest are classified into four groups Class I streams (about 320 miles) include major streams, high-value fisheries, and municipal watersheds utilizing surface waters Class II streams (about 490 miles) generally include streams with fisheries which are less significant than Class I streams Class III streams (about 1,020 miles) include some fish-bearing streams and all other perennial streams for which a higher ranking is not justified. Class IV streams (estimated at about 2,750 miles) are intermittent, but may support significant amounts of riparian vegetation

b. *RiparianEcosystems*

Riparian areas are ecosystems characterized by vegetation requiring freely- accessible water They include the stream and an adjacent area of varying width A critical portion of the riparian zone is called a "riparian area of influence," which is the area below the non-riparian, upland vegetation The area of influence contains trees which provide shade, contribute fine or large woody material to the stream channel, terrestrial insects for the stream, and habitat for riparian wildlife Riparian areas are well-defined habitat zones located within much drier environments, they are very productive in terms of wildlife species, plant biomass and vegetation diversity While riparian areas are a minor portion of the Forest's land base, they are disproportionately important

Stream margins frequently contain highly productive timber sites. When uncontrolled, cattle use riparian zones more heavily than other areas The relatively gentle topography makes riparian zones attractive for road locations. Recreationists concentrate their use in riparian areas and scenic values are often high In addition, wildlife use riparian zones more than any other habitat type Of the 365 terrestrial species which occur in the Blue Mountains, 214 (per Table III-8) depend directly on riparian zones or utilize them more than other habitats Riparian zones along rivers and streams are frequently used as migration routes by wildlife, particularly by deer and elk traveling between summer and winter ranges.

A comprehensive inventory of riparian areas is scheduled for completion during the first ten years of the Forest Plan The inventory will be a coordinated effort between many resource areas (watershed, fisheries, range, timber and wildlife) to assure that all riparian resources and values are evaluated. The inventory will be conducted according to the publication *Managing Riparian Ecosystem (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington*

An inventory of what has been called unsatisfactory riparian areas was prepared for this Forest planning effort It was based primarily on the Watershed Improvement Needs

(WIN) inventory and professional judgement about streams lacking adequate shade It was the first attempt to identify riparian areas needing attention in order to determine funding for correcting the problems The WIN inventory is not a "riparian area" inventory, but it does provide information about unstable streambanks and gullies It does not include the shrub, fish habitat, or shade portion of a complete, riparian-area inventory. From the WIN Inventory and professional judgment about several streams, 235 stream miles were determined to be in less than satisfactory riparian condition. This is a conservative estimate The total number of miles is expected to increase as a more complete riparian area inventory is completed in the next 10 years The Malheur National Forest has an aggressive Watershed Improvement Needs program. Each District utilized both appropriated and KV funds to complete projects Many of the inventoried problem areas existing today will be corrected through the watershed improvement needs program Watershed improvement need projects are prioritized and presented in Appendix A of the Forest Plan

Although timber harvest activities, road construction, insect outbreaks, and fire influence shading and streambank stability, the greatest affect on stream temperature and stability appears to be from a reduction in hardwoods caused by ungulate grazing With few exceptions, most of the gullies on the Forest resulted from loss of a stabilizing root system after reductions in the hardwood community

Hardwoods increase streambank stability and provide habitat for many wildlife species, including beaver Beaver dams were responsible for the maintenance and/or formation of many meadows Willow and quaking aspen meadows are substantially reduced in size and extent from historical levels. Thinleaf alder grows along water courses and provides shade and bank stability The larger size classes, those in an old and decadent condition, are being infected by a disease-causing fungus, but they are resprouting. It appears that natural succession is replacing older trees with young sprouts that will have ample light, nutrients, and moisture after competition is reduced

In historical perspective, it is likely that a great deal of woody shrubs and aspen were eliminated during a period of uncontrolled grazing around the turn of the century Several years of above average precipitation, an associated increase in other forage available to livestock, and implementation of multiple pasture grazing systems have improved much of the hardwood vegetation since the late 1960's The needs of riparian hardwoods have not been well researched, and continued monitoring of vegetative conditions in these areas is needed

Gullies are also related to loss of shrub and hardwood tree cover. Gullies cause meadow areas to drain prematurely, and may increase downstream peak flows much like artificial channelization would. Gullied meadows are less productive because of a lower water table, which reduces water available for plants Gully problems are most prevalent on the south half of the Forest

c *Relationship Between Forest Management and Water and Riparian Areas*

Timber management activities have little effect on runoff timing or amounts from the Forest The majority of past timber harvest has involved overstory removals Mature or overmature trees were selectively marked for removal, with younger age classes retained after harvest. This harvest method does not increase water yields significantly because roots of the remaining stand are still occupying the site and utilizing soil moisture The Forest does not have extensive, high-elevation snow zones where snowmelt is delayed until later in the runoff season It is believed that there is little opportunity to affect snow deposition patterns through design of harvest units and thereby delay snowmelt

Research studies indicate timber harvesting generally increases annual water yields. This is due primarily to reduced evapotranspiration Harr (1983) developed a regression equation which estimates potential increases in annual water yield from clearcutting in western Oregon and Washington Initial on-site increases of up to 20 inches are predicted, though

they completely disappear in about 27 years The equation predicts a smaller water yield increase when annual precipitation is less Harr estimated that sustained increases in annual water yield from most large watersheds in western Oregon and Washington are, at best, three to six percent more than flows from an undisturbed forest. Kattelmann (1983) estimated similar maximum potential increases in Sierra Nevada watersheds if all applicable laws were followed But they concluded that the typical increase in a large watershed drops to approximately one percent when constraints are imposed to meet other resource demands A similar result is expected in Region Six National Forests due to multiple use considerations. Flow increases on Region Six National Forests have already been realized due to past harvesting, so there is little or no potential for increasing yields in most large watersheds. Other factors affecting streamflow management are high natural variability, flow measurement accuracy is only within five percent at best (so potential changes are less than what is measurable in large watersheds), and most of the flow increases occur when it is needed the least or is unusable (during spring runoff on the eastside and during fall storms on the westside).

Research generally shows increases in summer flow result immediately after harvest in western Oregon But studies in the Rocky Mountains (Troendle, 1983) showed no change in late summer streamflow following timber harvest, despite annual increases (all increases occurred during spring snowmelt). In large watersheds subject to sustained yield harvesting, summer flow increases are temporary and not expected to be measurable at downstream locations.

Effects of harvesting timber on groundwater recharge and aquifers are similar to effects on streamflow, except for timing differences, e.g , aquifer responses are typically slower and fluctuate less than streamflow The research findings mentioned above indicate that timber harvesting as it is presently practiced, and will be practiced under any selected Forest Plan alternative, is expected to have a negligible, unmeasurable effect on downstream aquifers There is no realistic potential to modify timber harvests for augmenting downstream water supplies. This assumes management practices are conducted in a manner which reasonably maintains water infiltration characteristics, as is typical of current practices on National Forest System lands Best management practices (see Forest Plan standards and guidelines) will assure adequate infiltration characteristics are maintained Only if extensive, contiguous areas were compacted would infiltration be expected to be reduced so as to adversely effect downstream aquifers

There are localized areas in some grazing allotments where improved management may restore water tables and change streamflow from intermittent to perennial. This would occur through application of "best management practices" and Forest Plan standards and guidelines. Flow increases would probably be small Resources in the immediate vicinity will benefit, but measurable increases are not expected very far downstream Downstream aquifers would not be measurably influenced

Research does not indicate that timber harvesting has a significant potential for adversely affecting aquifer quality Application of "best management practices" will ensure groundwater quality is not degraded by management activities

Increased sunlight reaching the stream surface does more to increase water temperature than other factors, such as ambient air temperature Thus, increases in water temperatures are directly related to the amount of shade removed along a stream. Changes in shading are the most important factor affecting water quality

Selection cutting (uneven-aged management) in riparian areas often removes the large trees. Shade-tolerant conifers tend to become more frequent and shade- intolerant species less common, except where ponderosa pine is the dominant species In lodgepole pine stands, regeneration harvest (clearcuts) is the most common practice.

The Malheur 1979 Timber Resource Management Plan stated that accelerated harvest

will occur for 21 years to salvage dead and dying lodgepole pine in the mature and two-storied stand types. Many of these stands are located in riparian zones. Some streams are presently shade-deficient because of dead trees Fortunately, lodgepole pine is a fast-growing tree which often provides shade in 15 years or less During the intervening period, those stream reaches where salvage occurred may have elevated stream temperatures during the summer low-flow period.

Virtually any removal of large trees from a tree stand results in more light penetrating the upper canopy This usually results in more growth of understory plants, including woody and herbaceous plants and young conifers A secondary effect of promoting understory growth is increased attraction of livestock to the area

Livestock grazing has been a major factor affecting riparian areas on the Forest In recent years, livestock management has almost exclusively dealt with cattle. Due to the animals' natural preference for areas near water, use of riparian areas is disproportionately heavy unless management action is taken to disperse it. Forest-wide, abundance and diversity of riparian vegetation has been reduced In some areas the change has been fairly small, but in other stream reaches, the deciduous woody component has been largely eliminated However, many of these stream reaches have regenerating shrubs.

An increase in abundance and diversity of deciduous woody vegetation generally results from management strategies and structural improvements to minimize livestock use in riparian areas. The overall condition of riparian areas, based on vegetation abundance and diversity, generally improves as livestock use decreases Big-game use of riparian areas would tend to have the same effect as livestock use, but to a lesser degree.

Beavers have been responsible for converting streams from intermittent to perennial, with resultant increases in riparian area This process enhances the water resource by creating a reliable base flow, and wildlife by providing food and habitat Following beaver dam construction, flooding from high-intensity storms is often reduced But beavers may over use woody riparian shrubs and trees on which they depend.

Fish habitat management does not directly affect water quality or quantity except for short-term, site-specific impacts of habitat improvement projects Management of riparian areas and fisheries habitat improvement work can be compatible

The presence of water is a major recreation attraction Visitors attracted to water sources contribute to pollution and siltation Water-based recreation developments can contribute to water degradation from bacteriological sources such as sanitary facilities. Recreation activities associated with horses and pack stock are sources of fecal coliform in streams and smaller lakes Off-road vehicle use can contribute to soil disturbance on trails, stream crossings, and wetlands, which can then lead to erosion and impacts on water quality

Visual resource management does not directly affect water resources on the Forest Timber management designed to meet high visual quality standards should also protect riparian resources. Such management maintains enough canopy to provide needed shading

The two Wildernesses provide runoff for two of the major drainages on the Forest Water originating there is of high quality Wilderness runoff tends to occur somewhat later than for the rest of the Forest, which is important for contributing cooler water to the streams

Both surface and subsurface water resources can be affected by mineral exploration and development activities There may be effects on sediment yield, erosion, water chemistry, stream channel characteristics and stability, aquifer recharge, and ground water quality. These potential effects depend largely on the mineral being explored, mined, or developed,

and the location of the operation. Existing laws and regulations provide protection against adverse impacts and this protection must be included in the operating plan Recreational mining activities can cause temporary and generally insignificant suspended sediment problems

The effect of roads on water resources is complicated by soil type, rainfall, road location, and side slope percent Erosion is generally the second most important factor affecting water quality (Fredricksen 1970). Whether that erosion reaches the streams is largely a factor of road location and riparian condition Healthy riparian areas act like a filter, keeping surface erosion from entering streams.

Since many Forest roads were built in riparian areas, not only do they reduce the filtering ability of the riparian zone, they also reduce the amount of riparian habitat available.

6. Recreation

The high desert country, canyons, rolling uplands, and rugged mountain peaks of the Forest provide landscape variety that is not only scenic, but offers many settings for recreational activities.

Recreationists enjoy 25 developed Forest sites for camping and picnicking, each serves from 2 to 20 families per site Visitors enjoy picnicking among the wildflowers or viewing scenery along the Forest roads. Hikers and horseback riders have more than 240 miles of trails to enjoy. Trout fishing in Forest lakes and streams is also popular. Fall brings huckleberries and hunters, a period when campgrounds receive heavy use Dispersed sites are popular for large and small hunting camps, some of which have been used by the same parties for a quarter of a century or more Snowmobiling, cross-country skiing, ice-fishing, and sledding are all popular winter activities

Strawberry Mountain Wilderness, Monument Rock Wilderness, and other unroaded areas provide settings for solitude and backcountry recreation experiences. These unroaded areas were identified during the Roadless Area Review and Evaluation conducted in the 1970's (see discussion of these areas in Appendix C).

a *Lakes*

The Forest has nine lakes or reservoirs that are considered fishable. Several small ponds exist on the Forest, but their contribution to the fishery resource is minor A listing of Forest lakes and selected physical and biological parameters is presented in Table III-14.

High, Slide, Little Slide, Strawberry, and Little Strawberry Lakes are within the Strawberry Mountain Wilderness.



TABLE III-14: Some Physical and Biological Characteristics of Lakes and Reservoirs

Name	Elevation (feet)	Area (acres)	Depth (feet)	Species	Comments
Canyon Meadow Reservoir	5,036	25	40	rainbow cutthroat brook	Stocked annually, subject to extensive drawdowns
High Lake	7,448	5	12	brook	Naturally reproducing
Little Slide Lake	7,280	3	12	brook	Naturally reproducing
Little Strawberry Lake	6,960	4	10	brook	Naturally reproducing
Magone Lake	5,000	50	100	rainbow brook	Stocked annually Stocked annually
Slide Lake	7,200	13	8	brook	Naturally reproducing
Strawberry Lake	6,320	31	17	rainbow brook	Naturally reproducing Stocked every 4 years
Trout Farm Pond	4,890	1	5	brook rainbow	Naturally reproducing Stocked annually
Yellowjacket Reservoir	5,000	25	18	rainbow	Stocked annually

b *Wild, Scenic, and Recreation Rivers*

On October 7, 1968, Congress enacted the Wild and Scenic Rivers Act, P L 90-542, which placed 8 rivers in the nation under a National Wild and Scenic River System

This Act designated the initial rivers for the national system, suggested additional rivers for further study, and defined a process for future inclusion of rivers Federal protection, as per this Act, preserves certain of the nations' outstandingly remarkable, free flowing rivers for present and future generations

The Act designated 27 other rivers for detailed study as potential additions The Act was amended on January 3, 1975, and added 29 more rivers for study None of the rivers involved in the above legislation are on the Malheur National Forest The Heritage Conservation and Recreation Service (HCRS) conducted a national inventory of rivers having potential for inclusion in the Wild and Scenic System in the late 1970's This function has transferred to the National Park Service The Malheur National Forest had no rivers included in the national inventory

The process for adding rivers to the national system is comprised of three steps. Initially, the river must be determined eligible Eligibility is based on two conditions free flow, and possession of one or more outstandingly remarkable value The context for this judgement is regional, with the 1980 "Nationwide Rivers Inventory" conducted by the HCRS as a preliminary guide

Fifteen waterways were reviewed as potential candidates for eligibility on the Malheur National Forest, in response to public comments on the Draft EIS and Proposed Forest Plan The John Day, Malheur and Silvies rivers were mentioned most frequently. Responses often included only a river's name, without specific rationale for eligibility Comments received are included in the list below

John Day River
Malheur River. hiking, rainbow and redband trout fishing, roadless, big-game range, camping, hunting.
North Fork Malheur River. hiking, trails, redband trout fishing, roadless, big-game winter range
Little Malheur River
Silvies River: scenic river canyon, rafting, fishing and old-growth pine, big-game winter range, camping, hunting.
South Fork John Day River
Middle Fork John Day River
Murderers Creek
Deer Creek
Myrtle Creek
Bear Creek: hiking tied into North Fork Malheur River
East Fork Canyon Creek
Crooked Creek
Pine Creek vegetation diversity, scenic, low-elevation ecosystems with significantly-different recreational opportunities than those found on other streams of the Malheur National Forest
Calamity Creek

A Forest committee was established to evaluate the list of candidate streams and determine which ones might qualify for further consideration This committee recommended specific segments of the following waters for further consideration·

Middle Fork John Day River: This river has part of the largest wild run of anadromous fish (spring and summer steelhead) in the Columbia River basin. These species have a viable, unique, and wild gene pool.

Murderers Creek: California bighorn sheep are present due to reestablishment of historic range. This species is considered unique for the Malheur National Forest. A five-mile segment upstream from the National Forest boundary flows through a very deep rimrock canyon, which is a roadless area with geologic values.

Malheur River. The unique presence of Bull trout is an indicator of high-quality, cold and clear water Upper tributaries of the Malheur system are still considered pristine waterways with scenic value.

North Fork Malheur River: The unique presence of Bull trout is an indicator of high-quality, cold and clear water The prominent canyon and rugged topography provide scenic vistas and high geologic value

Little Malheur River· The unique presence of Bull trout is an indicator of high-quality, cold and clear water The canyon extending 4 6 miles above Forest Road 1674.457 provides outstanding scenic values

The final step in the process is the determination of suitability. This provides the basis for the decision to recommend designation or non-designation of a river or river segment. The suitability analysis is an evaluation of the effects of reasonable alternatives for management on a particular river segment. The Forest's leadership team analyzed the river eligibility recommendations and deemed that the North Fork Malheur River and Malheur River were suitable for potential designation as Wild and Scenic Rivers.

In 1988 the Oregon Omnibus Wild and Scenic Rivers Act was drafted Legislative negotiations resulted in addition of segments of the Malheur and North Fork Malheur rivers to the National Wild and Scenic Rivers system. They were included because of their free-flowing character, presence of at least one outstanding or remarkable value, adjacent lands were predominantly under National Forest ownership, and the segments were

not already addressed by existing legislation or management direction The North Fork Malheur River has 25 5 miles designated as "scenic" from its headwaters to the Forest boundary The Malheur River has 13 7 miles designated, with the section from Bosenberg to Malheur Ford as "scenic," and Malheur Ford to the Forest boundary as "wild." As required by the Wild and Scenic Rivers Act, management plans are being prepared for each of these rivers

c *Developed Recreation*

Forest visitors enjoy 25 campgrounds and 10 picnic sites on the Malheur National Forest. All but one of the picnic sites is adjacent to a campground The developed sites are quite limited in size and provide a truly rustic experience. All developed facilities are free-use because of their size, limited facilities, and normally low numbers of users.

Demand for developed sites is heaviest during the summer holidays (Memorial Day, 4th of July, and Labor Day) and during big-game hunting seasons. Developed sites associated with other attractions likes lakes or Wilderness receive the most use Three of the campgrounds are located adjacent to lakes – Magone, Yellowjacket, and Canyon Meadows Magone Lake campground and day-use area is the most highly- developed facility on the Forest

The Forest has the capability to supply 273,170 persons-at-one-time days if every potential site was developed to capacity Although there is plenty of developed capacity (273,170 persons-at-one-time days) to meet demand in five decades (105,972 persons-at-one-time days), all facilities are not used equally Water- oriented facilities like those at Magone Lake are being used near capacity, while other sites are used mostly during hunting seasons In order to respond better to demand, some high-use sites could be expanded, while some low-use sites could be eliminated. Some demands are not being met because of the kinds of facilities available at the developed sites Additional facilities could be provided to provide RV hookups and showers for bicyclists along the national bike route

Due to its close proximity to the Wilderness and to local population centers, Strawberry Mountain campground is a major portal to Strawberry Mountain Wilderness This facility's location is contributing to use levels near the limit of acceptable change for Strawberry Lake.

There is also one organization camp on the Forest, Lake Creek Camp. This facility is privately run under a Granger-Thye Special-Use Permit

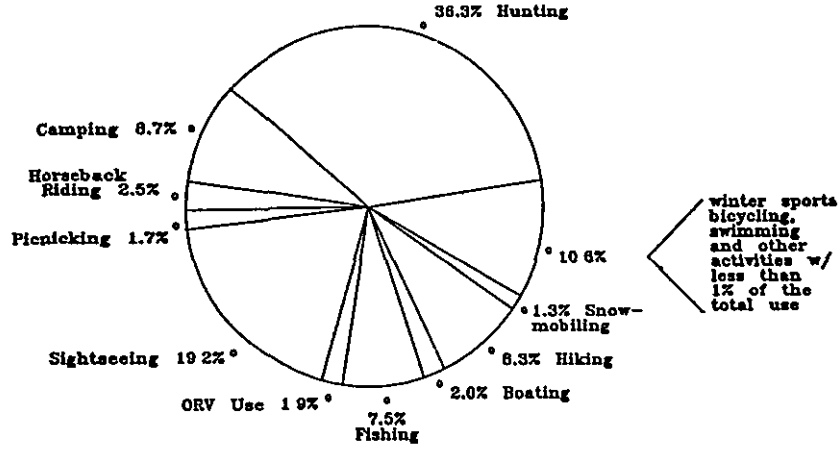
d *Dispersed Recreation*

Dispersed recreation refers to recreation activities that occur outside developed sites It includes such activities as hiking, off-road vehicle (ORV) use, fishing, and hunting

To identify recreational environments, the Forest is classified into various categories using a system called the Recreation Opportunity Spectrum (ROS) The ROS is a categorization of land according to a range of recreation opportunities

The range of recreation opportunities is divided into six spectrum categories ranging from primitive to urban They describe the range of recreation settings a visitor can experience, from an undisturbed, natural environment with no human contact to a highly-modified environment with many and varied human contacts The current array of recreation opportunities on the Forest, and the current use in these categories, is shown in Figures III-12 and III-13

FIGURE III-12: Dispersed Recreation Use by Activity (Percents)



Forest use statistics were summarized according to categories used by the 1983 Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP) Increases in Forest demand, by activity, were calculated from projected statewide demands as contained in the SCORP document. These projected demands are summarized by Recreation Opportunity Spectrum class in Table III-15.

Demand for both dispersed and developed recreation will increase slowly over the next 50 years. If current trends continue, overall recreation use will remain below the Forest's capacity through the year 2000 and beyond. Current recreation demand is low on the Forest. Projections for 5 decades were made using anticipated growth statistics from the State Comprehensive Outdoor Recreation Plan (SCORP) These projections were then converted to required acres using capacity figures in the "Recreation Opportunity Spectrum Users Guide."

FIGURE III-13: Recreation Use by Recreation Opportunity Spectrum Class

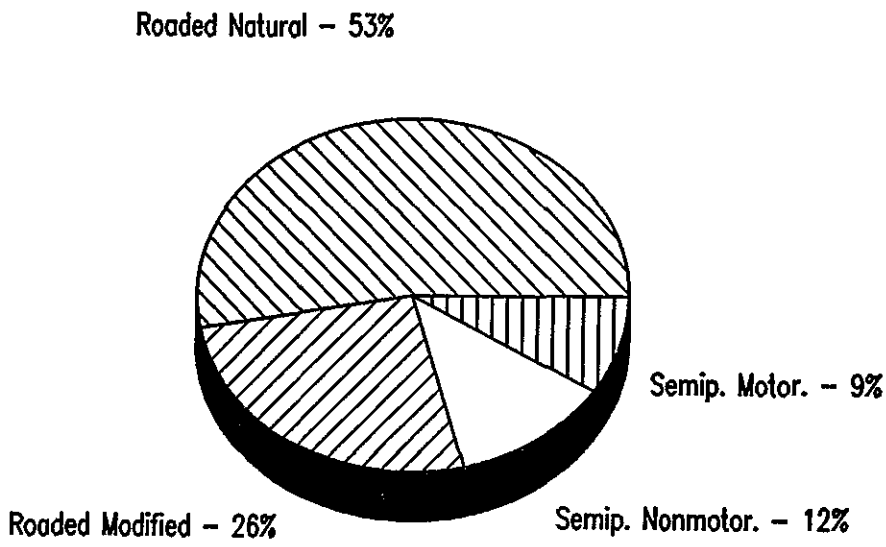


TABLE III-15: Anticipated Recreation Demand for Five Decades
(Thousands of Recreation Visitor Days)

	Present Use (1984)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Wilderness	16 5	17 6	19 3	20 6	22 0	23 4
Semiprimitive, Nonmotorized	6 8	7 5	8 2	8 8	9.4	10.0
Semiprimitive, Motorized	18 4	20 4	22 3	23.8	25 4	27 1
Roaded Natural	101 0	113 6	124 3	132.7	141.5	151.0
Roaded Modified	49 1	55 2	60 5	64 6	68 9	73 6
TOTAL	191 8	214 3	234 6	250 5	267 2	285 1

NOTE A recreation visitor day (RVD) is equivalent to one person enjoying recreation for 12 hours These figures also include wildlife-related recreation, as reported in wildlife-and-fish-user-days (WFUDs)

Table III-16 shows that the Forest has recreation capacity that exceeds projected demand The Forest currently has 180,948 acres of undeveloped land outside Wilderness that is suitable for unroaded recreation These lands could provide an annual potential of 137,520 recreation visitor days of semiprimitive, nonmotorized recreation or 157,424 RVDs of semiprimitive, motorized recreation If they were all designated as Wilderness, along with the two existing Wildernesses, they would provide an annual potential of 131,634 RVDs of primitive recreation Figure III-12 indicates how use is dispersed by activity across the Forest.

TABLE III-16: Area Currently Available, and Area Needed in the Fifth Decade, by Recreation Opportunity Spectrum Class (Thousands of Acres)

Recreation Opportunity Spectrum Class	Area Currently Available	Area Needed in Fifth Decade
Wilderness	81 3	30 8
Semiprimitive, Nonmotorized	45 6	13 1
Semiprimitive, Motorized	140 1	31 1
Roaded Natural	748.1	42 8
Roaded Modified	444.4	30 8
TOTAL	1,459.5	148 6

e. *Relationship Between Forest Management and Recreation*

Timber harvest causes major changes in recreation settings and associated use Existing trails may be rerouted or protected Improved access provided by timber sale roads usually results in increased hunting, fishing, and other recreational use of an area For recreationists desiring unroaded opportunities, building roads into areas reduces their appeal. On the other hand, roading provides opportunities for those who prefer an easily accessed setting.

Intensive livestock use and concentrated recreation use are often incompatible. Developed campgrounds are generally fenced to exclude livestock. This is not true of popular dispersed campsites, which often occur near stock water developments. Livestock droppings and odor detract from the recreational experience, affect water quality, and litter trails. Most livestock are removed before hunting season, when much of the Forest's recreation use occurs.

Management of fish habitat seldom detracts from recreation because habitat improvements usually don't disrupt natural-appearing settings. Improved fish habitat can enhance recreational fishing opportunities.

Cultural resource management seldom affects the recreation setting There is potential for interpretation of the Sumpter Valley Railroad, Oregon and Northwestern Railroad, and other historic and prehistoric sites to increase recreational enjoyment of Forest visitors.

Visual resource management directly complements the recreational setting and facilitates recreation use on the Forest

The Wildernesses provide the only opportunity for primitive recreation on the Forest, adding to recreational diversity Recreational use of Strawberry Mountain Wilderness has remained fairly constant over the last several years.

Rights of a mining claimant may interfere with recreational pursuits A recreationist removing minerals from someone else's mining claim may be in trespass In addition, recreationists cannot materially interfere with mining operations on a valid mining claim, and a mining claimant has a right to use the surface and subsurface resources when necessary for mining purposes Recreational mineral extraction and rockhounding are popular activities on the Forest

Since reasonable access for valid mining claims is a statutory right, mineral activities may result in roading areas which are managed primarily for unroaded recreation. Areas withdrawn primarily for recreational values may be similarly affected if mineral rights exist, either in the form of valid mining claims, leases, or outstanding mineral rights. But such conflict has not been significant on the Forest

Large fires can be distracting or dangerous to Forest visitors and they modify the recreation setting. Large fires could damage recreation facilities.

Roads provide access to both existing and potential developed recreation sites The standard of road design and maintenance plays a definite role in determining the type of visitor, mode of transportation, and camping style For instance, motor homes are limited by the type of access provided

The existence of a road network greatly enhances some dispersed recreation opportunities, and the degree to which visitors can be dispersed in their pursuit of recreational activities

The use of off-road vehicles (ORVs) is an issue that will be considered outside of the Forest planning process. The Malheur National Forest is currently developing a Travel Plan which will address this issue in detail At this time, ORV use is prohibited in the Monument Rock and Strawberry Mountain Wilderness areas Seasonal restrictions apply to Vinegar Hill scenic area, which is restricted to winter snowmobile use only. Other seasonal restrictions apply to specific areas during big-game hunting seasons, when a "green dot" system is used to designate open roads Other site-specific vehicle closures may be implemented as deemed necessary for resource protection

7 Roadless Areas

Under the Roadless Area Review and Evaluation (RARE) process completed in 1973, roadless areas were identified on the Malheur National Forest A second evaluation of roadless areas (RARE II) was initiated in 1976 and completed in 1979 This process identified 20 roadless areas on the Malheur National Forest that are being considered for roadless area management in this planning process

With the conclusion of RARE II in January 1979, one area within the Forest boundary did not receive full public review This area, Pine Creek, was recommended for further evaluation

The majority of two roadless areas were added to the wilderness system by the Oregon Wilderness Act (1984) Monument Rock (6240) and Strawberry Addition (6238).

The Oregon Wilderness Act of 1984 specified that the remaining 18 areas not be reviewed for wilderness designation during this planning process, except for Pine Creek. Roadless areas can be managed for semiprimitive recreation opportunities, which would maintain their suitability for future wilderness review

Each of the 18 identified roadless areas is described in detail in Appendix C and listed in Table III-17. Figure III-14 shows the location of areas listed in Table III-17 (note that the numbers identifying each roadless area in fig III-14 is the "RARE II Number" given in Table III-17)

a *Relationship Between Forest Management and Roadless Areas*

The relationship of these areas to other resources depends on the type of management they receive

Currently, three of these areas are managed to provide semiprimitive, nonmotorized recreation These areas are McClellan Mountain, North Fork of the Malheur River, and Greenhorn Mountain Pine Creek is also being managed in this way while its wilderness suitability is being reviewed

TABLE III-17: Roadless Areas of the Malheur National Forest

RARE II Number	Name	Acres
6231	Utley Butte	9,945
6232	Myrtle-Silvies	11,747
6233	Aldrich Mountain	4,951
6234	Malheur River	6,984
6235	Shaketable	7,137
6236	Dry Cabin	12,221
6237	McClellan Mountain	20,646
6239	Glacier Mountain	19,572
6241	North Fork Malheur River	18,276
6242	Baldy Mountain	6,431
6243	Dixie Butte	12,110
6244	Nipple Butte	11,525
6245	Fox Creek	5,879
6246	Flag Creek	7,789
6247	Cedar Grove	112
6248	Pine Creek	5,420
6251	Jumpoff Joe	4,006
6252	Greenhorn Mountain	16,197

Areas managed as semiprimitive, nonmotorized interact with other resources in much the same way as wilderness does. One exception is that these areas are not withdrawn from minerals development, although they may require special measures within the operating plans.

8. Scenery

The Forest provides a stunning backdrop for local communities and outstanding scenic variety. Scenic photos and descriptions of the Forest are used in local tourism literature Forest visitors expect to see a natural-appearing landscape This exists in most areas, even where resource management is occurring

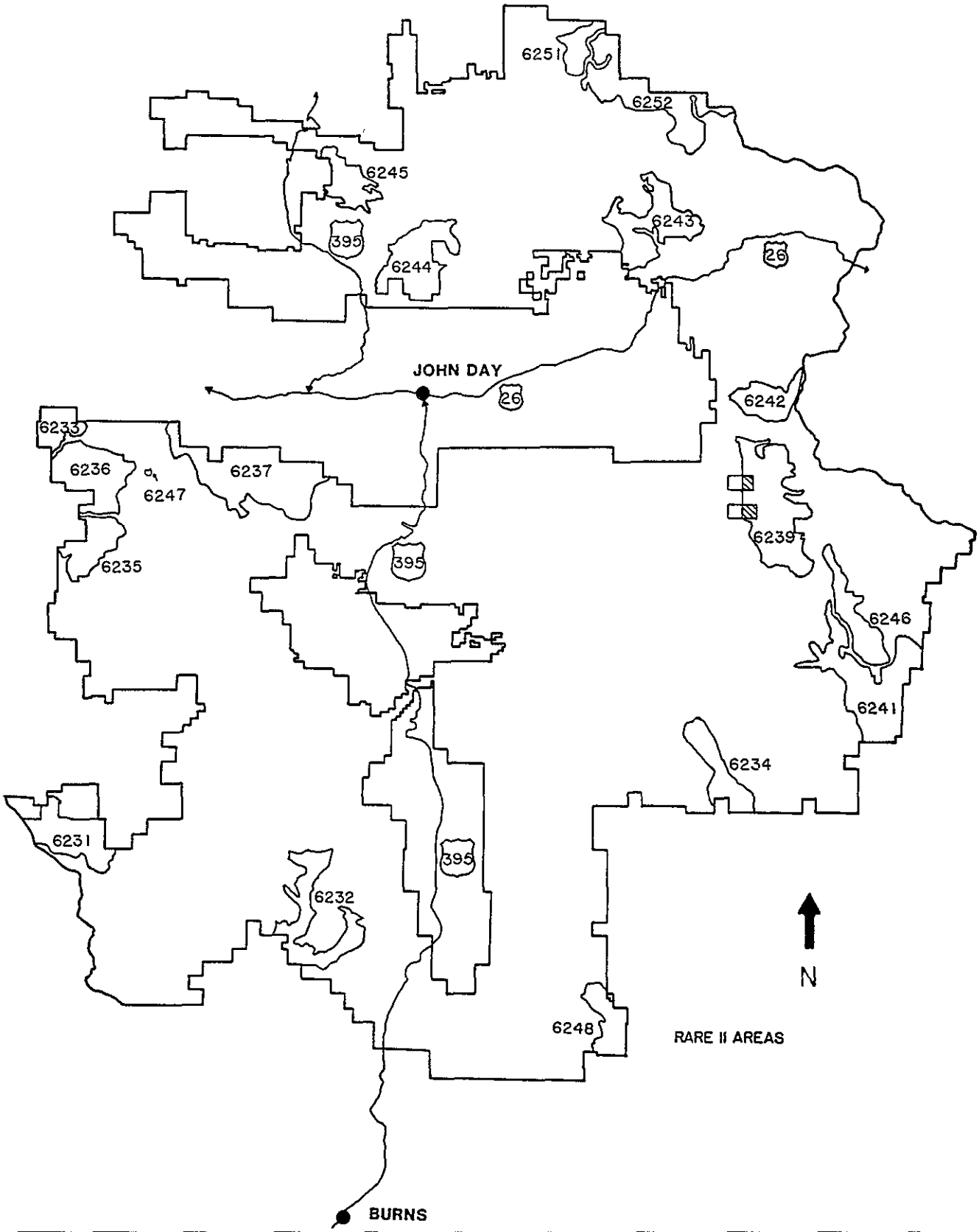
The majority of vehicle-oriented visitor use takes place in the roaded natural and roaded modified areas of the Forest These areas contain roads that have been used for timber harvest. Sightseeing is second only to hunting as a popular dispersed recreation activity. Scenic quality within areas of resource development is clearly important The landscape along many Forest roads is carefully managed to preserve that scenic quality.

In order to manage that landscape, the area which can be seen from the road is mapped The area that would be seen after management activities is also considered These mapped areas are called "corridor viewsheds"

The scenery along some roads is more important than that along other roads because of the number of drivers, the reasons people drive there, or other factors Along those roads, the corridor viewshed includes both foreground and middleground. Foreground is an area within one-quarter to one-half mile of an observer, details of a landscape can be seen. Middleground extends 3 to 5 miles from the observer

Table III-18 provides important corridor viewsheds on the Forest and the area in each one. The most sensitive corridors include both foreground and middleground acres The location of these corridors is shown in Figure III-15. A discussion about interactions between management activities and scenery follows

FIGURE III-14: Roadless Area Locations



a. *Relationship Between Forest Management and Scenery*

The obvious effect of timber management on scenery is alteration of natural- appearing landscapes These alterations may contrast with the form, line, color, and texture of the natural landscape. Road building and clearcutting have the greatest potential for creating contrast As the tree species follow natural succession from ponderosa pine to mixed conifer, impacts on the visual resource will become more evident because clearcuts are the most prominent treatment for regenerating these stands.

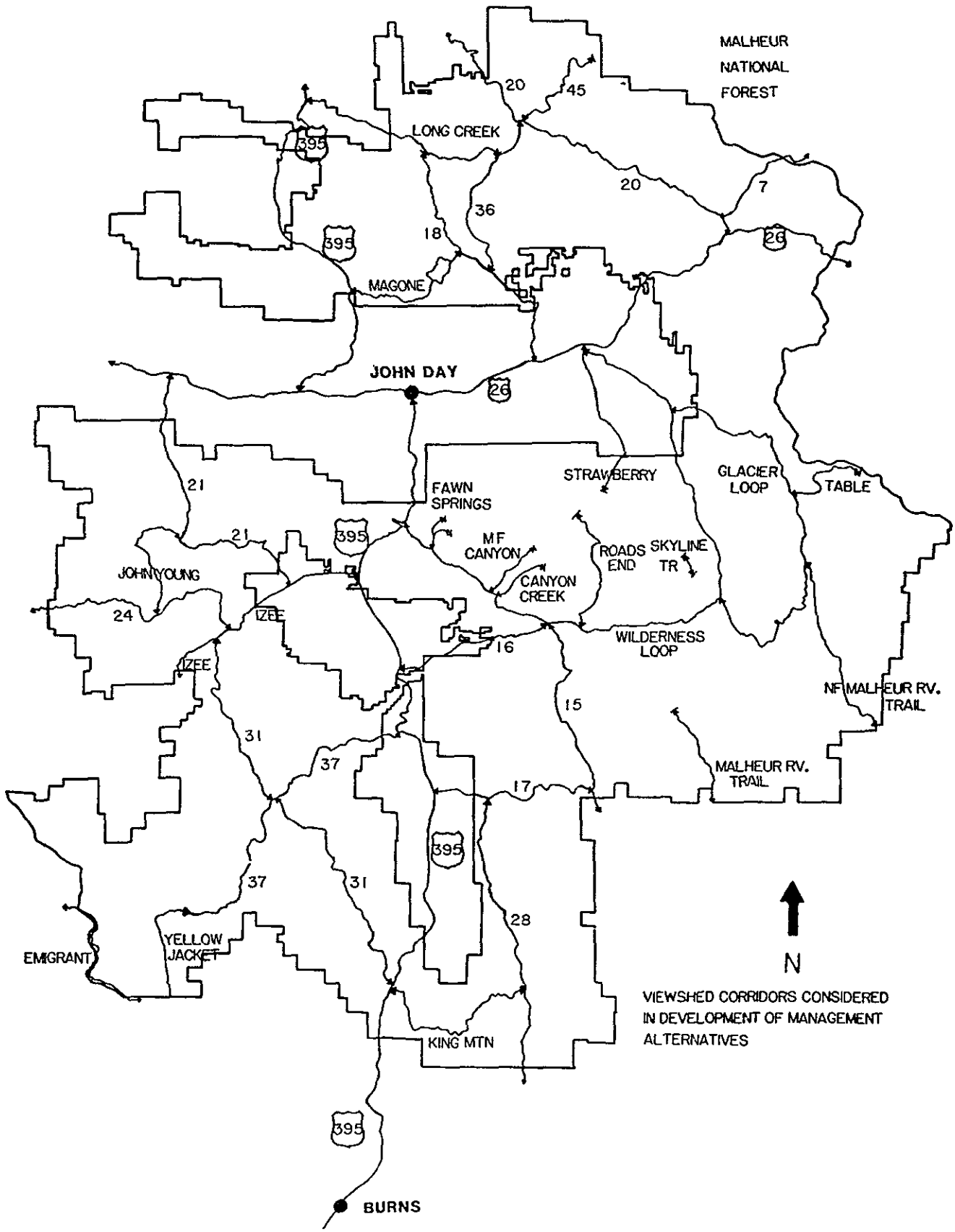
Through careful use of visual management principles and techniques, timber management activities can improve visual diversity of vegetation and increase viewing opportunities They can also preserve the visual character of an area, particularly in ponderosa pine stands, because careful management can maintain large, yellow-barked tree characteristics. Without timber management or prescribed fire, those stands would continue through natural succession and eventually be replaced by young trees, primarily fir.

TABLE III-18: Corridor Viewshed Acres (acres)

Viewshed Corridors	Foreground	Middleground	Total
Highway 395	8,514	29,734	38,248
Highway 26	8,461	19,646	28,107
Highway 7	1,426	9,973	11,399
County Road 20	8,303	19,203	27,506
Wilderness Loop	21,560	41,131	62,691
Canyon Creek	684	2,866	3,550
Malheur River Trail	1,343	284	1,627
North Fork Malheur River	3,038	5,565	8,603
Fawn Springs	455	0	455
Strawberry	366	0	366
Emigrant	4,142	0	4,142
FS Road 37	9,166	0	9,166
FS Road 31	12,124	0	12,124
FS Road 24	9,994	0	9,994
Yellowjacket	4,675	0	4,675
John Young	2,778	0	2,778
FS Road 21	8,746	0	8,746
Izee	7,190	0	7,190
King Mountain	4,451	0	4,451
FS Road 28	8,110	0	8,110
FS Road 17	3,680	0	3,680
FS Road 15	5,490	0	5,490
FS Road 16	1,950	0	1,950
Glacier Loop	12,470	0	12,470
Table	1,122	0	1,122
Skyline Trail	958	0	958
Roads End	3,475	0	3,475
Middle Fork Canyon	1,587	0	1,587
FS Road 45	5,771	0	5,771
FS Road 36	3,035	0	3,035
Long Creek	3,787	0	3,787
FS Road 18	4,724	0	4,724
Magone	4,173	0	4,173

NOTE FS Road means Forest Service Road.

FIGURE III-15: Viewshed Corridors



The presence of cattle adds visual variety to the forest landscape. Livestock use of streamside zones usually creates some visual degradation of the landscape. Structural improvements such as fences and cattle guards are alterations of a natural-appearing landscape. Most structures can be made compatible through the application of visual design principles.

Wildlife sightings add to viewing pleasure. Habitat management of big-game winter range may affect visual quality as openings are created

The sight and sound of water adds diversity to Forest scenery. Riparian areas can provide scenery that is pleasing to viewers and enhances recreational qualities of the Forest.

Management of fish habitat generally produces visually-appealing scenery, but intensive instream habitat improvements, particularly log weirs, can result in unnatural-looking streams.

Recreation management is designed to enhance and complement the recreation experience of Forest visitors, including appreciation of scenic quality Historic cultural resource properties add some visual interest to Forest settings, but these effects are minimal

Mineral resources have no interaction with visual resources until exploration or development activity occurs. Visual quality changes may occur as a result of road construction for drilling, mining, mineral extraction, processing and transporting, milling, waste disposal, and other activities These changes might include clearings which enhance the visual diversity of an area, or they might involve intrusions on the naturalness of the landscape. Visual management objectives may be included as mitigation measures and reclamation stipulations in mineral operating plans

Fire is instrumental for creating visual diversity in timber and range ecosystems on the Forest Differences in tree stand ages, subtle differences in color and line, and patches of stately, silver-colored snags are all evidence of previous fire activity. Large fires have created extensive areas of young trees and snags

High-intensity fire can damage vegetation and decrease visual quality This is usually characterized by black, denuded slopes and stark, black caricatures of a former green forest. This catastrophic-appearing vista will, within 2 to 10 years, soften to create the diversity noted above. This scenario will have varying degrees of impact depending on its proximity to viewpoints Viewed from a distance of 5 to 10 miles, impacts will be much less than when viewed from the immediate foreground.

Various applications of prescribed fire in visually sensitive areas will result in some scorching of lower limbs of trees and a landscape with blackened ground This is particularly true in underburning, but effects are of short duration Depending on the visual quality objective for an area, continued intermittent underburning can result in a long-term lack of visual diversity by developing unbroken vegetative stands Underburning can promote vegetative and visual diversity by perpetuating open stands of mature ponderosa pine

Many Forest roads provide views of scenic forest settings. Scenic viewsheds are established along popular travel routes to maintain visual quality Road systems built for timber harvest will have an effect on the existing natural conditions of some landscapes. Steep slopes, contrasting soil color, and reduced vegetation screening make it difficult to construct roads which are not highly visible

Visible roads in clearcuts and midslope areas have the greatest effect on scenery. Locating roads along ridgetops and in valley bottoms tends to retain scenic quality better than midslope locations Valley bottom roads typically have been located adjacent to riparian zones. Visual impacts of these roads can be minimized by careful road location, narrow

width, and minimal vegetative clearing Roads in visually-sensitive areas usually cost more to construct because of a need to reduce visual contrast of the cut and fill slopes.

Future construction of local roads for timber management can reduce visual quality. These roads may also improve viewing pleasure by creating scenic overlooks and additional sightseeing opportunities on a particular road

9. Cultural Resources

There are extensive, fragile and nonrenewable cultural resources on the Forest, and on private and other public lands which are managed through cooperative programs (e g , Range Evaluation project) These include prehistoric sites estimated to date from at least 8-10,000 B C to historic times, and more recent historic sites

The Cultural Resource Management (CRM) program complies with provisions of the National Historic Preservation Act (NHPA) of 1966 (P L 89-665), Executive Order 11593· Protection and Enhancement of the Cultural Environment, 1971, and the Archaeological Resources Protection Act (ARPA) of 1979 (P L 96-95)

The Forest Service Manual (FSM 2361 and 2363) is the primary guide for conducting the cultural resource management program Used in conjunction with the Manual are the Code of Federal Regulations (Parts 36 and 60) and guides provided by the Advisory Council on Historic Preservation (ACHP) Various Programmatic Memoranda of Agreement (PMOA) documents are also utilized

Cultural resources on the Forest occur in one of three relative chronological eras prehistoric, protohistoric, and historic The first represents American Indian activity up to the time of European contact and influence The second represents unrecorded American Indian activity after the influence of European contact The third, historical cultural resources, is the remains of European and American exploration and settlement
The cultural resources found on the Forest include, but are not limited to, prehistoric quarries, workshops, campsites, caves, historic cabins, mines, railroad grades, and homesteads; and historic Forest Service structures such as lookouts, guard stations, and Civilian Conservation Corps campgrounds

Inventory of cultural resources began in 1974. An overview of historical and archaeological resources of the Forests in northeast Oregon was completed in 1978 While early surveys often did not meet the National Historic Preservation Act standards, all surveys since 1981 have complied with those standards Currently, cultural resource surveys are concentrated in areas with planned projects, such as timber sales, land exchanges, and range developments Through the 1988 field season, 785,000 acres (54 percent of the Forest) had been surveyed

The location of known and potential sites is confidential to protect them from vandalism As of 1988, the Forest had inventoried 571 historic and 1,395 prehistoric sites for a total of 2,242 sites There is potential for scientific recovery and study of the past 10,000 - 12,000 years of human existence in this region of Oregon.

As cultural resources are identified and recorded during a cultural resource survey, they receive a preliminary evaluation of significance. This preliminary evaluation follows criteria contained in FSM 2361 and 2363, 36 CFR 60 6 and 800, and various Programmatic Memorandums Of Agreement (PMOA) between the USDA Forest Service (Pacific Northwest Region), Oregon State Historic Preservation Officer, and the Advisory Council on Historic Preservation. Only the Forest Archaeologist or other qualified cultural resource management specialists conduct evaluations, and usually an evaluation is completed during the initial recording of a site

Cultural resources are evaluated to determine if they qualify for nomination to the National Register of Historic Places (NRHP) This evaluation does nothing but determine

significance. Qualifying properties are "significant" and are *Class I*. Properties requiring further evaluation to determine significance are *Class II*, but the policy is to try to avoid this classification. Class I and Class II properties are provided management consideration. *Class III* properties are not significant and are not considered any further.

Five thematic nominations for the National Register of Historic Places are being processed or have been completed for the Forest. They are

a Depression-era administrative sites in John Day, Oregon.

b. Sumpter Valley Railroad between Baker City and Prairie City, Oregon.

c. Main spur of Oregon and Northwestern Logging Railroad down the Middle Fork John Day River below Bates, Oregon.

d Hines Lumber Company Railroad from Crane to Burns, and up to Seneca, Oregon, with logging spurs trending eastward and westward into the Forest.

e Depression-era administrative sites at the Bear Valley Work Center, Bear Valley Ranger District.

As the surveys near completion, other significant properties will be prepared for nomination. Many sites of a similar kind and era will be prepared for a single archaeological district nomination. Plans for thematic group nominations will also be developed Both district and thematic nominations are cost-effective

a. *Relationship Between Forest Management and Cultural Resources*

Two types of cultural resources that could be affected by management activity are:

Prehistoric: Heavy concentrations of lithic sites, including quarries, quarry workshops, seasonal camps, resources procurement, hunting stations and such

Other sites may include, but are not limited to, cambium-peeled trees, earthen alignments, fire hearths, house pits/villages, kill/butcher sites, middens, ovens, rock art, rock shelters, and rock structures like cairns, hunting blinds, alignments, etc

Historic· Includes, but is not limited to, linear features like placer ditches, railroad grades, trails, wagon roads, and stock driveways; buildings and structures, including log cabins and depression-era administrative sites; dendroglyphs, livestock management sites like log troughs and salt licks, and mines

Potential effects of range management on cultural resources come from construction of improvements like fences, corrals, and stock tanks, from vegetation treatments; and from concentrations of livestock in the vicinity of a cultural site. The impacts from range improvements are limited, can be defined very clearly on the ground, and are easily avoided with advance planning. Site trampling by cattle tends to be more generalized and can result in displacement of cultural materials, as well as flaking, nicking, and breakage of any stone flakes or tools on the surface. Ground compaction causes subsurface breakage of artifacts and can also change the levels at which they lie, thereby altering their relationship.

Grazing has taken place on the Forest since the turn of the century The impacts of current use are difficult to assess Range developments and livestock use predate surveys for cultural sites Subsequent reconnaissance surveys along ridgetop driveways and at developed springs have identified a number of prehistoric sites It is likely that the surface components that may once have existed in some of these areas have long since been trampled beneath the surface

Today there are few obvious conflicts between cultural resources and range management As there is a high correlation between natural springs and cultural sites (especially on the southern two-thirds of the Forest), the greatest potential for site impacts would be from concentrated livestock use or spring developments at those localities

Because timber management activities often disturb the ground, they have the potential to damage or destroy cultural resources. These effects have been minimized through systematic inventory and evaluation of cultural resources prior to harvest These efforts have accelerated the identification of cultural resources on the Forest Some undiscovered sites will probably be damaged

A significant increase in water flow or streamcourse changes may affect cultural resources by either washing them away, exposing them, or burying them Since a large number of the Forest's archaeological sites occur in association with water (Steggell 1985), streamside stability improvements will likely improve long-term preservation of cultural resources There are no significant interactions between cultural resources and fish

Frequently, the qualities that result in selection of an area as a campsite or a picnic spot today are the same ones which were valued by people in prehistoric or early historic times This may damage cultural resources on the site.

Public use of developed sites and increasing use of dispersed areas may result in compaction and displacement of artifact-bearing sediments This may indirectly contribute to loss of cultural resources because of higher potential for vandalism and relic collecting. Recreational artifact collection creates a permanent loss of historic and prehistoric data by removing artifacts from the context of the sites in which they are found. On the other hand, recreation may also provide an opportunity for education and protection through interpretive programs

The majority of trails on the Forest coincide with prehistoric and early historic travelways Effects of past foot-trail construction and use have been minimal

Much of the Forest's road system has developed along routes originally used as prehistoric travelways, prospectors' trails, and/or sheep driveways Therefore, roads have considerable potential for impacting cultural resources The amount of impact is determined largely by the location of the road and standards to which it was built. Significant impacts appear to be in valley bottoms along rivers, major creeks and their tributaries, and along ridgelines, saddles, and divides

Conflicts between cultural resources and road construction are sometimes encountered in management of historic linear features. Because these features may extend for miles, it is nearly impossible to avoid bisecting them at some point with a road crossing (The Sumpter Valley Railroad is a particularly good example) Many railroad grades have already been converted to roads

Roads have also increased motor vehicle access to cultural sites previously accessible only by foot or pack animals Thus, roads may have contributed to an increase in vandalism, especially at historic sites Since data are lacking about the condition of sites prior to road construction, the increase in vandalism cannot be verified

Road construction has promoted cultural resources by providing access to remote areas of the Forest, thus facilitating cultural resource inventory These same routes could benefit the public by improving access to sites selected for future interpretation.

Cultural resources occurring most frequently within Wilderness are cabins and high-elevation, prehistoric sites These properties are subject to the same inventory, evaluation, and consultation requirements as properties outside Wilderness To protect the "untrammeled" character of a Wilderness environment, above-ground, historic structures

are eventually removed or allowed to deteriorate naturally. This is done after creating a written and pictorial record in compliance with Section 106 of the Historic Preservation Act of 1966. There is no maintenance, rehabilitation, or on-site interpretation. Prehistoric sites may be stabilized through use of nonmechanized (hand) methods Any research studies must be consistent with the concept of Wilderness.

Mineral management effects would occur during exploration, development, and extraction of minerals, when surface-disturbing activities take place. These activities may identify previously unknown cultural properties at some sites, while damaging or destroying historic values at others The degree of interaction varies by commodity being explored, developed, or mined The type of mining operation, degree of environmental alteration required, and location of the development are also key factors.

Research on fire effects for cultural resources is incomplete and, on this Forest, completely lacking. However, impacts appear to be determined by the nature (controlled versus wildfire) and intensity of the fire, type of cultural resources within the area affected, and magnitude and location of fire suppression efforts

Fire will consume wooden structures unless they are protected through fire suppression activities Fire's affect on nonperishable artifacts and below-ground features is less severe. However, temperatures above 590° Fahrenheit can cause stone artifacts to spall, break, or crack (Pilles 1982). Fire can also contaminate dating properties at the site Fire may scorch or burn away rock art features Combustion temperatures may also affect faunal and shellfish remains, soil constituents, and site factors that are important in archaeological research. Fire and subsequent erosion may expose artifacts to undesirable weathering processes and to vandalism (Pilles 1982; Kelly and Mayberry 1979)

Suppression activities associated with fire are also of concern. Construction of firebreaks, heliports, and fire camps may shatter, bury, or displace artifacts, and completely destroy small sites (Eisler et al. 1979; Kelly and Mayberry 1979) In addition, past fire suppression practices have led to heavy fuel loadings and an increased threat of intense fires.

Fire can benefit cultural resources by removing ground cover, thereby exposing the surface and helping to detect sites in heavily-vegetated areas Controlled burns can reduce wildfire potential and lessen the risk of damaging archaeological sites during suppression activities Elimination of ground cover makes sites more vulnerable to artifact collectors because of improved visibility.

10 Wilderness

There are two designated wilderness areas managed by the Malheur National Forest: Strawberry Mountain and Monument Rock.

Wilderness offers unique opportunities for physical challenge and solitude in natural settings where evidence of human activities is minimal In addition to special recreation experiences, wilderness provides diverse plant and wildlife habitats as well as summer forage for livestock.

Wilderness often contains important watersheds, collecting and channeling large quantities of water. The Strawberry Mountain Wilderness contains headwaters of major tributaries to the Malheur, John Day, and Silvies Rivers. Monument Rock Wilderness contains headwaters of the Little Malheur River and upper drainages of the South Fork Burnt River

In April 1942, the Strawberry Mountain wild area was established on the Malheur National Forest The name was changed to "Strawberry Mountain Wilderness" upon enactment of the 1964 Wilderness Act (P.L. 88-577), when it became part of a new National Wilderness Preservation System at 33,650 gross acres and 33,000 net acres. The 1984

Oregon Wilderness Act added 35,700 acres to the Strawberry Mountain Wilderness for a total of 68,700 net acres, all in Grant County, Oregon

Soon after passage of the Wilderness Act in 1964, it became apparent that there were other National Forest areas that should be considered for inclusion in the National Wilderness Preservation System (NWPS). As a result, a Roadless Area Review and Evaluation (RARE) program was initiated to identify those roadless and undeveloped areas that were good candidates for addition to the Wilderness System

In October 1973, Monument Rock was first identified, along with 273 other wilderness study areas, as having wilderness potential. Monument Rock Roadless Area was evaluated in the Silvies-Malheur Land Management Plan, Final Environmental Impact Statement (FEIS) in November 1978. It was also evaluated in the Roadless Area Review and Evaluation II (RARE II), initiated by H R. 3454, to evaluate the roadless area situation and to determine which areas should be given further consideration for wilderness in the land management planning process

The 1984 Oregon Wilderness Act established a Monument Rock Wilderness encompassing 19,650 acres in the Malheur and Wallowa-Whitman National Forests Of those acres, 12,620 acres are located in the Malheur National Forest and 7,030 acres in the Wallowa-Whitman National Forest Most of the Wilderness, about 18,850 acres, lies within Baker County and about 800 acres occurs in Grant County

Following the guidelines established to inventory the recreation opportunity in a Wilderness, Strawberry Mountain and Monument Rock Wildernesses have each been inventoried as providing semiprimitive wilderness settings This does not preclude the option of managing these Wildernesses as primitive pristine

The management objectives for wilderness-primitive classification recognize that wilderness offers opportunities for solitude and a primitive, unconfined, recreation experience. In other areas, which are classified as wilderness- semiprimitive, the user can expect conditions of relatively concentrated use, where encounters with other groups are as frequent as 12 encounters per day during 80 percent of the summer season and user controls may be highly evident Overall, these two Wildernesses provide opportunities to pursue outdoor recreation in a variety of wilderness settings

Wilderness is managed to maintain or enhance appropriate diversity and existing character, as stated in a nondegradation policy (FSM 2320.2). Another objective is to ensure that areas experiencing relatively concentrated use are not reduced below their limits of acceptable change simply to accommodate more use

The limits of acceptable change for a wilderness are defined in terms of the maximum biological and social change that can occur without violating the nondegradation policy These limits, including the monitoring and management objectives, will be identified in Forest Plan standards and guidelines

a *Strawberry Mountain Wilderness*

This scenic mountain wilderness contains rocky, barren slopes, subalpine fir, and alpine meadows At lower elevations, the area is 92 percent forested North- facing slopes have a vegetation mosaic of mixed-conifer, lodgepole pine, and subalpine fir stands south-facing areas are generally mixed-conifer or ponderosa pine types Forested areas on the north side of the mountain range are primarily white fir, Douglas-fir, western larch, and lodgepole pine, with a ground cover of dwarf huckleberry, bearberry, and elk sedge. Some areas contain needlegrass and bottlebrush squirreltail Phlox, sandwort, and senecio are common forbs.

The drier, nonforested sites have juniper, sagebrush, mountain-mahogany, and ponderosa pine Ground covers on these sites include pinegrass, elk sedge, and lupine on north

slopes, and elk sedge, pinegrass, Idaho fescue, and bluebunch wheatgrass on southerly aspects.

Mixed-conifer stands are prone to insect and disease pests Indian paint fungus is present and can probably be found in all size classes of true fir. Much of the Douglas-fir is infected with dwarf-mistletoe, especially when growing on rocky, dry soils . Mistletoe patches of varying size can be found, but it is not a major problem. These pests play a natural role in the ecosystem by thinning stands of old, damaged, or stressed trees.

The terrain is primarily steep, broken slopes that are highly dissected with stream courses on the north, east, and west sides, and relatively flat slopes on the south side. Altitude varies from 4,000 feet to over 9,000 feet

Soils are generally volcanic in origin with ash layers on north-facing areas Some soils are derived from shales and graywackes along the south side. There are no commercial mineral deposits known to exist within the Wilderness boundaries. Some chromite ores, a little gold, and possibly some other metals exist, but not in great quantities Chrome ore was produced in several mines along the north boundary of the 1984 Wilderness addition area during the 1940's and 1950's.

The wildlife resource within the Wilderness consists of an interesting variety of large and small mammals Large animals found in the Wilderness include deer, elk, bear, cougar, and California bighorn sheep

There are over 100 species of bird life that use the Wilderness as their home Ruffed grouse and blue grouse are classed as game birds and most of the others are protected as migratory birds.

There are also several fur-bearing animals found in the Wilderness, though quite small in numbers. Those found in the area include mink, beaver, and marten

The bulk of recreation use occurs in the lakes basin area. The attraction for many visitors is fishing, picnicking, camping, or a short hike, which do not require a wilderness or pristine setting. This setting is perceived by such users as an added amenity. There are few other fishing lakes on the Forest or in the surrounding area. This factor, combined with the fish-stocking program of the Oregon Department of Fish and Wildlife, attracts visitors expecting superior fishing opportunities and water-based recreation The lakes basin area is at or near its maximum carrying capacity.

Most recreational use occurs during the summer months, with July being the heaviest use month During October and November, the Wilderness receives use by deer and elk hunters. During winter and spring, the area receives day-use with the methods of travel being skiing and snowshoeing.

The remaining use occurs in areas which are intermediate between readily accessible and difficult. These areas are used primarily by people seeking secluded and challenging wilderness experiences. It is here that the wilderness visitor comes to hunt big game, observe and photograph wildlife, observe and photograph scenery, explore and climb difficult terrain, and generally seek seclusion

Areas of difficult access are few. The area's shape and location limit its seclusion and extent of scenic vistas A view of the populated valley is present from most Wilderness terrain. Still, most of the Wilderness provides a relatively complete wilderness experience within two hours distance from road access.

Currently, wilderness users are asked to register when they enter. Registration is voluntary with registration boxes located at all major entry points.

Portions of three commercial livestock-grazing allotments occur within the 1984 Strawberry Mountain Wilderness addition. These cattle and horse allotments are Indian Creek, Sugarloaf, and Fawn Springs. Livestock numbers permitted to graze are normally Indian Creek - 75 head, Sugarloaf - 364 head, and Fawn Springs - 97 head A portion of Rail Creek Allotment is also located within the 1984 Strawberry Mountain Wilderness addition and the original Wilderness boundary. A total of 150 head of livestock are permitted on Rail Creek Season of use varies from June to November Current use for allotment portions inside the Wilderness is considered light; that is, below 35 percent of annual forage production

Some areas of the Wilderness have suffered adverse effects from grazing by sheep and cattle. Rehabilitation seeding introduced nonnative grass species into the 1984 Wilderness addition prior to 1984

Fences are visible and are maintained regularly for livestock control. Some portions of the allotment boundaries are unfenced and a few cattle occasionally drift further into the Wilderness Range allotment management plans show a need for additional fences and water developments, but none are proposed at this time

Four recreation allotments, Roberts Creek, High Lake, Strawberry Mountain, and Canyon Mountain, have been established to manage recreational livestock use and packer-guide permits. Presently, horseback activity is minor compared to hiking and walking Most overnight horse use occurs outside the Wilderness Horse use varies from a single pack animal to large groups with more than 25 horses Outfitter/guides have historically operated in the Wilderness, but presently there is only one operating under a special-use permit.

The Wilderness Act states (Section 4d(4)(2)) that grazing, if established prior to designation of the area as Wilderness, "shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture." Any adjustments in the number of livestock allowed in the Wilderness area will be made via the Forest Service's normal grazing, land management planning, and policy-setting process Due consideration is given to legal mandates, range condition, and the need to prevent range deterioration Permit increases can be granted, but are limited to, levels that do not diminish wilderness values

Facilities used in livestock operations, such as fences and stock tanks, may be maintained and replaced New livestock grazing facilities may be constructed if they are needed to protect the rangeland and/or wilderness resource rather than to accommodate increased livestock numbers

Motorized and mechanical equipment may be allowed in some situations involving livestock grazing operations in the 1984 Wilderness addition

North slopes of the Strawberry Mountains contain a geologic environment favorable for chromite deposits These deposits tend to be small and erratic. About 15,000 long tons of chromite ore were mined from this area during times of national shortage and chrome price supports Nickel and platinum group metals occur as trace elements within the host rock of the chromite deposits. Some copper mineralization has been found within the Wilderness, but deposits are small and of low grade All known gold production has come from areas outside the Wilderness.

Numerous mining claims have been held in the past in what is now Wilderness, but only 11 claims were still being maintained as of April 1988. Five of these are being held for chrome on the north slope of the Strawberry Mountains Six are placer claims, presumably held for gold on the south slope in the East Fork Canyon Creek drainage. No gold was found in this drainage during a U.S Geological Survey study of the area (Thayer et al 1981)

There are seven lakes in the Wilderness covering an estimated 54 acres. The water quality in the lakes is high but they are relatively shallow Fish are found in six of the seven small lakes within the Wilderness There is a small amount of stream fishing available. Lake fishing is the third most important activity for those visiting the Wilderness. The fish population in the lakes consists of rainbow and brook trout Present management knowledge indicates that these are the most suitable species.

The most popular fishing lake is Strawberry Lake. It is the largest lake (31 acres) and produces the largest fish It is stocked every 4 years with brook trout to relieve pressure on a naturally-reproducing rainbow trout population. This program continues under the direction of the Oregon Department of Fish and Wildlife Regular stocking is contributing to concentrated use around the shoreline. High Lake is also popular since it is close to a road, but the lake (5 acres) and the fish are small The two Slide Lakes are the most inaccessible lakes in the Wilderness The scenery and surroundings are among the finest in the entire Wilderness. Slide Lake is 13 acres and Little Slide Lake is 3 acres.

Little Strawberry Lake has an attractive setting and fishing is good There are many small-sized fish but use is lightest at this lake Little Strawberry is only 4 acres in size and is a 2-hour hike from a road end.

As in most alpine lakes, the fishing resource is quite attractive even though the success may be greater in more prosaic surroundings Fishing success depends on the angler and the time of year

There are two small mud lakes in the headwaters of Big Creek. These two small ponds are very shallow and do not furnish any desirable fishing. The entire area, water and meadow areas combined, is only 2.5 acres for Little Mud Lake and 4.5 acres for Big Mud Lake. The water area is only about one-third of the total meadow and open area

Most streams in the Wilderness are small headwater streams with a steep gradient. Many do support fish life, including Berry Creek, Middle and East Fork Canyon Creek, Strawberry Creek, Onion Creek, and the forks of Big Creek Redd Creek, which feeds Strawberry Lake, is a spawning creek for rainbow trout in Strawberry Lake. The falls on Meadow Fork Big Creek block fish passage.

Strawberry Lake is within an hour's walking time for most people from the end of the access road at Strawberry Campground High Lake is also within an hour from Indian Springs Road The trails to either lake are easily negotiated by most people The attractive lakes and their fishing have been used as promotional information by local groups, including the Grant County Chamber of Commerce

In the southwest part of the Wilderness is Canyon Creek Archery Area, established in 1940 as a mule deer and elk archery area with any sex animal being legal game. The balance of the Wilderness is used for rifle and bow hunting for deer and elk. The Canyon Creek Research Natural Area is also in the southwest part of the 1984 Wilderness addition

The Wilderness contains 649.72 acres of private land within the proclaimed boundaries These private lands are in the eastern part of the Wilderness and are little used by Wilderness visitors They are high in elevation, contain little commercial timber, and are inaccessible by road

There are about 100 miles of trail within, and immediately adjacent to, the Wilderness In the heart of the Wilderness, many trails are located within 2 miles or less of another trail

There are 15 entry points into the Wilderness, but only 3 could be classed as receiving heavy or moderate use trailheads serving Strawberry Lake, High Lake, and Strawberry

Mountain. These three trails are adequately served by roads The variety of different accesses is adequate, but road conditions are inadequate The roads have narrow spots and inadequate turnouts, lack sufficient drainage, and need surfacing Parking for vehicles with trailers and holding facilities for horses at trailheads are also insufficient

Trail additions are being considered for the Wilderness Objectives for these additions would be to disperse impacts from heavily-used areas and provide loop trails which would connect some existing trails with others

Forested areas are considered to have average fire hazard for the Malheur National Forest, grassy areas have an extreme rating for wildfire spread In the past, fires were predominantly lightning caused and acreage burned has been small due to topography and fuel types. Consequently, fire has not played a significant role in the Wilderness ecosystem This is also verified by lack of evidence, such as fire scars on trees and charred stumps or logs, which would substantiate fire history for earlier years

Because the Wilderness is long and narrow, different standards of fire management are difficult to establish Fire management in the Wilderness has operated under a policy to suppress all fires, based on the risk, cost, and fuel conditions involved in fire control

The Clean Air Act, as amended on August 7, 1977, established that air over the Strawberry Mountain Wilderness is to be managed as a mandatory Class 1 airshed, which allows for little deterioration of air quality and maintenance of pristine air quality. The Clean Air Act imposes special restrictions to assure that no major new facility will have an adverse impact on the area's air quality

Smoke impacts on the Wilderness, as a result of prescribed burning outside its boundaries, could be significant Conditions will be monitored to protect air quality over the Wilderness

Table III-19 provides 1985 recreation use for the Strawberry Mountain Wilderness

Most of the use shown in Table III-19, about 80 percent, is concentrated in the lakes basin area Recreational demand in the lakes basin is approaching the limits of acceptable change for semiprimitive wilderness recreation, although additional capacity exists elsewhere in the Wilderness If demand for wilderness recreation increases, the additional use should be dispersed to other areas

Demand for wilderness recreation is expected to increase by 80 percent between now and the year 2030 Capacity for the Strawberry Wilderness has been established at 36,400 recreation-visitor-days Existing use averages 13,600 recreation- visitor-days for Strawberry Mountain Wilderness (37 percent of capacity)

b *Monument Rock Wilderness*

This area's main feature is gentle, south- and west-facing slopes running from Flat, Huckleberry, and Hunter Creeks to the ridgetops that form the Monument Rock Wilderness boundary. Elevations range from 5,200 feet to over 7,800 feet.

The area is located on the east side of headwaters of the North Fork Malheur River and includes several tributaries to this system The north and south portions of the area include the Little Malheur River drainage and tributaries

Monument Rock Wilderness is subject to the sounds and sights of nonwilderness due to its small size and topography. Also, a road corridor about 3 miles long to Table Rock Lookout accesses the central and highest point of the Wilderness

TABLE III-19: Strawberry Mountain Wilderness Recreation Use (1985 data)

Activity	RVDs	Percent of Use
Camping	3,247	22
Swimming	300	2
Sightseeing	8	0
Fishing	2,294	15
Boating	230	2
Hiking	5,501	37
Hunting	2,001	14
Horseback Riding	742	5
Cross-Country Skiing	216	1
Other	251	2
TOTAL	14,790	100

Timber harvest has occurred on all sides of the Wilderness and other timber sales are planned near its boundary Timber sale activity has created a less than natural view from overlooks within the Wilderness The Big Cow Burn in 1939 burned over the northwest portion of the Wilderness. In this area evidence of the burn and firelines are visible

Soils in the area are predominantly of volcanic ash composition On northerly slopes, soils are two to three feet deep. All soils with volcanic ash content have a moderate to high erosion susceptibility. Because of its cool climate and short growing season, there is little vegetative protection at high elevations At low elevations, soils have a low bulk density and high water-holding capacity This limits the water available for erosion and contributes to perennial streams in the area

The Wilderness is about 60 percent forested, ranging from ponderosa pine in lower elevations to subalpine fir along the peaks Other tree species include lodgepole pine, Douglas-fir, white fir, aspen, and juniper Understory vegetation is primarily elk sedge, pinegrass, wheatgrass, huckleberry, and bluegrass The mountain crest is generally not forested. There are no known threatened, endangered, or sensitive plant species in the Wilderness.

Indian paint fungus is present and can probably be found in all size classes of true fir Much of the Douglas-fir is infected with dwarf mistletoe, especially when growing on dry, rocky sites. Mistletoe infections vary from fairly light to quite severe. Root rots can also be found but at this point are not considered a problem These agents are a natural part of the ecosystem.

Due to large amounts of white fir and Douglas-fir, many timber stands are highly susceptible to tussock moth and western spruce budworm Western spruce budworm is present now and has caused serious damage. The western spruce budworm is part of the natural ecosystem and will continue to play a role in this wilderness

Western pine beetle is active in old-growth ponderosa pine trees of low vigor. Mountain pine beetle can be found in areas where mature lodgepole pine is present.

Fire management within the Wilderness has operated under a policy of suppressing all fires, based on the risk, cost, and fuel conditions involved in fire control

A fire lookout at Table Rock is located in the center of the Wilderness and is currently staffed from June to November. Old telephone lines which were used for communications between the Lookout and Ranger Station are visible.

No mineral claims are currently filed in the Wilderness, nor has mining occurred in the past Mineral claims are currently filed near the Wilderness boundary to the northeast, east, and southeast. When the northeast boundary was established, its location was designed to exclude mineral claims from the Wilderness. There were no valid claims within this Wilderness at the time of its enactment (1984) The Oregon Wilderness Act of 1984 (PL 98-328) prohibits new mineral development.

Most wildlife species found in Wildernesses also occur elsewhere in the Forest. A possible exception is American peregrine falcon, which may only occur in the Strawberry Mountain Wilderness.

Rainbow trout occur in the Little Malheur River and angling is considered fair to good. The trout migrate up the river from Beulah Reservoir to spawn The larger trout move downstream as the flow decreases in summer months Fish also inhabit small perennial streams arising from the mountain crest The greatest fishing pressure occurs in the Little Malheur River

Monument Rock Wilderness includes parts of three livestock grazing allotments Spring Creek and North Fork on the Malheur National Forest, and Bullrun on the Wallowa-Whitman National Forest The use season varies from June to November Permitted use totaling 1,314 livestock is allowed during a grazing cycle

Under a rest/rotation system on the Spring Creek Allotment, grazing use occurs every other year in the Wilderness On the North Fork Allotment, grazing use occurs 2 out of every 3 years. The Bullrun Allotment has some part of the Wilderness in every grazing unit and is also grazed under a rest/rotation system. Grazing use varies from moderate to heavy, i.e , 50 percent to 70 percent use.

The Wilderness Act states (Section 4d(4)(2)) that grazing established prior to designation of an area as wilderness, "shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture" Adjustments in livestock numbers are made through the Forest Service grazing, land management planning, and policy-setting process. Consideration is given to legal mandates, range condition, and the need to prevent range deterioration Permit increases can be granted but are limited to levels that do not diminish Wilderness values

Fences and water developments are visible and are maintained regularly for livestock control and use Range allotment plans show a need for additional fences and water developments and both are currently planned New improvements may be constructed or developed only if they are needed to protect rangeland or Wilderness resources, rather than to accommodate increased livestock numbers. Motorized and mechanical equipment may be allowed in some situations involving livestock-grazing operations.

Two major uses occur in the Wilderness recreational visits and cattle grazing Current recreation use is light and does not create management difficulties Cattle grazing creates management difficulties because livestock use mixes with recreation use and distribution is uneven.

There are no recreation allotments in the Wilderness and horseback activity is considered minor compared to hunting and hiking Overnight horse use occurs mostly outside the Wilderness Present horse use varies from a single animal to a small group of less than 10 horses. Two outfitter/guides, one on each National Forest, operate in the Wilderness under special-use permits.

Much of the recreation use is well-distributed, with the most use occurring at Table Rock, a major entry point A 1985 campsite inventory found 13 campsites along the mountain crest, 1 campsite along the Little Malheur River, and 4 in other frequently used areas. Campsite density is about 001 site per acre

Use of the area for nonconsumptive activities, such as backpacking and hiking, increased after Wilderness designation in 1984. Hunting continues to be the primary recreation use. Consequently, most use has not been trail-oriented with the exception of the Little Malheur River zone. Two trails, comprising 10 miles, are presently maintained in the Wilderness. Old jeep trails used mostly by hunters are visible and also provide foot access for much of the Wilderness

Trailhead facilities are nonexistent for this Wilderness There is a need to develop trailheads at each end of the Little Malheur River.

Table III-20 summarizes 1985 recreation use for the Monument Rock Wilderness

TABLE III-20: Monument Rock Wilderness Recreation Use (1985 data)

Activity	Malheur National Forest (RVDs)	Wallowa-Whitman National Forest (RVDs)	Percent of Total
Camping	271	0	12
Swimming	2	0	0
Sightseeing	4	0	0
Fishing	50	0	2
Hiking	434	50	22
Hunting	768	415	52
Horseback Riding	186	20	9
Cross-country Skiing	39	15	3
Other	6	0	0
TOTAL	1,760	500	100

Most recreation use is well-distributed in Monument Rock Wilderness, with road access to Table Rock being a major entry point. Recreation use patterns and amounts may change as this new Wilderness is discovered by recreation users.

Demand for Wilderness recreation has not approached the limits of acceptable change and additional capacity exists Demand is expected to increase by 80 percent between now and the year 2030 Capacity of the Monument Rock Wilderness has been estimated at 9,591 RVDs Existing Wilderness recreation use averages 1,800 RVDs (19 percent of capacity).

11 Minerals

Minerals, and gold in particular, have had an important influence in growth and development of the area influenced by the Forest (see Table III-21). Important gold- and silver-producing districts for the area were Susanville, Quartzburg, Middle Fork, Greenhorn, and Idol City (see Figure III-16 and Table III-22)

Locatable mineral deposits on public domain lands may be prospected for, and extracted, under the 1872 mining law, as amended and supplemented. Administration of general mining laws is a responsibility of the Bureau of Land Management (BLM). Joint administration of the mining laws on National Forest System lands is provided by a 1957 Memorandum of Understanding between the BLM and the Forest Service. Regulations covering surface use of National Forests under the mining laws were developed in 1974 to provide for orderly development of locatable mineral resources and for subsequent reclamation of the land

All lands on the National Forest are open to mining except areas specifically withdrawn from mineral entry, or areas on which rights to locatable minerals are reserved to a private party. The Wilderness Act of 1964 allowed prospecting for locatable minerals and location of mining claims until December 31, 1983 The passage of that date has withdrawn the Strawberry Mountain Wilderness Area from mineral entry. The Oregon Wilderness Act of 1984 withdrew additional acreage as additions to the Strawberry Mountain Wilderness, and for the new Monument Rock Wilderness. Mining claims which predated these withdrawals and which contain valid discovery of a valuable mineral, may continue to be worked under the mining laws subject to constraints of the surface management of wilderness Table III-23 shows the acres withdrawn from principal mineralized areas on the Forest

A potential for locatable minerals exists almost anywhere on the Forest But some areas have more likelihood of mineral occurrence than others Areas on the Forest have been classified according to their mineral potential, with classes ranging from I-High to V-Low or unknown (see Appendix F for a description of evaluation criteria for the various categories)

Western portions of the Forest are within the Columbia Basin of Oregon and Washington It has been recognized for many years that the Basin has potential for oil and gas within or beneath the layers of lava known as Columbia River basalt. Exploration has been limited and sporadic due to hard drilling in, and difficulty of exploring beneath, the basalt Carbonaceous sediments provide a potential source of oil and gas, and porous volcanics provide suitable reservoirs Recently, numerous interests, including major oil companies, have obtained leases in the vicinity During the 1985 fiscal year, 219,828 acres were under oiland gas leases, producing $196,950 of revenue, half of which was returned to the State of Oregon

Figure III-17 shows areas considered prospectively valuable for oil and gas by the U.S. Geological Survey Leases and lease applications have been received for lands outside, as well as within, the prospectively valuable areas Many applications were later withdrawn and several leases have now terminated To date, no drilling has occurred

TABLE III-21: Total Production of Minerals from Northeastern Oregon and Malheur National Forest Vicinity

Northeastern Oregon*	Malheur National Forest Vicinity*
3,526,300 ounces gold	102,900 ounces gold
5,111,900 ounces silver	766,700 ounces silver
18,940,000 pounds copper	272,000 pounds copper
312,000 pounds lead	15,112 long tons chrome ore
41,000 pounds zinc	8 flasks mercury
20,000 long tons chrome	
390,000 short tons lime	
122 flasks mercury	

1983 Metal Prices

Gold (Au)	$399 72/oz
Silver (Ag)	11 45/oz
Copper (Cu)	0 793/lb
Chrome ore (Cr)	50.00/long ton
Mercury (Hg)	322 44/flask

*Value at 1983 prices $1,484 2 million for northeastern Oregon; $51 million for Malheur N F. vicinity

TABLE III-22: Key to Mineralized Areas on the Malheur National Forest
(Production figures are for areas within and immediately adjacent to the Forest)

Map No.	District/ Category	Past Production Estimates	Value @ 1983 Prices	Current Activity and Estimated Potential
1	Susanville II	40,000 oz. Au 646,000 oz Ag	$23,386,000	Numerous lodes; a few placerclaims Large exploration program by major company. Good potential for vein-type silver and gold production.
2	Quartzburg III	31,800 oz. Au 16,700 oz. Ag 272,000 lb Cu	$13,118,000	Many claims on Forest and adjacent BLM land Most activity around Dixie Meadows Mine. Potential for gold, silver, copper, and cobalt
3	Middle Fork IV	23,000 oz Au 3,900 oz. Ag	$ 9,238,000	Past placer production; most land in private ownership Unmined sections have potential for placer gold production.
4	Greenhorn III	4,400 oz. Au 800 oz Ag	$ 1,768,000	Many claims; Most of the area is off the Forest. Generally small targets in Forest area, no interest by large companies
5	Ben Harrison Peak III	500 oz. Au 96,000 oz. Ag	$ 1,299,000	Many claims; substantial exploration activity. Good potential for silver and gold production.
6	Idol City III	2,400 oz Au 600 oz. Ag	$ 966,000	Entire area claimed by one company exploring for epithermalgold deposits. Future activity may depend largely on results of current exploration program

TABLE III-22: (continued)
(Production figures are for areas within and immediately adjacent to the Forest)

Map No.	District/ Category	Past Production Estimates	Value @ 1983 Prices	Current Activity and Estimated Potential
7	Strawberry III	15,000 lt Cr ore	$750,000	Substantial gold production off-Forest in past Potential for chrome on-Forest limited by small deposit size and erratic occurrence.
8	South Slope IV	800 oz Au 2,700 oz Ag	$351,000	Numerous lode and placer claims currently being prospected, but no large projects. Some potential for gold, silver, and possibly copper and molybdenum
9	Flagtail Mountain IV	8 fl Hg	$2,600	Some gold prospects associated with mercury, indicating some potential for epithermal gold deposits
10	Dixie IV	Unknown	Unknown	There is evidence of past placer production and lode prospecting. Hydrothermal alteration extends from the adjacent Quartzburg area onto this area. Exploration for lode deposits, and some placer gold production, is expected to continue
11	Black Butte IV	Unknown	Unknown	A few lode and placer claims are currently held in the area, and a small seasonal production comes from the placers.
12	Unity II	None	None	This area is primarily under claim to one large company interested in gold and copper-molybdenum mineralization The Malheur Forest portion of the area is away from any historic mining activity, and it is unlikely that any substantial mining activity will occur on the Forest in the near future

FIGURE III-16: Mineralized Areas

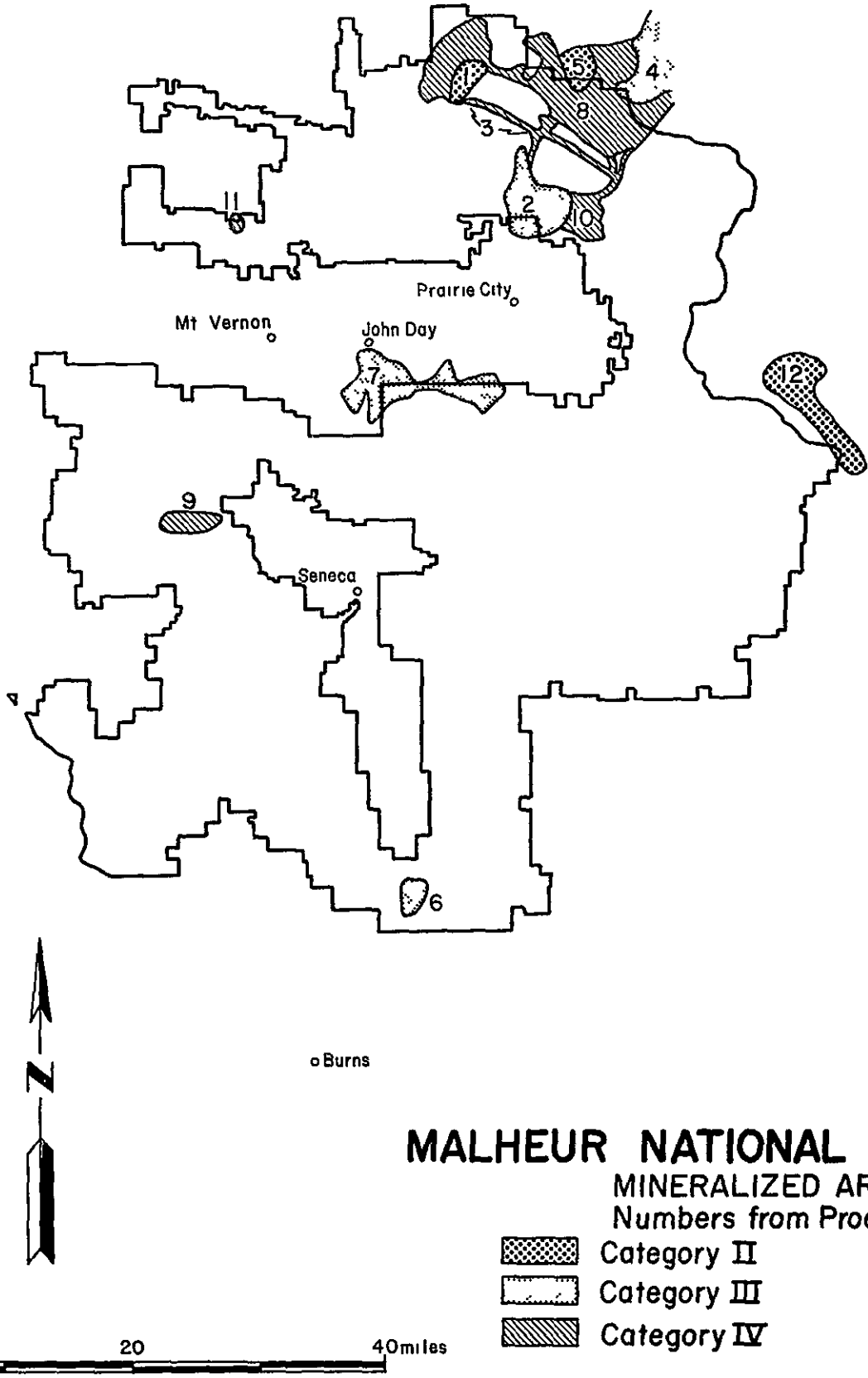


TABLE III-23: Acres Withdrawn from Mineralized Areas

Locatable Mineral Category	Map No.	Area Name	Gross Acres	Private Ownership	Net National Forest	Acres Withdrawn	Localized Minerals Reserved
II	1	Susanville	4,400	1,000	3,400	20	0
	5	Ben Harrison Peak	1,108	8	1,100	0	0
	12	Unity	200	0	200	0	0
III	2	Quartzburg	11,250	250	11,000	0	0
	4	Greenhorn	310	10	300	0	0
	6	Idol City	3,620	320	3,300	0	0
	7	Strawberry	8,100	100	8,000	5,510	0
IV	3	Middle Fork	5,300	2,400	2,900	280	54
	8	South Slope	40,948	648	40,300	60	4,677
	9	Flagtail Mountain	4,500	0	4,500	0	0
	10	Dixie	5,620	220	5,400	0	345
		TOTALS	85,356	4,956	80,400	5,870	5,076

The Forest Service has no statutory responsibility to issue leases or permits on lands reserved from the public domain The Mineral Leasing Act of 1920 reserves this authority for the Secretary of the Interior The "Federal Onshore Oil and Gas Leasing Reform Act of 1987" provides the Secretary of Agriculture with consent authority for issuance of oil and gas leases on National Forest System Lands This Act also provides that no drilling permit for an oil or gas lease may be granted without the analysis and approval of the responsible Forest Service official. On acquired National Forest System lands, the "Mineral Leasing Act for Acquired Lands " of 1947 requires consent by the Secretary of Agriculture prior to leasing of the mineral estate

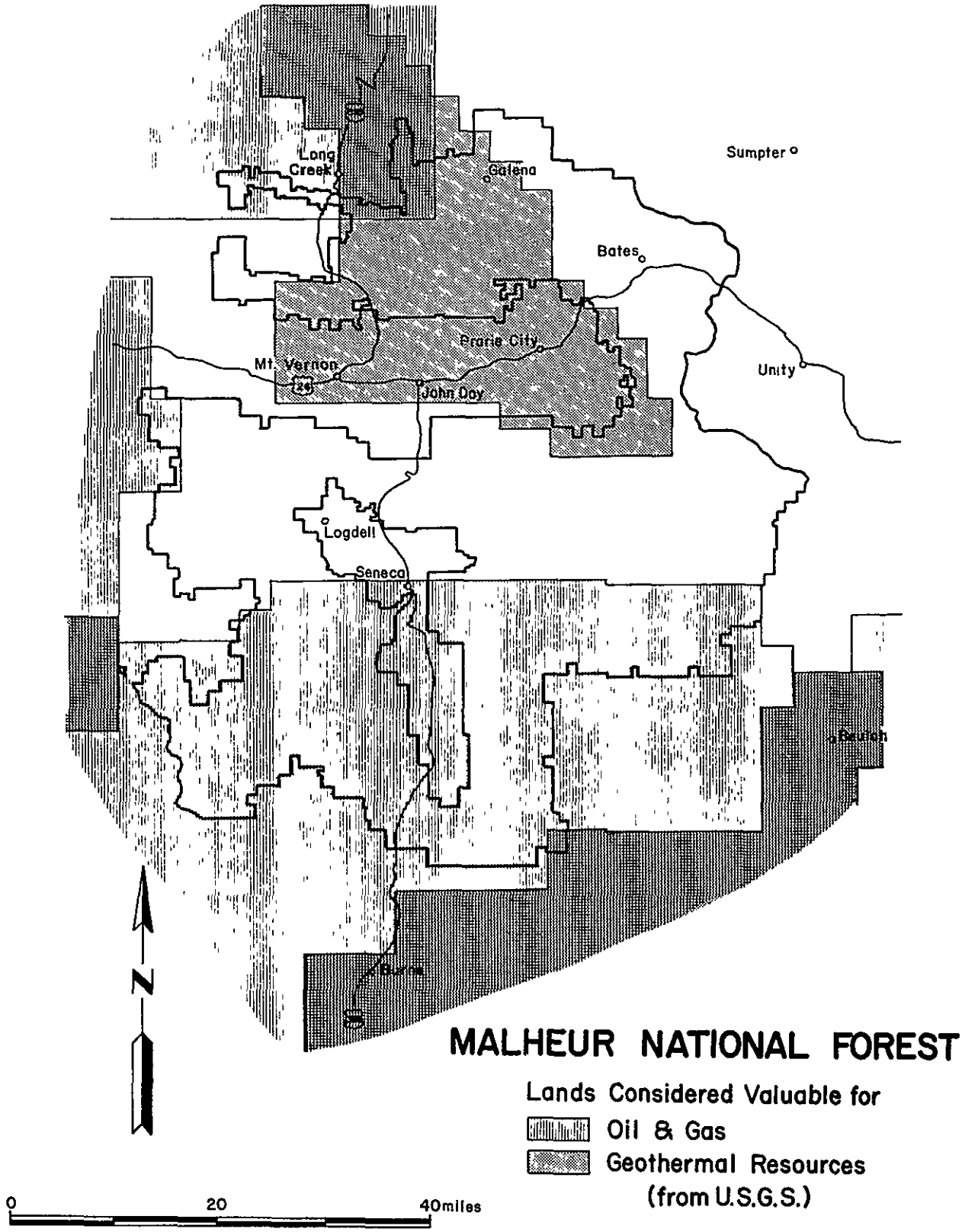
Although a few hot springs are known to occur in and near the Forest, there does not seem to be a high potential for geothermal resource development There currently are no geothermal leases or lease applications within Forest boundaries The U.S Geological Survey considers some lands prospectively valuable for geothermal resources in the vicinity, some of which partially overlap the Forest boundaries (Figure III-16) Should interest in geothermal exploration develop, the Geothermal Steam Act of 1970 requires that geothermal leasing on National Forest System lands be subject to the consent of, and conditions prescribed by, the Secretary of Agriculture

Sand, gravel, crushed rock, building stone, and some limestone occur within the Forest boundaries They are all low unit-value materials which must be near transportation routes, and usually the point of consumption, to be used The Forest Service may dispose of obviously common mineral materials like cinders, building stone used for construction purposes, river rock, and rock or sand to be used for aggregate or road construction

a *Relationship Between Forest Management and Minerals*

In order to comply with applicable cultural resource protection laws and regulations, an inventory must be conducted to determine if cultural resources are present on affected sites before the Forest Service approves any mineral- related activity In addition, if cultural resources are discovered during a mineral activity, the operator must cease operation and notify the Forest Service immediately For leasable minerals, all costs of protection and mitigation are borne by the operator. If impacts cannot be satisfactorily mitigated, surface occupancy of the site is prohibited

FIGURE III-17: Areas with Potential for Oil and Gas



For locatable minerals, approval of an operating plan is required before beginning any substantial ground-disturbing activity The General Mining Laws give the miner the right to mine in an area of a cultural resource site, but the miner must bear all costs of protection and mitigation.

Wildernesses are withdrawn from all forms of appropriation under the mining and mineral leasing laws, subject to any valid existing rights established prior to the date of withdrawal

12 Air Quality

Throughout time, fire has played a significant role in development of forest environments To date, smoke has not caused significant problems within or adjacent to the Forest

Predominantly light southwest winds during the spring, summer, and fall result in relatively clean, clear air. Visibility in the Blue Mountains is considered a prime asset by residents and visitors

Prescribed burning is the only temporary emission source from the Forest of any significance Prescribed burning is used for removal of logging residue, site preparation for reforestation, maintenance of range and wildlife habitats, and enhancement of specific fire-dependent plant communities Most prescribed burning activity takes place in late fall and early winter

Current policy for management of slash and other activity residues emphasizes utilization of the wood fiber

Currently, prescribed burning on the Forest is producing approximately 604 tons of total suspended particulates (TSP) annually This amount of TSP has not had any significant effect on either Wilderness or nonwilderness parts of the Forest. With greater wood utilization and a reduction in fuel treatment, the total amount of TSP is expected to decline in the future

Commercial chip log sales and firewood sales have contributed to a reduction in slash burning on the Forest As the supply of dead lodgepole pine is depleted and cogeneration plants are completed, utilization of logging residue should increase.

Cogeneration plants generally burn more efficiently than the old wigwam burners For that reason, it is expected that cogeneration plants will produce less particulate matter per cubic foot of biomass burned than do wigwam burners But because of their ability to produce electricity, cogeneration plants may consume more cubic feet of biomass The overall result may be an increase in particulate matter dispersed into the air

Local woodstove use has not been shown to have a significant effect on air quality To date, no restrictions on use have been deemed necessary

Air quality standards are considered when activities are planned. The Forest complies with all applicable air quality laws and regulations, and coordinates with appropriate agencies and the State of Oregon on smoke management The main concerns are those areas having Class I visibility standards On this Forest, only the Strawberry Mountain Wilderness has such standards, although the Monument Rock Wilderness is also being managed to meet it

The predominantly southwest winds tend to carry any Forest-related smoke away from heavily-populated areas like Boise, Idaho All air quality effects have generally dissipated by the time they reach other Class I airsheds over the Eagle Cap Wilderness or the Selway-Bitterroot Wilderness in Idaho

a *Relationship Between Forest Management and Air Quality*

Timber harvest activities have a temporary effect on air quality, primarily from slash disposal. Prescribed fires can also have short-term effects on air quality. Dust from logging traffic can have a localized effect.

There are some short-term effects, such as vehicle exhaust and dust, from recreational traffic. Clean air with good visibility and fresh, natural odors enhances recreational experiences. There is potential for slash burning to have some effect on recreationists during fall, when the Forest's heaviest recreation use and slash burning coincide.

Wildland fire, prescribed fire, and other activities outside the Wildernesses can periodically affect air quality within the Wildernesses. Air quality will be monitored to meet Class I airshed standards

Construction and use of Forest roads have a temporary effect on air quality because the soil is disturbed and may temporarily add dust to the air

13. Transportation

"David Eccles . . came to Baker to found the Oregon Lumber Company (in 1899). He soon realized he needed a railroad to funnel logs to his mill by 1909 .. (the) narrow gauge track covered eighty bouncy miles with switchbacks and hairpin curves from Baker to Prairie City .. in 1933 the Sumpter Valley Railroad tracks retreated to Bates and all the tracks were pulled up for good in 1947" (Malheur Ethnographic History, pp. 133-134).

Until 1921, railroad development had barely tapped the timber resources of the Forest In conjunction with an 890 million board foot timber sale, a railroad connection between Seneca and Hines, Oregon, was completed This line operated until 1983

Road building on the Forest began in earnest during the early 1920's. These roads were built mainly for firefighting access, but were also used by ranchers

By 1928, there were about 384 miles of road on the Forest After World War II, the availability of dependable and economical automobiles, easy access to fuel, and a growing population with increased leisure time contributed to growth of motorized recreation.

Through the 1950's and 1960's, the road systems were improved and extended, largely in support of timber management activities. By the 1970's, concern began to focus on the environmental impact of roads, the impact of easy recreational access on areas, and the desire to preserve remaining unroaded areas. But demand for existing and additional roads is expected to continue

Section 10 of the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), and Section 8 of the National Forest Management Act of 1976 (NFMA) require a "Forest Development Road System Plan." National direction requires that a Forest Development Transportation Plan include a transportation inventory system (TIS) and a map *National Forests in Oregon and Washington are also required to have a Road* Management Plan, consisting of multiyear development plans, traffic management plans, maintenance plans, and interagency road plans. Since these plans are often lengthy, they are not included in this document, but are available for review at the Forest Supervisor's Office in John Day, Oregon.

The state and county road systems are essential for management of the Malheur National Forest These road systems provide access to the Forest's arterial and collector road system. The Forest, in cooperation with the Federal Highway Administration, shares reconstruction costs with the state and county on selected roads The Forest also enters into cooperative maintenance agreements with counties when such agreements are in the best interest of both parties.

In 1990, there are an estimated 8,570 miles of road on the Forest. About 18 percent of this total is classified as arterial and collector roads (see Figure III-18), they access large or popular land areas and usually connect with state and county roads to form an integrated network of primary and secondary travel routes The arterial and collector system is 99 percent complete, but about 41 percent is in need of reconstruction

About 82 percent of the total system is local roads, which are usually intended to provide access for a specific resource project or protection activity, such as a timber sale, recreation site, or firebreak These roads are normally shorter and access small land areas. Resource service, rather than travel efficiency, is emphasized in their location, design, and operation The local road system is about 86 percent complete Typical permanent road density necessary to harvest timber on the Malheur National Forest is 3 5 miles/section

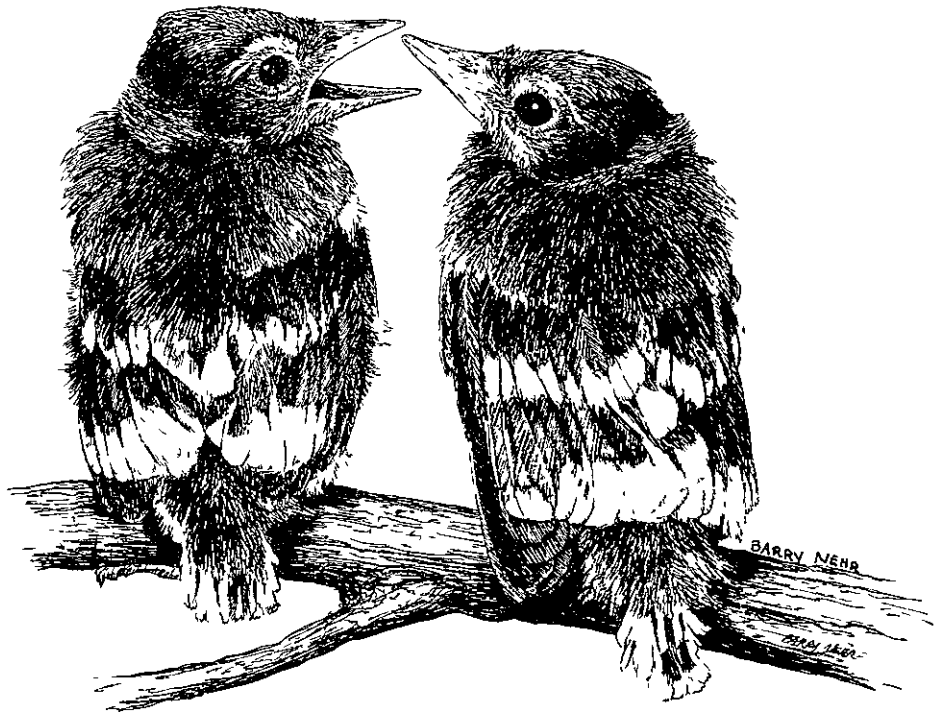
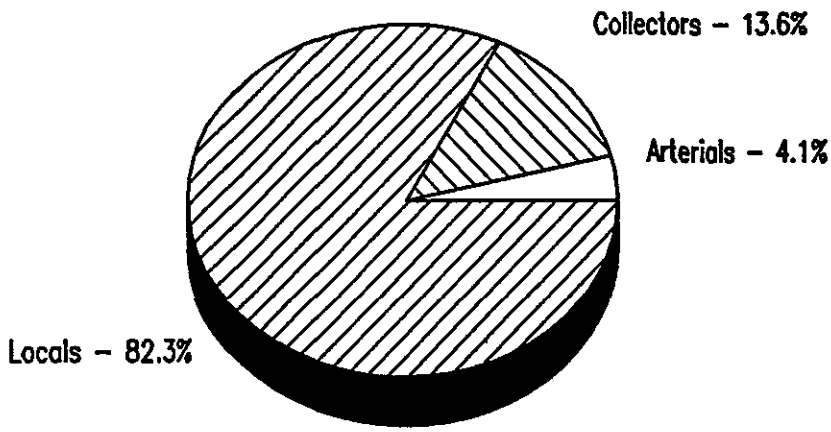


FIGURE III-18: Road Percentages by Classification, Malheur National Forest



The National Forest Management Act of 1976, Section 8, states that "roads shall be designed to standards appropriate for their intended uses considering safety, cost of transportation, and impacts on land and resources." Of the 8,570 miles of existing road, about 1,200 miles is currently managed for public travel (passenger car access) and the balance for high-clearance vehicles

a *Trails*

There are 240 miles of trails within the Forest boundary, 197 miles receive the most public use. These include trails for all purposes. Many of the trails lie within, or adjacent to, the Strawberry Mountain Wilderness and receive the heaviest use. The Wilderness areas contain 128 miles of trails.

The present trail system appears to be satisfying recreational needs on the Forest. Much of the trail system was developed before most of the roads that exist today. These early trails were not necessarily designed with recreation in mind. Because of that, the Forest has been evaluating these trails to assess how well they meet the needs of today's users.

Trail difficulty varies across the Forest. Within Strawberry Mountain Wilderness, one can find the most difficult and challenging trails. Outside the Wilderness, trails generally follow rivers or ridges which provide easier grades and less difficulty. Trail use is low on most of the trails, but use is expected to grow as people discover the uncrowded recreation environment on this Forest.

b *Railroads*

There are currently no railroads operating on the Forest Several hundred miles of abandoned railroad grades are present and efforts are being made to inventory them

c. *Utility Corridors*

A utility corridor is a linear strip of land designed for location of utility or transportation right-of-ways. According to a Western Regional Corridor Study (1986), no unoccupied utility corridors have been identified on the Forest

There are two utility corridors crossing the Forest One is owned by Idaho Power and runs from Baker City to John Day. The other runs from Unity Junction through John Day to Burns These corridors are managed using special-use permits.

Exclusion areas are lands which are unavailable for corridor allocation or facility siting These areas are only those with a legal (Congressional) mandate that excludes linear facilities, Wilderness areas are an example Exclusion areas on the Forest include the Strawberry Mountain and Monument Rock Wildernesses

Avoidance areas are lands which have particular land use or environmental characteristics that would be difficult or impossible to mitigate (may vary by type of facility) Two categories of avoidance areas have been identified.

Category 1 - Areas where use of corridors would conflict with land management objectives. Examples include (1) specially managed areas, such as those designated for developed and primitive recreation, research natural areas, environmental education areas; (2) environmentally sensitive areas such as certain wildlife habitat areas, faults, wetlands, slump areas, etc ; (3) archeological and historical sites, and (4) areas with visual quality objectives that conflict with facility placement

Category 2 - Areas with special or unique values that have been accorded specific management status by legislation These values conflict with facility placement. Examples include National Recreation Areas, wild, scenic, and recreational rivers, nationally classified trails, and state recreation areas

Windows are short, narrow passages through constrained areas which are the most feasible potential locations for linear facilities, considering engineering and/or environmental factors. Examples include areas recognized as critical corridor segments because of physiographic or technical suitability, and restricted passages identified as a result of exclusion or avoidance areas

d *Relationship Between Forest Management and Roads and Trails*

Roads are essential to intensive timber management Large, high-quality trees can often be removed economically by helicopter or long-span skyline systems But small, low-value trees like those removed in thinnings can seldom be removed economically with these expensive logging systems

Workers use roads to reach project sites to accomplish erosion control, utilize or burn logging residues, plant trees, and thin tree stands Amounts and kinds of timber management activities have the biggest influence on the Forest road system.

Timber management activities can temporarily close, re-route, or obliterate Forest trails Trail facilities are generally protected within a sale area, or are rehabilitated after sale termination

Range management activities have little effect on existing Forest roads When roads are constructed in range allotments, additional costs may be incurred for installation and maintenance of cattleguards or gates Grazing use does affect Forest trails, particularly in canyon areas As cattle utilize a trail, they cause soil displacement, leave droppings

behind, and often create adjacent and cross-cutting trails. These impacts may result in increased trail maintenance.

Wildlife or fisheries management, or recreation needs, could result in seasonal road closures to protect riparian areas, reduce hunting pressure, or reduce harassment of wildlife during nesting, roosting, fawning, calving, and winter stress periods Road closure costs will be considered a mitigation cost. Wildlife are believed to have no effect on Forest roads or trails.

Precipitation levels, snowmelt, runoff, soil moisture, evaporation rates, and subsurface water movement have complex effects on existing and proposed roads. These factors require interdisciplinary consideration when planning for road access. A major effect of water and riparian resource management on roads is the cost of mitigating adverse effects related to road construction and maintenance.

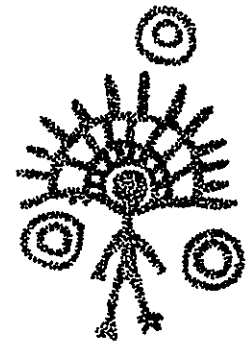
Fish habitat management results in increased road costs associated with mitigation measures for allowing fish passage These effects are not considered significant

Visual resource management affects the location of Forest roads and trails. The effect on roads will be a minor increase in costs for mitigation measures

The relationship between roads and minerals is generally positive Common-variety mineral resources provide materials for road construction and maintenance, while roads provide access for mineral exploration, development, and production

The dominant need for construction materials is to support the timber management program. Future demand will continue to come from timber harvesting activities. Demand for new roads will be influenced insignificantly by minerals activities unless ongoing and future exploration results in large-scale development.

Rock-source location and rock characteristics are critical factors in road maintenance and construction costs Through management emphasis, some specific rock sources may be unavailable for future use Rock sources on the Forest have been inventoried and only in rare instances will the potential for rock source development fall short of projected demands for the material.
Fire has little interaction with roads and trails, but roads do provide access for fire control and also serve as fuelbreaks.



Chapter IV

Environmental Consequences

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Chapter IV Environmental Consequences

A. Introduction

In Chapter I, the purpose of and need for this planning process was described. Planning questions were identified which delineated the scope and intensity of analysis. The alternatives being analyzed were described in Chapter II. Those alternatives were created around the various ways of resolving the planning questions. In Chapter III, the environment that will be affected by those alternatives was described. Chapter IV presents a discussion of what the effects on the environment would be if the alternatives were carried out. The consequences discussed in this chapter include the positive and negative effects that are part of determining net public benefits. (Net public benefits are defined in Chapter II.)

The environment, as discussed here, needs to be distinguished from program outputs. The environment includes such things as wildlife habitat, soils, vegetation, recreational opportunities, community stability, etc. Program outputs include such things as timber harvest and grazing levels. Program outputs are presented in detail in Chapter II (primarily in Table II-5) and will not be repeated again here except as they relate to environmental consequences.

Environmental consequences can be beneficial or adverse, direct or indirect, cumulative or single, and may be short-term or long-term. This information provides the scientific and analytic basis for the comparison of alternatives in Chapter II. Alternatives are primarily different combinations of land management areas. The effects of the alternatives are largely determined by the effects of Management Area direction and the number of acres assigned to each management area.

The role of standards is very important in considering environmental consequences since standards are the primary mitigation measures for any activity on the Forest. Some standards are effective Forest-wide, others are specific to a Management Area. They give program and project implementation direction and will be addressed in subsequent analysis of site-specific projects tiered to this Final Environmental Impact Statement. The Forest Standards are identified in the Forest Plan. Standards that differ from those recommended for the Forest Plan are described in Appendix D.

Much of this analysis is based on computer modeling which simulates the complex physical, biological, and economic interrelationships of the Forest and human environment. Many predictions are based on average values and are, at best, rough estimates. An important part of implementing the Final Forest Plan will be monitoring the accuracy of these predictions to provide new and improved information for future planning. In some cases, there simply is not enough information available about these interrelationships. Research needs have been identified in the hope that additional information will be made available in those areas as well.

B. Summary of Changes from Draft to Final EIS

Several changes have been made to this chapter since the Draft Environmental Impact Statement was released in August of 1987. The following is a summary of the changes related to environmental consequences.

Updated and expanded coverage of key topics has been added to the discussions on environmental effects from mining and mineral exploration, vegetation and forage conditions, effects on the anadromous and non-anadromous fisheries resources of the Forest, and impacts on riparian conditions and forage utilization. In addition, discussions of the potential timber harvest outputs and effects have been expanded to include ponderosa pine outputs over time, timber harvest rotation lengths, management intensity, and timber outputs by alternative.

There has been a reassessment of livestock strategy in less than desirable conditions within riparian zones and the effects of management practices on big game The cover-to-forage ratio method previously used to estimate potential elk habitat has been replaced by a Habitat Effectiveness Index (HEI)

Five alternatives presented in the draft EIS have been dropped in this FEIS Due to the lack of public interest following release of the draft EIS, Alternatives D, E, F-departure, G and H are not brought forward in FEIS chapter discussions In response to public comments, Alternatives B and C are modified and Alternative I has been added to this FEIS, as newly-developed alternatives In addition, the baseline 10-year period used to gauge outputs and effects between all alternatives has been updated to the 1980-1989 time period Consequently, past timber sales, harvests, and experienced costs are now presented at recently-experienced levels

Lastly, a new cumulative effects analysis is discussed along with a summary of qualitative rankings of alternatives for several key resource indicators. These rankings are tied to both direct and indirect effects on resources, over a 50-year planning horizon, and the potential risk to the specific Forest resource

C. How This Chapter is Organized

This chapter is organized by affected resources The environmental consequences (effects) that do not vary between alternatives are discussed first Then, the effects of the alternatives on the various resources of the Forest are discussed

D. Effects That Do Not Differ Between Alternatives

1 Prime Farmlands, Rangelands, and Forest Land

There are no prime farmlands within or adjacent to the Forest All alternatives are in keeping with the intent of Secretary of Agriculture Memorandum 1827 for prime rangeland, farmland, and forest land

2 Wetlands and Floodplains

Wetlands and floodplains comprise approximately 5 percent of the Forest land Executive Orders 11990 and 11988 require protection of wetlands and floodplains Timber harvesting, grazing, and road construction are activities that have the greatest potential for affecting them in all alternatives No significant adverse effects are anticipated, as adherence to standards and mitigation measures should prevent all but minor and temporary impacts on these areas Because of the small area involved, differences between alternatives may not be measurable The effects on specific wetlands and floodplains will be evaluated during the analysis of site-specific projects (See Forest Plan, Chapter IV, Section F.)

3. Urban Environments

Situated in rural eastern Oregon, more than 100 miles from the nearest urban area, none of the alternatives would have a direct effect on any urban area The existence of the Forest for urban dwellers' enjoyment may be an indirect effect Management of the Forest also contributes to the national economy which indirectly affects urban dwellers as well.

4. Threatened and Endangered Species

There are no Threatened or Endangered plant species on the Forest Sensitive plant and animal species habitats are protected through Standards (Forest Plan, Chapter IV, Section E) The only Threatened or Endangered wildlife species on the Forest are the bald eagle and the American peregrine falcon. The USDI Fish and Wildlife Service concurs with this finding (USDI, FWS, 1988) Bald eagles roost in specific areas along the southern edge of the Forest during the winter only. These areas will be managed under Management Area 5 in each alternative. (See the Forest Plan for a complete

description or the Final Environmental Impact Statement, Chapter II for an overview of this management strategy) This strategy is consistent with implementation of the Pacific States Bald Eagle Recovery Plan There are no known nesting occurrences of American peregrine falcons on the Forest, however, potential American peregrine falcon aeries have been identified within the Strawberry Mountain Wilderness None of the alternatives would impact these sites A survey will be made for the American peregrine falcon in the Strawberry Mountain Wilderness Area, and if no birds are found, the species will be introduced, as per Recovery Plan objectives None of the alternatives should cause loss of habitat for Threatened, Endangered or Sensitive species The USDI Fish and Wildlife Service has reviewed the biological evaluations and concurs with the determination of no effect on the bald eagle and the American peregrine falcon (USDI, FWS, 1988)

5 Human Resource Programs

The human resource programs of the Malheur National Forest are funded independently of the Forest Plan They are unrelated to Forest Plan management alternatives and would not be likely to vary by alternative

E Effects That Vary by Alternative

1 Effects on Soils

Most forest management activities impact the soil resource to some extent The degree to which the soil is impacted is generally related to the total amount of the activity planned An example is timber harvesting The greatest potential for adverse impact exists with alternatives that have the highest harvest rates

It is important to note that not all soil disturbance is undesirable Many of the tree species that occur on the Forest require bare mineral soil to germinate Disturbance (site prep) is typically required to expose mineral soil The disturbance that is critical to forest managers is one reduces the long-term productivity of the site Detrimental soil conditions that are known to reduce site productivity and for which the Forest Service has developed standards are compaction, displacement, puddling, severe burning, and erosion in terms of effective ground cover (see Glossary for definitions) Other site factors that can impact productivity but for which no specific standards have been developed are soil nutrient levels, organic debris (limbs, down logs, etc) and fire intensities.

Intensive soil monitoring has been used effectively on the Malheur National Forest to ensure that soil protection standards have been met Results from samples of 24 tractor harvest units revealed excessive compaction where units had been logged more than once Changes in management have been made to ensure compliance with soil protection standards.

More specific comments on effects will be made by resource area As previously noted, the units with the greatest amount of outputs and activity will be the units with the greatest impact to the soil Overall, Alternatives NC, B-Modified, and F will have the greatest adverse impact due to the high level of output in those areas Alternatives A, and I will have moderate resource impacts, and Alternative C-Modified will have the least amount of impact

a *Timber Management Effects on Soils*

Timber management activities affect a large portion of the Forest Although the specific amounts vary by alternative, an average of about 900 thousand acres (plus or minus 10 percent) is available for timber harvesting on the Malheur National Forest (amount of acres available for scheduled timber harvest within the FORPLAN model for all viable alternatives) Of that, approximately 80 percent have slopes less than 35 percent that are subject to tractor logging While cable logging can result in detrimental impacts, most cable units stay well within the standards as routine mitigation measures are applied

The activities most likely to result in detrimental soil impacts are tractor logging, machine piling, and road construction The relative amounts of the activities by alternative are presented in Table IV-1

TABLE IV-1: Major Soil-Disturbing Activities by Alternatives
(First Decade Average Annual Outputs or Effects)

Alternatives	Annual Harvest (MMBF)1/	Thousands of Acres Impacted	Thousands of Acres Tractor Yarded	Thousands of Acres Machine Piled	Miles/Year of New Road Construction
NC (No Change)	N/A	N/A	N/A	N/A	N/A
A (No Action)	233	33	32	1 7	81
B-Modified	266	36	35	1 8	81
C-Modified	154	21	20	1 0	49
F	247	35	34	1 7	80
I (Preferred)	211	28	27	1.4	62

1/MMBF = Million board feet of total sale program quantity (TSPQ)

Soil monitoring has shown compaction to be the most detrimental to the soil condition on tractor units (Slaughter and Gasbarro, 1988) Most of the excessive compaction occurs during machine piling On the steep units (greater than 35 percent) displacement is the major concern. Displacement is more critical because it is an irreversible loss of soil Compaction can be alleviated through ripping

Erosion is another hazard that must be specifically addressed, because of the potentially irreversible consequences When the standard protection measures are not sufficient, there are optional measures available

The erosion hazard is typically confined to compacted skid trails and landings where the infiltration rates have been reduced Problems in the forested area outside these compacted areas are very limited

Timber felling does not directly affect the soil resource; however, it does affect the way that machines can transport, or skid, logs to the sorting and loading area (landing). If trees are felled in a way which reduces the area that the machines travel on (skid trails) then the impact to the soil in the total timber sale area can be minimized

The major adverse impact from timber harvesting on soil results from tractor skidding. Tractor logging typically results in well-defined skid trails on the ground. Garland (1983) reported that as much as 40 percent of an area could be covered with skid trails if allowed to occur unchecked Skid trails are nearly always compacted (Foil and Ralston 1967; Froehlich 1979) Soil compaction decreases soil productivity (Froehlich 1979; Froehlich and McNabb 1983, Wert and Thomas 1981). Overall growth reductions from 5 to 15 percent have been reported in the Pacific Northwest (Adams and Froehlich 1981; Froehlich et al., 1981)

Site preparation methods differ greatly in their impact to the soil The primary methods used on the Malheur National Forest include machine piling, mechanical treatment, burning, and crushing. In recent years, the practice of not treating slash has been used frequently. Research has shown that it is beneficial to the long-term productivity of the forest to leave the slash on the site If there is no reason to treat the slash it will be left on the site.

Machine piling is the most severe treatment Forest monitoring results (Slaughter and Gasbarro 1988) have shown machine piling to result in excessive compaction on units that have been logged more than once. This is particularly true when machine piling is being used to achieve a site preparation objective

Mechanical treatment and burning can generally be done without significant impact to the soil The effect of crushing depends on the amount of slash

Compaction is by far the most widespread environmental consequence, related to soils, that occurs as a result of timber management Displacement, puddling, and erosion also occur in minor amounts Displacement generally occurs on designated skid trails with slopes greater than 35 percent The potential for displacement is greatest on ash soils when large volumes of logs are skidded Puddling generally occurs on soils that have a clay content of more than 35 percent and a high moisture content (35-52 percent moisture by weight depending on the texture) Erosion is primarily a concern on compacted skid trails, temporary roads, landings, and roads

The cumulative effect of repeated entries can have an adverse significant effect on the soil resource. Forest monitoring results (Slaughter and Gasbarro 1988) have shown that the cumulative effect of multiple entries commonly results in excessive amounts of soil compaction on tractor units Units that have been logged previously typically receive special protective measures designed to prevent additional compaction Those measures include designated skid trails, directional falling, winching, and an alternative to machine piling Ripping is used to alleviate excessive compaction where possible

b *Effects of Range Management on Soils*

The effect of grazing on the soil resource needs to be discussed in terms of both the historic grazing practices and our current grazing policies Early sheep and cattle grazing practices have accelerated erosion over a good portion of the range and more open timber types. Photographs of meadows taken in the 1930's showed meadows completely denuded and gullied

Range Management Practices in the past 20 to 30 years have made great strides in reducing the impacts to the systems Also, better control of the livestock has served to improve the range on the Forest The problem areas that still exist today have been inventoried in the Watershed Improvement Needs Inventory and are scheduled for improvement The Malheur National Forest has developed an aggressive program of watershed improvements

The potential for impacting the soil resource is related to the total number of Animal Unit Months (AUMs) permitted on the Forest Those numbers are presented under Chapter II, in Figure II-36, as grazing capacity by alternative

c *Effects of Wildlife on Soils*

The effects of deer and elk grazing on the soil resource are similar to the impacts of cattle Concentrated trampling and intensive use can result in accelerated erosion and compaction Only scattered trampling and erosion problems presently occur There is a risk, however, that the increasing elk herds anticipated, regardless of alternative, could result in accelerated erosion on fragile, nonforested portions of the winter ranges These are sites that were severely eroded during the early years of sheep and cattle grazing

d *Effects of Recreation on Soils*

The desirability of a site for recreation use may be affected by soil factors like drainage, erosiveness, and compactability. These factors are used in determining a site's suitability for campsites, playfields, pit toilets, etc It is important that soil limitations be considered in selecting sites for development Soil limitation may be a reason for nonselection of a site or for developing mitigation criteria in the facility design

Public use at developed sites often denudes and compacts the soil surface (Beardsley and Wagar 1971; Cull et al , 1981) Past monitoring results show that all developed sites tested were compacted Compaction seals the soil surface and greatly reduces the water infiltration rate When rain falls or snow melts much of the water runs off, which can cause accelerated soil erosion The combined effect of erosion and compaction contributes

to denuding of tree roots, and also reduces availability of air, water, and nutrients to vegetation.

Dispersed sites generally are not compacted, however, continued use over time will cause soil compaction.

Sites located at higher elevations are generally more sensitive to heavy use than are similar sites located at lower elevations This is probably due to colder temperatures and shorter growing season and the fact that native vegetation is often more sensitive to trampling and soil compaction

All forms of trail use have some localized impact on the soil resource. Essentially all trail treads are compacted so water infiltration is very slow. This means trails could become channels for surface runoff water. Trails are constructed to prevent unacceptable soil erosion and gullying The impact on trails by hikers' boots, horses' hooves, or trail bike tires varies with soil texture All have the potential for water puddling, displacement of soils, and a tendency to entrench the trail tread into a "U" shape. Sediment from trail tread erosion is often deposited directly into small streams, which can affect water quality.

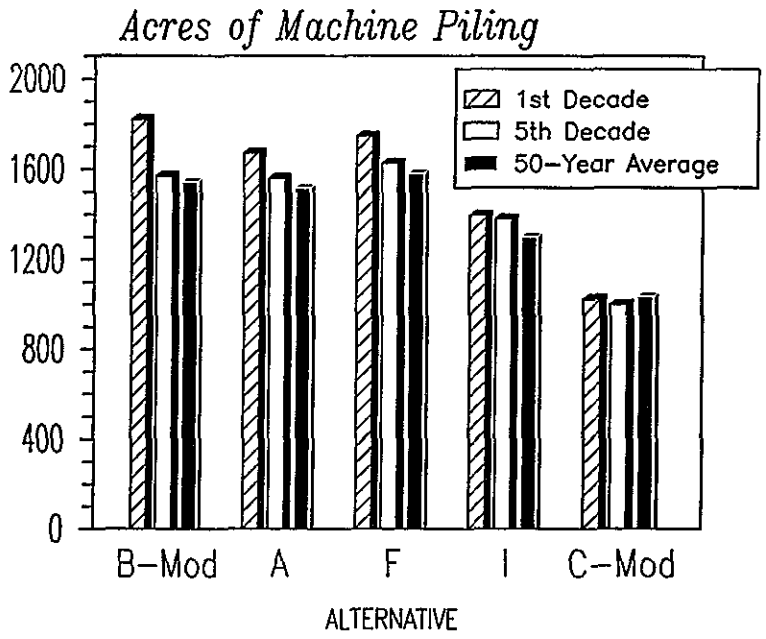
e *Fire Management Effects on Soils*

Fire management activities affect the soil resource in three ways. The first is the effect that machines used for piling slash have on the physical condition of the soil; the second is the effect that removing woody debris has on long-term productivity of the site; and the third is the effect of fire itself on the soil

Machine piling is the leading cause of soil compaction based on Forest monitoring results. This is especially true when the machine piling activity is used as preparation of an area for planting The only difference between alternatives in terms of machine piling is the total number of acres planned. Figure IV-1 shows the total number of acres scheduled for each alternative The higher the number, the more areas which will be affected.



FIGURE IV-1: Machine Piling by Alternative



Woody debris is an important contributor to the long-term productivity of the Forest Large woody debris is also an important component of fish and wildlife habitats The smaller material is an important source of nutrients in the short term (20-30 years), while the larger material (12-inch plus) has been shown to be extremely important to growth and survival of soil mycorrhizae, a root fungus that many trees depend on for survival (Bergstrom 1976, Thomas 1979) Removing the woody material reduces the site productivity. Loss of woody debris will occur in every alternative, there is no measurable difference between alternatives

Prescribed fire can produce the following effects reduction of plant competition on selected species, enhancement of plant community stability, exposure of mineral soil for natural seeding; increased availability of nutrients; reduced fuel loads, and reduction of certain microorganisms Uncontrolled fire can result in total consumption of the organic layer of the soil, which depletes the nutrient supply and increases the potential for surface erosion. It can also result in a condition called water repellency which increases the erosion hazard substantially. Additional information can be found in a publication by Boyer and Dell (1980) Prescribed fire will be used in implementation of any of the alternatives, but the extent of use would be determined on a site-specific basis It is impossible to predict the occurrence of wildfires

f. *Mining Impacts on Soils*

Mining exploration and development can have a significant impact on the soil resource depending on the activity Surface mining has the greatest impact. This type of mining generally involves removing the productive surface soil in order to get to ore-bearing subsoils and bedrock Underground mining impacts much less surface area

g *Effects of Transportation Management on Soils*

The transportation system has two basic effects on the soil resource First, it takes land out of production Once a road has been constructed, the site has lost its potential to grow trees The cut-and-fill slopes, and even the road itself, may support vegetation of

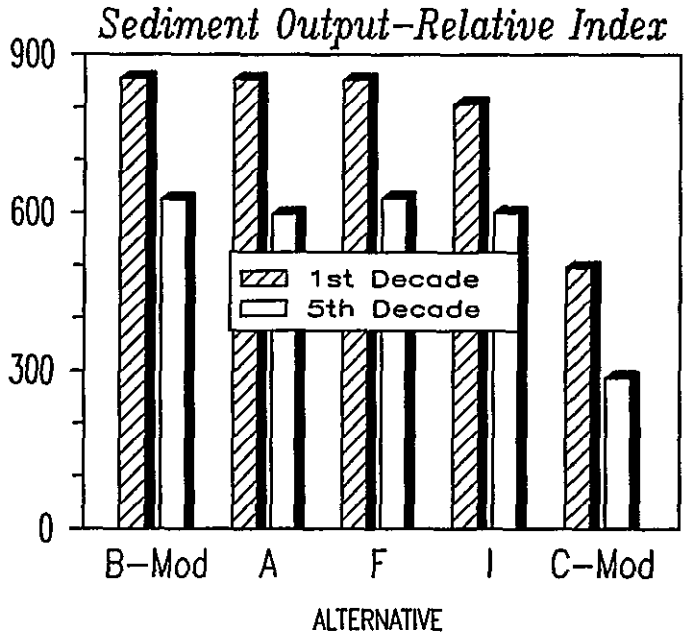
some kind, but the small amount of production that does occur is not part of the suitable land base for growing trees

The second effect is the impact of the road on water quality over time. Roads are major collectors and funnels of water Paved roads and rock-surfaced roads tend to produce less sediment than unsurfaced roads Surfaced roads produce little sediment over time and are easily maintained. Unsurfaced roads and native material roads are responsible for most management-related sediment that leaves the Forest, and these roads are difficult to keep maintained. Most road construction on the Forest in the future will consist of unsurfaced and native-surfaced local roads

Alternative B-Modified, with the largest amount of road construction and reconstruction, will have the greatest impact on the soil resource Alternative C-Modified will have the least.

An index of sediment yield is presented in Table II-5 in Chapter II of the Environmental Impact Statement and also in Figure IV-2 below. Sediment yield, as modeled here, is a function of the total amount of soil-disturbing activities that occur in each alternative These are gross estimates that do not distinguish between natural and management-related sedimentation. They are based on the modified universal soil loss equation. Sediment yield tables were developed for different combinations of ecoclass, roading level, harvest prescription, slope, logging system (cable or tractor), and road status (old or new). Roads in general, and new construction specifically, are the major contributors of management-related sediment. The results are presented as an index to be compared one to another and not as an absolute value. The higher the number, the more sediment that is generated The reliability of this information is somewhat low, it is based largely on professional judgment with a minimum of data or validation It should be used only to compare alternatives on a relative scale

FIGURE IV-2: Index of Sediment



The differences between alternatives are very small and reflect an assumption that most future new road construction will occur in the first decade The decrease in the second and fifth decades reflects the reduction in new road construction

h *Mitigation Measures*

Mitigating measures are the treatments and restrictions used to lessen the adverse impact of management activities on the soil resource Some measures are automatic such as erosion control in Division B of the timber sale contract Others are optional, used as needed for a particular activity Mitigating measures used to minimize or reduce impacts from logging include the use of dedicated skid trails, directional falling, winching, winter logging requirements, cable logging, equipment limitations, soil moisture limitations, grass seeding, ripping, etc

Designated skid trails can be very effective in controlling the amount of soil compaction on a timber sale unit The effectiveness depends on the degree to which skidding equipment is permitted to operate off designated skid trails Studies have shown that, where skidding equipment is restricted to designated skid trails, 100 percent effectiveness in controlling compaction on the rest of the sale unit is achieved (Froehlich and McNabb 1983; Froehlich et al , 1981)
In units previously tractor logged (a typical situation on the Forest), it is common to use existing, already compacted and displaced skid trails as designated skid trails in order to limit further impact to the sale unit

Waterbars and grass seeding are very effective in controlling erosion from skid trails and landings Waterbars are standard for all timber sales (Division B Requirements). Erosion seeding is used on disturbed soil along Class I, II, III, and IV streams, and on skid trails with slopes greater than 20 percent This is done in conjunction with the waterbarring In addition to the erosion seeding, other disturbed soil generally receives forage seeding through the Range Management Program This seeding also offers some erosion protection

Skyline logging is a cable system which suspends one end of the logs off the ground as they are transported to the landing This type of logging system has been used since the mid-1970's to mitigate adverse effects of tractor logging on steep slopes (Kile 1986) The Forest-wide Standards for the Forest Plan (Chapter IV, Section E) state that cable logging will generally be used on areas of 35 percent slope or steeper Based on judgment and experience, the Forest Soil Scientist and the Logging Systems Specialist have previously estimated that skyline logging is 95 percent effective as a soil protection measure

Equipment limitations are used as needed during logging and slash disposal Crawler-mounted skidders are periodically required on 35-45 percent slopes where skyline logging is not feasible The crawler-mounted skidder requirement has proven to be an effective measure on the Forest (Kile 1986)

Soil moisture restrictions are not widely used although they do hold some potential for limiting compaction The critical soil moisture values need to be validated for the Forest through monitoring Once validated, soil moisture restrictions may be an effective tool.

Winter logging is a restriction used to reduce the impact of tractor logging A winter logging designation requires either 4 inches of frozen soil or a minimum of 24 inches of snow before permitting tractors to operate This mitigation measure is generally very effective based on previous experience on this Forest

Scarification ripping is the treatment prescribed when there is an excessive amount of soil compaction over a unit Effectiveness is highly dependent on type of equipment used for the treatment (Andrus and Froehlich 1983) and soil moisture conditions The Rome plow was used extensively for several years to mitigate compaction on Forest units An informal investigation revealed this method to be ineffective, the major limitation being

inadequate soil penetration The average effective depth of scarification using a Rome plow is estimated to be 4-5 inches, the average depth of compaction is 1 foot However, there are several other tools that have been shown to be effective, among them the winged ripper and the forest cultivator. Recovery of compacted soil with the winged ripper has been about 80 percent (Andrus and Froehlich 1983), making this one of the most effective soil compaction mitigation measures The winged ripper is being introduced on the Forest at this time.

Mining operations are required to stockpile topsoil prior to processing of underlying mineral bearing rock or gravel This topsoil must be replaced, contoured and revegetated upon completion of mining. Soil protection and erosion control methods employed in *other operations on the Forest are also used for mining These include the use of waterbars* and scarification. These mitigation measures are prescribed in the preceding paragraphs.

2 Effects on Vegetation/Trees

a *Timber Management*

Timber management activities in the alternatives are the primary influence on tree vegetation of the Forest These activities can be categorized into three levels of intensity. high, medium, and low. The main variations between alternatives are the number of acres treated in these three categories

In high-intensity timber management, most existing overstories are harvested Most understories will be managed until growth rates diminish and they become of merchantable size. This is expected to be within the next 30 to 80 years, when they will be harvested using shelterwood or clearcut harvest methods, and a new stand of trees started using planting or natural seeding The general effects of this type of timber management are discussed in Chapter III

This type of management results in a change in species composition on about 60 percent of the forested acres where timber harvest occurs These stands will contain a higher percentage of Douglas-fir, white fir, and other shade-tolerant species than they currently do Alternatives NC, A, B-Modified, and F will result in an overall shift in tree species *across the Forest from shade-intolerant species, such as ponderosa pine, to potentially* faster growing, shade-tolerant species, such as white fir and Douglas-fir Species composition will change once again when these stands are regenerated. Over a rotation period, regenerated ponderosa pine stands are anticipated to produce about 90 percent ponderosa pine volume and mixed conifer stands about 35 percent ponderosa pine volume Harvest compositions, by species will differ by alternatives In all cases there will be a decrease in the average size of trees being harvested, from over 20 inch trees for the next 15 to 20 years to 12 to 15-inch trees at some point in the future The percentage of trees over 20 inches DBH being harvested will be highly variable ranging from about 5 to 50 percent over the first 50 years

Alternative C-Modified will result in an increase in and continuation of ponderosa pine across the Forest except in riparian areas, elk winter ranges, undeveloped areas, and cold, moist, fir sites In addition, most forested acres across the Forest will be at or approaching the older seral stages (over 100 years old) Ponderosa pine volumes will most likely increase over the decades in this alternative with projected percentages ranging from 60 to 80 percent in decades 10 to 15. Overall harvest diameters will vary from 12 to 22 inches in DBH in the first 50 years, and increase to 16 to 24 inches in DBH in decades 10 to 15. The percentage of trees over 20 inches being harvested will be highly variable ranging from 15 to 70 percent over the same 150-year time period

Alternative I is a combination of many different high intensity management prescriptions and objectives. These range from the intensive management of existing understories to the use of uneven-aged management to produce more ponderosa pine. There will be an overall shift to the younger trees, thus younger seral stages over time. Due to use

of uneven-aged management, portions of some older stands (over 100 years old) will be retained Ponderosa pine volumes will steadily decrease over the next several decades with harvestable percentages dropping from approximately 50 percent to 25-35 percent over the next 3 decades for all alternatives The last 5 decades in the planning horizon are projected to produce approximately 60 to 70 percent ponderosa pine Actual harvest diameters will vary from 20 to 22 inches DBH in the first 10 years to about 16 inches DBH after 100 years Unlike other alternatives, Alternative I produces harvestable trees that average no less than 15 inches in DBH for any decade Trees over 20 inches in DBH available for harvest will vary from 20 to 50 percent over the planning horizon, depending upon alternative strategy.

The age-class distribution will also change in managed stands The existing stands in seral stages 5 and 6 will be converted to younger seral stages (1-4) This change will be particularly evident by the end of the third decade when most of the managed stands will be in seral stages 1-4. This general trend increases diversity of the Forest in managed stands during the first three decades. (See discussion of current situation, in Chapter III) Diversity decreases after the third decade because about 60 percent of the managed acres will be at seral stage 4.

The medium intensity of timber management generally consists of a modified, but fairly intensive, form of uneven-aged management On these acres, tree vegetation will eventually be evenly distributed among the first five seral stages

In Alternatives A, B-Modified, F, and I, riparian areas across the Forest which are available for timber management activities and which are not in visually sensitive areas receive moderate-intensity timber management On these acres, there will be a shift to more shade-tolerant tree species There is also expected to be a continuous stand of trees on forested riparian acres except in lodgepole pine sites Lodgepole pine sites will generally receive small group cuts, which will meet an uneven-aged management definition. The actual rotation will be extended to a time period of about 100 years. Alternative NC will have moderate-intensity timber management consisting of an extended rotation of 190 to 235 years There will be some selected large trees retained under this strategy to meet the need for large woody debris in streams in Alternatives B-Modified, F and I Alternative C-Modified will provide for the highest number of large trees being left, as no timber harvest is scheduled in riparian zones

In Alternative C-Modified, riparian areas are managed as indicated above. In addition, approximately 414,907 acres in Alternative C-Modified is managed at moderate intensity to produce large-diameter ponderosa pine trees This management scheme uses a rotation age of 130 to 150 years, usually including one commercial thinning for even-aged management strategies Approximately 309,060 acres in Alternative C-Modified consists of sites which are suitable for growing ponderosa pine but which currently support mixed conifer species This regime will result in a shift to ponderosa pine and other shade-intolerant species on most of these acres This change will begin immediately, but the largest shift will occur during the third through eighth decades when most of the currently mixed conifer sites are regenerated to ponderosa pine Alternative C-Modified not only shifts species composition to ponderosa pine but also perpetuates it. This could be done manually, with herbicides, or with low-intensity prescribed fires. The age-class distribution on these acres will tend toward the later seral stages This trend will become most evident in the sixth or seventh decade

Another medium level of intensity can be found in Alternative I In Alternative I, many of the 479,148 acres currently supporting mixed conifer species would be managed to produce ponderosa pine to a rotation age of approximately 100 years for even-aged stands. Uneven-aged management will also be used in Alternative I to achieve the ponderosa pine conversion goal, with approximately 15,000 acres of the 148,319 mixed conifer acres being converted This will result in a shift to ponderosa pine and other shade-tolerant species on 454,388 acres in Alternative I The age-class distribution on these acres will be the

same as the lands managed under high intensity for even-aged systems and towards the later seral stages in those stands using uneven-aged systems.

Old-growth replacement stands (mixed conifer only) produce a medium level of intensity in Alternative I This management intensity uses an extended rotation of 140 to 160 years to produce trees 24 inches in DBH at final harvest This scenario will produce an age-class distribution towards the later seral stages. Ponderosa pine volume will be at that level naturally found in those stands, i e , 90 percent for pine climax sites and about 50 percent for mixed conifer sites Actual harvest diameters will be around 20+ inches at final harvest, if replacement of dedicated old-growth stands is found not to be necessary.

The acres of land managed for a low intensity of timber production in each alternative occur in visually sensitive foreground areas. These areas receive a modified form of uneven-aged management in which the trees will grow to large sizes (26-36 inches) before harvesting High-intensity management harvests trees at about 18 inches diameter at breast height. Following each harvest, there will be more trees remaining in the stand than there would be under high-intensity management. In addition, three to five large trees per acre would always be retained This type of management results in a slow growing, natural-appearing stand of trees at all times (General effects of this type of management are discussed in Chapter III Further discussion about the selection of harvest cutting methods can be found in Appendix E). The acres treated with various intensities of timber management are displayed in Figure IV-3

FIGURE IV-3: Acres Treated by Timber Management Intensity by Alternative

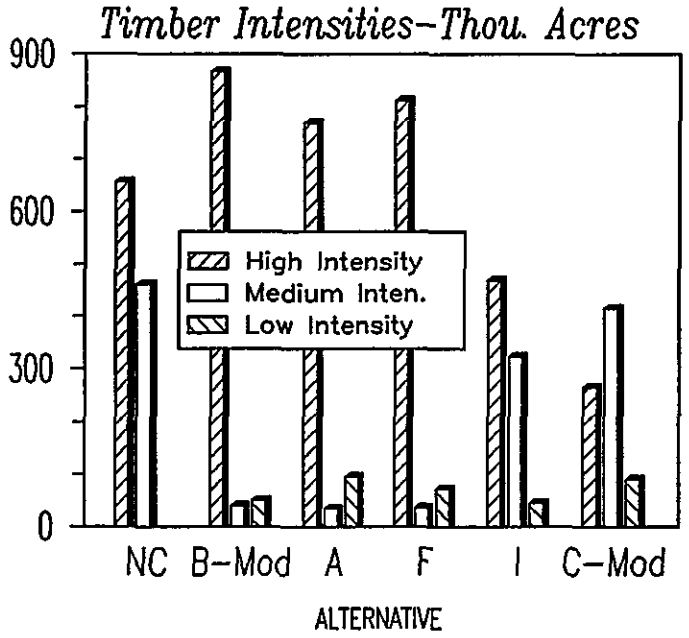


Table IV-2: Summary of Timber Management Intensities by Alternative

	Alternatives					
	NC (No Change)	A (No Action)	B-Mod	C-Mod	F	I
High	655,770	769,160	866,977	265,232	811,952	468,656
Medium	460,807	34,384	39,691	414,907	36,115	322,862
Low	0	94,880	50,115	90,248	71,681	44,452
Total	1,116,577	898,424	956,783	770,387	919,748	835,970

Changes in the types of trees present will cause changes in the insect and disease activity on the Forest (See discussion of current situation in Chapter III) In Alternatives NC, A, B-Modified, and F, there will be an increase in predominantly fir stands to well over 500,000 acres by the end of the third decade Fir species are more susceptible to disease than pine species, the susceptibility to disease increases with increased management activity because of activity-caused damage While increased losses to disease are probable, the increased growth from faster wood fiber producers may offset those losses (Dezellem 1985)

In addition, fir stands provide habitat for the western spruce budworm and the tussock moth It can be expected that there will be periodic outbreaks of both these insects due to the amount of habitat provided in each of the alternatives listed above; however, the risk of outbreaks is anticipated to decrease over the next 30 years as host stands respond to intensive timber management (Brookes et al , 1985, Brookes et al , 1978) Even though some growth loss will occur from outbreaks, the trees will be vigorous and should survive in sufficient numbers to ensure continued management of these stands It can also be expected that effective Forest-wide or site-specific insect control spraying projects using environmentally acceptable insecticides may be needed to control the extent of outbreaks that do occur

Ponderosa pine is much less susceptible to diseases and, under specific levels of stocking control, is not highly susceptible to mountain or western pine beetles In Alternatives NC, A, B-Modified, F, and I, pine trees should remain healthy and vigorous In Alternative C-Modified 309,060 additional acres as noted are managed to produce ponderosa pine In Alternative C-Modified, this means a total of 481,783 acres will be managed to produce large, mature ponderosa pine. These trees should remain healthy during the early decades, however, insect activity will probably increase in these stands after they pass culmination of mean annual increment In Alternative I, a total of 454,388 acres will be managed to produce ponderosa pine at economic rotations, of about 100 years, with about 125,578 acres managed with uneven-aged methods to produce ponderosa pine In Alternatives C-Modified and I, the remaining fir stands will be susceptible to the same risks as noted above

In all alternatives except Alternatives NC and A, there will be a risk of increased insect and disease activity in riparian and visually sensitive areas because of the species changes in these areas from pine to fir, and/or trees in these areas will be retained past culmination of mean annual increment Those trees carried many decades past culmination of mean annual increment will be growing less vigorously and may become more susceptible to attack from various pests

There will be an increase in the activity of pocket gophers directly related to the number of acres regenerated in each alternative These animals have the potential to kill or

severely damage trees on about 25 percent of the acres receiving regeneration management activity in the ponderosa pine and Douglas-fir tree species. Control activity will consist of silvicultural methods (i e , size of units and/or type of cuts) and poisons. Alternatives that have large acreages receiving regeneration harvest activity will also have large numbers of acres treated for pocket gophers Alternatives will have between 1,000 and 3,000 acres treated with poison annually for pocket gopher control.

b *Timber Management Effects on Old-Growth Trees*

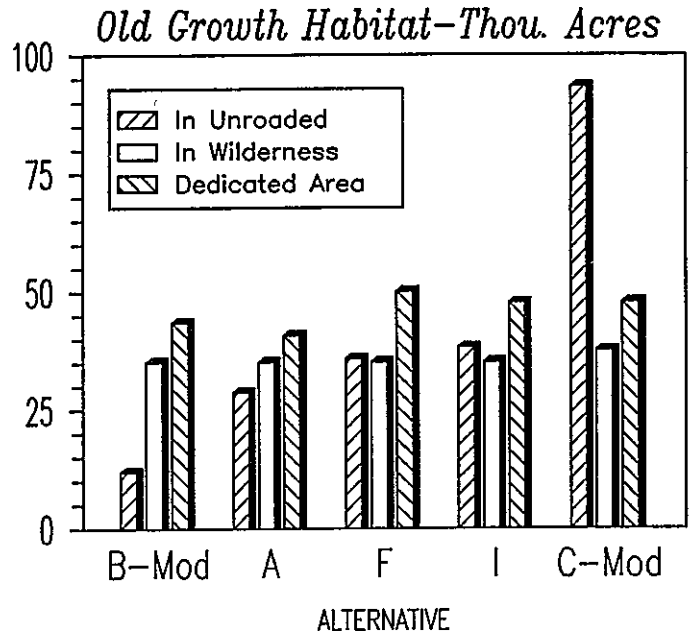
Each of the alternatives retains some timber stands in old-growth status, seral stages 5-6. (See Chapter III for definition of old-growth stands) The main variation between alternatives is the amount of forest lands retained in this status

Old-growth assignments were distributed throughout the Forest. See Appendix G (dedicated stand alternative) and response to comments on old-growth management for descriptions of the process

In addition to the acres identified as dedicated old growth, additional acres of old growth which meet snag and down material requirements (defined by the Pacific Northwest Regional Guide) occur in wilderness, undeveloped areas, and the bald eagle winter roosts. In these areas, vegetation will progress through its natural successional stages barring any natural catastrophe such as insect infestation, disease, fire, or windstorm. Management of these areas precludes any timber harvest which would alter the old-growth characteristics. Old growth not only provides wildlife habitat, but also ecosystem diversity, and may provide spiritual or aesthetic values to humans In Alternative I, an additional 25,000 acres will be managed on extended rotation to produce old growth replacement stands. Timber management will be the same as in normal even-aged or uneven-aged prescriptions for the first 100 years, with little activity occurring for the next 40 to 60 years in order to produce a stand which will have about 50 percent of the trees 25 inches or greater. The main variation between alternatives is the number of acres assigned to management areas which do not allow for timber management activities

The total number of acres which will provide old growth through all decades by alternative is displayed in Figure IV-4.

FIGURE IV-4: Acres of Old Growth by Alternative 1/



1/Alternative NC manages 123,587 potential old-growth acres on the Forest on a 260-year rotation using the three-tier system, maintaining old growth at 5 percent in timber and range emphasis areas and 10 percent in wildlife emphasis areas Old growth data for the unroaded category includes 3,350 acres within bald eagle winter roosts

In addition to the acres displayed in Figure IV-4, visually sensitive areas, old-growth replacement stands, and wildlife emphasis areas, as well as managed forest lands will provide some characteristics of old growth

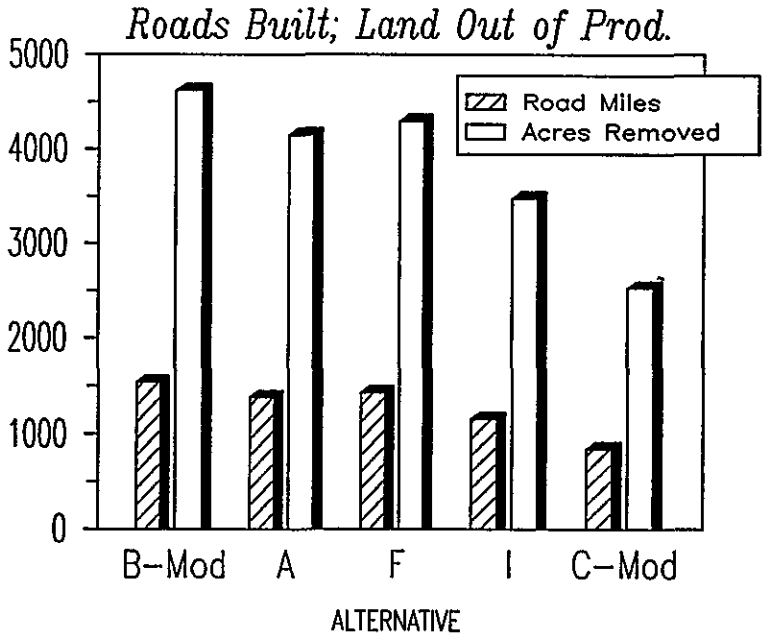
The visual zones, wildlife emphasis, and general forest, however, will be managed to produce values other than old growth Over time, the number of snags, down material, and the multistoried stands required for old growth may not be present in these areas. Old-growth replacement stands will be managed to meet old-growth characteristics, but not all stands will meet them at different times during the rotation.

There will be a risk of increased insect activity in old-growth stands They could become infestation centers to produce epidemic populations of insects which would then move into the rest of the Forest This risk increases with increased acres of old growth and it increases over time, but it is somewhat mitigated by the many insectivorous birds which are anticipated to be at optimum levels in old-growth stands

c Effects of Roads on Trees

To provide access for management activities in each alternative, additional roads will be constructed The general effect of the transportation system on trees is to eliminate land from production of trees. The main difference between the alternatives is the miles of road built and the number of acres removed from production of trees Figure IV-5 displays the miles of road built over 50 years and the acres removed from tree production, by alternative

FIGURE IV-5: Miles of Road Built and Acres Removed from Tree Production



d. *Effects of Mining on Trees*

Operations taking place under the authority of the Mining Laws have the right to remove trees which are within the area proposed for mining Trees needed for mining purposes may be obtained free of charge from the operator's mining claims Merchantable timber, which is not needed for mining purposes, remains government property and is sold separately. These impacts are removed from any planned sale activity by the Forest, and must be dealt with as they arise

e *Effects on Cumulative Timber Supply*

Lumber mills within and adjacent to the Malheur National Forest's zone of Cumulative influence are expected to experience a reasonably stable timber supply from the Timber Supply Forest over the next 15 years However, the supply of high-quality, large diameter sawlogs will diminish over time, and may not satisfy demand Projections indicate that the supply of non-National Forest stumpage will remain near present levels, although the contribution to total supply is not substantial (around 10 percent of total). Consequently, because of the dominant supply position of National Forests in the local area, harvest levels proposed under the different National Forest management alternatives are critical to the cumulative timber supply available Table IV-3 displays the total harvest volume expected in Grant and Harney counties for each decade by alternative.

TABLE IV-3: Total Projected Harvest by Alternative Grant and Harney Counties
(Average Annual Harvest in Millions of Board Feet)2/

	1970-1979	1980-1989	1990-1999	2000-2009	2010-2019
Non-National Forest Volume	42	22	34	34	30
Other National Forest Volume1/	70	70	83	83	83
Forest Supply by Alternative 3/					
Alternative NC (No Change)	N/A	N/A	387	N/A	N/A
Alternative A (No Action)	N/A	N/A	350	350	348
Alternative B-Mod	N/A	N/A	383	383	379
Alternative C-Mod	N/A	N/A	271	271	267
Alternative F	N/A	N/A	364	364	360
Alternative I (Preferred)	N/A	N/A	328	328	324
Estimated Demand by Period4/			300-348	309-365	318-383

1/Figures presented here include 40 MMBF from the Ochoco National Forest in Harney County and 43 MMBF from the Umatilla National Forest in Grant County These supply estimates from other National Forests represent projected harvest levels, from the preferred alternatives of the Forest Environmental Impact Statements and Forest Plans Estimates were obtained by prorating projected Forest harvests against acres of the respective Forest in Grant and Harney Counties

2/Assumes a constant cubic foot/board conversion ratio over all displayed time periods for individual alternatives Forest supply by alternative estimates include timber sale program quantity from the Malheur National Forest (specific to alternatives) plus non-National Forest and other National Forest volume

3/The No Change Alternative is based on the 1979 Timber Resource Management Plan (TRP) The first decade projected harvest for this alternative is assumed to be the potential yield of 269 7 MMBF, although actual programmed sell levels are lower The 1979 TRP does not project harvests in later decades, thus, no projection are made for later decades

4/From Table III-6

Cumulative Supply 1990-1999 As displayed in Table IV-2 above, all alternatives except C-Modified contributes enough to the total supply picture to satisfy the lower bound demand estimate for the 1990-99 period. The total supply associated with Alternative I is near the midpoint of the range of estimated demand, and the probability of supply satisfying local demand is estimated to be greater than 50 percent. All other alternatives would supply stumpage apparently in excess of estimated demand. In actuality, any excess supply may encourage growth in existing industry in the zone of influence or growth in adjacent areas which may expand the Forest zone of influence. Also, increased competition may occur for the supply of timber from the Forest as a result of reductions in timber supplies in surrounding areas

Cumulative Supply 2000-2009. Under the assumption that demand will increase 3 to 5 percent over the 1990-1999 period, all except Alternative C-Modified contributes enough to the total supply picture to satisfy the lower bound demand estimate However, Alternative I is somewhat near the lower bound of demand, which may result in demand

exceeding supply. Alternatives A, B-Modified, and F project supply levels near the upper bound of demand, and excess supply may be available However, growth in the timber industry within or adjacent to the Forest zones of influence may occur, absorbing any excess supply Projections of supply for Alternative NC are not available

Cumulative Supply 2010-2019 With the assumption of a steady 3 to 5 percent growth in demand during the 2010-2019 period, Alternative C-Modified continues to result in insufficient supply for estimated demand Under Alternative I, the growth in demand would probably be minimally met by the total supply All other alternatives would also result in cumulative supply levels within the range of estimated demand for the period. No significant oversupply is projected, and most alternatives are near the midpoint of the estimated demand range Projections of supply for Alternative NC are not available

Discussion of Results The interaction of the cumulative supply, by alternative, with the projected demand by time period is contingent on several important assumptions Perhaps foremost are the assumptions underlying the estimates of demand For example, if no growth in demand were to occur and demand remained at the 1980-85 level, all alternatives (except Alternative C-Modified) would result in an adequate (or greater) cumulative timber supply Correspondingly, if major long-term increases in demand were to occur (if, for example, adjacent supply sources reduced their offerings), the cumulative supply under most alternatives would not meet the demand For all alternatives, the cumulative supply over time is relatively stable, reflecting the high percentage of publicly managed raw material in the total supply picture Based on past management practices and policies, the publicly-managed stumpage will generally be available regardless of market forces.

In general, the cumulative supply picture within the Forest's zone of influence is highly dependent upon the supply actions (i e., the harvest levels) of the National Forests within the zone. However, because of the large public holdings, fluctuations in local timber supply are expected to be minimal because of agency policies (e g., nondeclining flow) Opportunities to increase supply quickly, in response to market forces (e g , rising prices for stumpage) will be foregone Strong increases in demand without similar increases in supply would result in price increases and possible market reactions similar to the late 1970's and early 1980's. The market conditions during this period were marked by speculation on continued inflationary trends, and eventually resulted in the timber buy-back program

Projections of some combined effects of current demand and anticipated future supply conditions are as follows

1 In general, the supply of National Forest timber for Grant and Harney counties will be sufficient for existing local industries Industry employment will be relatively stable

2. Some increases in demand for Malheur National Forest timber may occur as adjacent Forests analyze their timber holdings and revise harvest levels. Demand for the high-quality, large-diameter ponderosa pine on the Malheur National Forest will intensify as the supply of that type of material diminishes in surrounding market areas (e g , Baker, Bend, Boise) This is presently being realized in the local area

3 Local industries may expand or new industries may locate in the Forest zone of influence if supply from the Forest increases substantially This movement of industry will be in response to perceptions of ample supply from National Forests in Grant and Harney counties Implicit in any industrial expansion or relocation in the Forest zone of influence is the expectation that investments will be recovered over a substantial period of time, essentially through sustained supply

4. Other sources of supply (i e , private or other public ownerships) will continue to provide some raw material, but in relatively small amounts. Private ownerships will supply

stumpage after consideration of price trends or, in the case of industrial ownerships, as supply needs dictate The National Forests and other public ownerships will schedule harvests regardless of pricing factors

f. *Mitigation Measures*

Mitigation measures such as designated skid trails, directional falling, equipment size limitations, line pulling, and stage logging will be used to protect or lessen the physical damage or loss of trees which are to remain on a site following timber harvest These measures, individually or in conjunction with each other, should help achieve successful mitigating results for 75-80 percent of the time (Kile 1981, Perry 1984)

These same measures will be used to reduce the loss to disease agents, mainly by preventing damage to the trees or excessive activity on the site which would increase the trees' susceptibility to damage Again, success should occur 75-80 percent of the time

Silvicultural practices will also be used to mitigate losses due to insects and disease. These practices include species selection for a site, stocking level control, and number of entries allowed in a stand These methods will vary in their success at controlling losses A species change may solve a root rot problem entirely, while stocking level control may only lessen the impact of the western spruce budworm (Dolph 1985; Hadfield 1984; Hadfield 1985; McArthur 1985, Twardus et al., 1984)

Following mining activity, reclamation will include such measures as may be necessary to re-establish trees in the impacted areas Measures used are natural regeneration, and planting of young trees in large cleared areas which will not readily revegetate through natural processes

g *Relationship with Plans of Others*

A summary of the response of alternatives to the basic objectives of the Forestry Program for Oregon can be found in Table IV-4 Four alternatives (Alternatives A, B-Modified, and F) meet the timber output levels desired by this program Two alternatives (Alternatives C-Modified and I) do not meet those output levels in any decade. Alternative NC meets the program in the first decade Due to lack of specific information after the first decade, no volume projections can be made

The State Board of Forestry's Forestry Program for Oregon target levels related to timber production must not be confused with the State of Oregon objectives reflected in the Governor's response nor the State Alternative prepared for the forest plan Objectives guiding the Governor's response include concerns for Oregon's forest environment, wildlife protection, jobs, and timber production An equitable balance among these often conflicting resources is the principal goal

TABLE IV-4: Relationship of the Proposed Action and Alternatives to the Basic Objectives of the Forestry Program for Oregon
Proposed Action and Alternatives

	Basic Objective	Level 1[1/]	Level 2[2/]	Level 3[3/]
1a	To maintain the maximum potential commercial Forest land base consistent with other resource uses while assuring environmental quality	A,B-Mod,F, NC	C-Mod,I	
1b	Oregon Department of Forestry Compatibility Standard Alternatives are compatible with objective if the acres suitable for timber management meet or exceed the suitable land base used in the maximum Present Net Value benchmark run, constrained by Management Requirements	B-Mod	F,NC	A,C-Mod,I
2a	To identify and implement economically feasible levels of intensive Forest management required to achieve cost-effective growth and harvest	A,B-Mod,F, I,NC	C-Mod	
2b	Oregon Department of Fish and Wildlife Compatibility Standard An alternative is compatible with the objective if alternative equals 90 percent or more of the number of acres allocated to the full timber yield in the maximum Present Net Value benchmark, constrained by Management Requirements	B-Mod	A,F	C-Mod,NC I
3a	To maintain community stability by remaining flexible for increases in future harvest levels that would offset projected shortages	A,B-Mod F,NC	I	C-Mod
3b	Oregon Department of Fish and Wildlife Compatibility Standard An alternative is compatible with this objective if the number of jobs and income levels and payments to counties meets or exceeds the current direction levels of these parameters during the first decade	B-Mod F,NC	A,I	C-Mod

1/Meets share of Forestry Program for Oregon target level and is compatible with basic objective
2/Compatible with the basic objective but does not meet target level or meets the target level but is not compatible with the basic objective
3/Does not meet target level and is not compatible with the basic objective

Discussion

1a Congressional Acts and Executive Orders (Final Environmental Impact Statement, Chapter I) and State law (Oregon Forest Practices Act) mandate management guidelines for certain lands Incorporated throughout the planning process, these guidelines have served to define the suitable land for timber production that is compatible with the objective.

1b. Oregon Department of Forestry has stated the Forestry Program for Oregon acknowledges the need for minimum levels of environmental protection. While the Department believes that some Management Requirements may unnecessarily restrict timber management, they suggest use of the maximum Present Net Value with Management Requirements benchmark as the best available land base standard for comparison.

2a A full range of intensive timber Management Practices (refer to Management Strategies and Management Area Direction in Chapter II) is utilized for timber production New and improved practices would be implemented consistent with technological advances

2b The Oregon Department of Forestry defines the full timber yield as the maximum economic yield, constrained by a 95 percent culmination of mean annual increment Again, using the Management Requirement constrained acres as a standard does not mean the Department approves of all Management Requirement strategies The maximum Present Net Value benchmark identifies the economically feasible levels of Forest management for this analysis

3a Deviation from sustained yield management would be implemented consistent with National Forest Management Act regulations and Forest Plan direction This involves the harvest of available surplus old-growth inventory to offset projected shortages

3b The Forestry Program addresses timber harvest scheduling and the resulting effects on local communities and the economy of the State For most National Forests located in Oregon, the Oregon Department of Forestry has stated that departure from nondeclining flow will be necessary to maintain overall economic stability as private industrial harvests inevitably decline The three parameters listed will be measured to determine how each alternative maintains, improves, or decreases economic stability The Department believes that, although the current direction alternative on some Forests does not accurately represent the existing situation, it provides the best available basis for this comparison

In addition, a comparison of how the acres managed for timber production in the preferred alternative compare to the current Timber Resource Plan can be found in Table IV-5 This comparison shows that fewer acres are managed for timber production in Alternative I (preferred), and less acres are managed at higher intensities than under the Timber Resource Plan These changes result in a reduction of harvestable volume available in the first decade from the current plans, and lower harvest volumes than are actually being sold today This also does not meet or exceed the volume called for in the Forestry Program for Oregon

Alternative C-Modified harvests fewer acres and uses less-intensive timber management to produce lower volumes than are currently being sold (see Table II-6 for the average cut and sell volumes for the period 1980-1989), and thus does not meet the goals for the Forestry Program for Oregon

The other alternatives (Alternatives A, B-Modified and F) exhibit this same trend. Alternative NC exceeds the volume called for in the Forestry Program for Oregon in the first decade Due to lack of specific information regarding management activities in the NC alternative, no volume projections are available for later decades

Alternatives A, B-Modified, and F will provide timber sell levels equal to or greater than historic levels (228 MMBF average annual from 1980-1989). Assuming that the local communities have been experiencing minor growth historically and are capable of dealing with community growth easily, community stability will be maintained in those alternatives which maintain a timber sell level equal to or greater than historic levels None of the alternatives would result in growth so rapid that it would cause destabilization of the community services Alternative C-Modified and, to a lesser degree I, (with timber sell levels slightly below recent historical levels) would result in reductions in employment opportunities and, consequently, some displacement in the local communities.

TABLE IV-5: Comparison of Preferred Alternative to Current Timber Management Plan

Timber Management Plan[1/]	Alternative I (Preferred)	Reason for Change
A Land Suitability	These changes in suitable land acreage are consistent for all alternatives in this final EIS	These changes are due to
1 Lands available for timber harvest number of acres in Standard, Special, and Marginal, and upon which a regulated harvest was based 1,123,123		The correction of forested acres with a new mapping system, identification of sites with regeneration difficulties, reduction for transportation system,
2 Acres of RARE II roadless areas which were suitable for timber harvest and upon which timber harvest was deferred pending resolution of the wilderness issue 25,948		The 1984 Oregon Wilderness Bill added to Strawberry Mt Wilderness and created the Monument Rock Wilderness, 1988 Wild and Scenic Rivers Act reduced suitable acres
	Total change = 83,255 acres	
	Tentatively suitable lands - Lands which scheduled timber harvest is permitted 1,039,868	Suitable acres vary by alternative design The following is specific to Alternative I (preferred)
2a Unregulated Acres		
Roadless management areas found in the established unit plans 33,361	47,690	Acreage dedicated for old-growth management
	60,228	Acreage in Semi-Primitive, Scenic, Wildlife Emphasis
	2,231	Bald Eagle Winter Roosts and Special Interest Areas
	24,568	Riparian zone acres removed from scheduled harvest
	40,091	Acreage identified with spatial infeasibilities
	29,090	Acres economically poor for timber production
3 Total acres of commercial forestland 1,182,432	Total suitable acres 835,970	Total Change -346,462

1/Information available during development of the Forestry Program for Oregon (1982)

1979 Timber Management Plan[1/]	Alternative I (Preferred)	Reason for Change
B Timber Management Intensities		
Number of acres selected and managed for	Number of acres selected and managed for	Alternative I is less of a commodity-oriented alternative The result is that fewer timbered acres are scheduled to receive full-yield timber harvest prescriptions than in the current Timber Management Plan
1 Full Yield (91-100%) 657,750[2/]	1 Full Yield (91-100%) 468,656[3/]	
2 Partial Yield (50-90%) 465,373[4/]	2 Partial Yield (50-90%)322,862[4/]	Riparian areas are not the only areas to receive this moderate level of management in this alternative Acres managed for subclimax ponderosa pine on climax mixed conifer sites receive a moderate level of management Old growth, wildlife, streamside management units, visual resource management areas, lodgepole pine type, and other special areas received this level of management in the current Timber Management Plan
3 Partial Yield (1-49%) 0[4/]	3 Partial Yield (1-49%) 44,452[4/]	Foreground visual management areas receive this level of timber management in the preferred alternative No acres received this level of timber management in the Timber Management Plan

C Other Factors

Forestry Program For Oregon is based on a 55-year minimum age of harvest Culmination of mean annual increment constraint (or 95 percent thereof if based on 70 to 80 years) for all species in this alternative Forestry Program For Oregon assumes merchantability to a 4-inch top for all species, Alternative I assumes a 4-inch top for all currently managed stands in the first decade and a 4-inch top for all species, after the first decade, once stands are brought under timber management regimes.

2/Generally equates to "standard" areas in timber plans

3/Generally equates to Management Area #1 acreage in Forest Plan

4/Land classifications/prescriptions which reduce timber yields from "full yield".

3. *Effects on Vegetation/Forage*

The Malheur National Forest is over 80 percent forested and roughly 70 percent tentatively suitable for timber management. In forested areas, the structure of plant communities are most influenced by timber management activities, especially logging

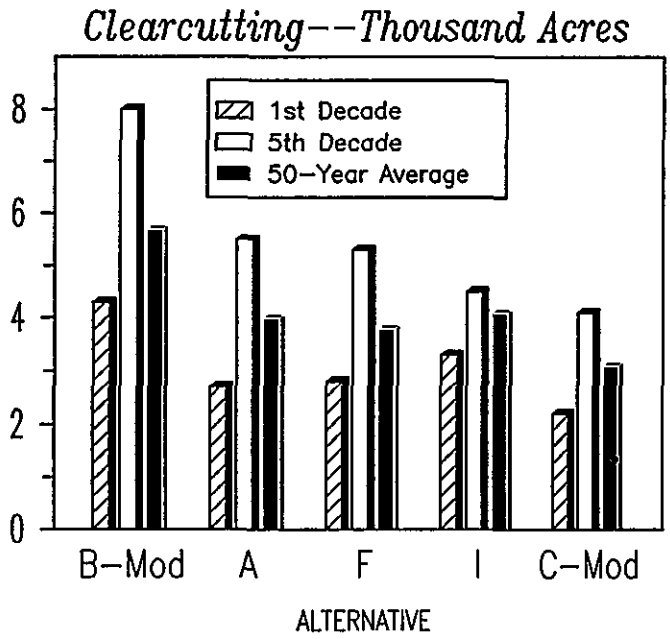
a. *Timber Management Effects on Forage*

The rotation age (how many years trees grow before they are cut), frequency of entry into a stand, amount of timber cut, and silvicultural system all influence other vegetation as well as trees

Alternatives NC, A, B-Modified, F and I emphasize high-intensity timber management on many acres. (See Section 2 of this chapter.) The primary final harvest methods in mixed conifer stands will be clearcuts and shelterwoods These stands are not natural rangeland or forage areas due to the dense tree cover, dominance of huckleberry, and lack of grass and grasslike vegetation. However, timber management activities provide the opportunity to seed disturbed areas with grasses (usually wheatgrasses or orchard grass) and removal of tree cover allows sunlight to reach vegetation on the ground, stimulating growth of shade-intolerant species These results provide transitory range where little to none existed prior to the activity Further entries into the stand (approximately every 20 to 30 years) to complete a precommercial thinning and up to 3 commercial thinnings will provide added opportunities for forage enhancement and continued removal of tree cover.

The highest forage production follows clearcutting Figure IV-6 shows the acres of clearcuts for each alternative for five decades

FIGURE IV-6: *Clearcut Acres Scheduled*



The primary regeneration method used in ponderosa pine is via shelterwood harvest Ponderosa pine sites are naturally the most productive and valuable forested range on the Forest. These sites will also receive entries for stocking level control (thinnings) Timber management activities on these sites provide an opportunity to further enhance the natural productivity on treated areas.

Alternative C-Modified emphasizes open stands of large, mature ponderosa pine (see description of this timber management strategy in Section E2 b of this chapter). Because it takes longer to grow these large trees (stands generally receive only one commercial thinning), these stands are entered fewer times than tree stands receiving high-intensity timber management In addition, no seeding for forage enhancement will be done on timber sale areas in this alternative. Forage response to timber treatments will be limited to naturally occurring vegetation and a small amount of erosion seeding. The tree canopy will remain in place longer, however, such stands are naturally more open and sunny than mixed conifer stands and produce forage vegetation even in these conditions.

In addition, the emphasis in these areas to perpetuate ponderosa pine will result in treatment of the understory This could be done chemically, manually, or with prescribed fire. Either of the latter two methods would reduce competing tree vegetation thus enhancing the grasses and shrubs Fire would produce the most response, actually stimulating grass and grasslike plant growth, particularly of native elk sedge and pinegrass.

There are areas on the Forest which will not be emphasized for pine production in Alternative C-Modified. Clearcutting and shelterwood harvests will often be used to manage mixed conifer stands The natural vegetation will respond to these harvests, which remove the dense tree cover and allow it to flourish (see above)

In each alternative there will be areas on the Forest (wilderness, old growth, undeveloped areas, etc) which receive no vegetative manipulation The vegetation in these areas will move through natural successional stages

b *Range Management Effects on Forage*

Within the Forest, riparian zones are a focal point of cattle grazing activity. Typically, riparian zones comprise 3-5 percent of a pasture, but they generally provide 20-30 percent of the total livestock forage. In a riparian area, when shrub use reaches 50 percent of the annual growth available to wildlife and livestock, livestock use will typically be curtailed

The vigor of shrub species in riparian areas improves over time in all alternatives except Alternative A Heavy utilization of herbaceous vegetation in riparian zones by cattle and anticipated increase in elk herds in Alternative A could cause competition for forage. Riparian areas in winter ranges could show a deteriorating condition caused from grazing, by elk in early spring and by livestock from late spring into fall Shrub growth along streams would slow or be eliminated

In all alternatives except Alternative NC, allowable grazing level on the uplands is targeted at 50 percent of the available forage It is anticipated that, along with the grazing systems and structural improvements, this grazing level will maintain plant vigor and condition, and community diversity

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will also maintain plant vigor and condition The effects on plant community diversity are not known.

Establishment of young grass/grass-like plants in the plant community is expected as the season of use is rotated and overall grazing pressure is maintained at a moderate level After grazing, the forage will generally have a rough, uneven stubbly appearance with scattered seedheads

Forage consumption by cattle tends to be important for short periods during the early part of the grazing season, dropping off rapidly as plants develop Forb use will generally be less than prescribed for grass/grass-like plants, affording that component of the plant community slightly more protection Those forbs in close proximity to grasses, such as

in a meadow or riparian setting, will be managed through the allowable use standards set for grasses

A primary objective of Alternative B-Modified is to increase desirable forage species for livestock A total of 19,000 acres could be treated to enhance livestock forage on flat or gently sloping, nonforested areas within 10 years Higher quality livestock forage can be produced on these sites by introducing a mixture of grass species. Management of livestock will emphasize utilization of the introduced forage Because cattle will prefer and use the introduced grass species, accelerated improvement will occur in native forage species on the untreated areas This improvement will not occur until a significant area has been treated with introduced grass species.

Alternative C-Modified emphasizes reliance on native species for the forage base. Since no timber sale seeding is planned, riparian areas, along with elk sedge and pinegrass, would provide the bulk of available forage Alternative C-Modified improves and maintains the native vegetation through reduced livestock stocking and removal of livestock in those riparian areas in less than desirable condition.

Alternatives F and Iwould create a mix of introduced and native species by seeding approximately 6,000 acres of forest land a year Livestock use would be limited on a site-specific basis to return riparian areas to satisfactory condition The limited livestock use would be staged to occur over a longer period of time, and livestock use would vary from no use to 40 percent use, depending on the rate of recovery desired. This would accelerate recovery of streamside vegetation and maintain shrub and herbage vigor once satisfactory condition is reached

c *Mitigation Measures*

Grazing and browsing remove vegetative material; this curtails the rate of energy production (photosynthesis) Prolonged and excessive forage utilization can result in a reduction of plant vigor, changes in composition of vegetative communities, reduced vegetation density, and decreased biomass production Forest-wide Standards (Forest Plan, Chapter IV, Section E) for management of vegetation using browsing and grazing will be followed on all grazing allotments and include specific objectives for all resources and uses Additional site-specific interdisciplinary objectives will be developed for each allotment to manage use of the vegetation. Combined livestock, wild horse, and big-game use will be limited to a level which assures that vegetative-use objectives are met on every allotment.

Allotment management plans will be prepared and maintained to direct site-specific management actions. Monitoring of these plans for effectiveness and achievement of Forest-wide Standards and specific objectives will be an ongoing program Inventory and analysis of forage trend, production, and condition is an essential part of the monitoring effort Range practices and improvements will be evaluated and modified to improve and mitigate effects of browsing and grazing use

Such range practices may include additional fencing of allotment pastures, development of water sources away from live streams, proper amounts and distribution of salt, riding and herding, livestock forage enhancement, reduced season-of-use, reduced animal numbers, and appropriate grazing systems Local Forest experience and professional judgment have determined that forage mitigation measures can be 70 percent effective if sufficient resources are available to plan, administer, develop, and monitor use If resources are not available the mitigative course of action is to reduce numbers and/or season of grazing and browsing animals (Wambolt 1973)

The Forest manages habitat for big game The State of Oregon manages big-game populations. Big-game numbers are controlled by lengths of hunting season, bag limits, number of hunting permits issued, sex of animals harvested, etc Natural mortality factors such as predation and winter kill, also play a factor in the maintenance of herd

numbers The Forest may recommend population control to the State if animals are overusing the forage.

One mitigation measure the Forest has over big-game animals concerning utilization of forage in riparian zones is creation of exclosure fences which exclude both livestock and big game Examples of vegetative recovery, evaluated on the Forest through professional judgment and experience, show this practice can be 99 percent effective when annual maintenance is performed on the exclosure As with any type of structure, if not maintained, it becomes ineffective over time

4. Effects on Wildlife/Big Game

The general effects of timber harvest and other management activities on wildlife are discussed in Chapter III, Affected Environment

a *Timber Management Effects on Big Game*

Timber management activities have the potential to alter the Forest ecosystem more drastically than any other Forest management activity and, as such, can have a profound effect on the response of deer and elk populations As timber management activities remove overstory trees, the understory vegetation responds and forage production is increased Theoretically, more forage is produced and available to grazing animals as more acres are managed by timber production This transitory forage is available for a few years until the new forest stand develop and reoccupies the site Timber management activities have improved and can further improve the balance and distribution of cover and forage if strategies are well-developed Elk populations have increased over the last 12 years, probably in response to a reduction of excess cover and corresponding increases in forage

However, big-game populations may respond to many factors other than forage production and availability One such factor may be related to reductions in cover beyond threshold levels As much information is anecdotal, and not analytical, many opinions exist concerning big-game habitat and the response of big game to habitat conditions For the purposes of habitat discussions in this FEIS, a Habitat Effectiveness Index (Thomas, et al , 1988) is used to estimate differences in big-game habitat, and potential populations, by alternative design

Population levels are not directly related to the Habitat Effectiveness Index (HEI) for elk because of factors such as hunting mortality and the quality of winter range outside the Forest But, for planning purposes, the assumption is made that potential elk populations are directly proportional to HEI, which is used for alternative comparison Habitat Effectiveness Index is the relationship of habitat factors, cover quality, spacing and size, tied to the miles of open road (disturbance) and available forage These factors interact as a result of management activities, and potential numbers of elk correspondingly increase or decrease. Because of the lack of data, forage factors are assumed to be similar for all alternatives

The Habitat Effectiveness Index model has been designed for habitat analysis in subwatershed areas of 3,000 to 15,000 acres in size For planning purposes and for analysis and comparison of alternatives, the HEI has been used to give a Forest-wide picture of habitat conditions for elk Forest-wide application of the model has masked the more subtle differences between alternatives over the 50 year planning horizon However, generalized differences between alternatives can be addressed and are discussed below

Alternative A, through steady-increasing regeneration harvests, brings a slow improvement in cover size and spacing and an overall slight decrease in cover quality. Road closures through the 50 years slowly increases the Habitat Effectiveness Index to .59 by the end of the fifth decade

Alternative B-Modified makes a rapid improvement on cover distribution for the first few decades, but reduces the amount of satisfactory cover throughout the 5 decades via greater emphasis on regeneration harvests Cover quality decreases rapidly by the end of the fifth decade as younger stands fail to provide substantial amounts of satisfactory cover. A road closure program mitigates the effect of cover quality reductions, so that by the end of the fifth decade, the Habitat Effectiveness Index has remained at .56

Alternative C-Modified only slowly improves on cover spacing throughout the 5 decades due to emphasis on management for large ponderosa pine and fewer acres assigned to timber management, especially regeneration harvest However, cover quality is maintained and increased, as old growth stands and unharvested older stands remain at higher levels than any other alternative Satisfactory cover is retained at twice the frequency of Alternative B-Modified In Alternative C-Modified, the winter range is managed in mixed conifer providing higher quality cover for elk. By the end of the fifth decade, the Habitat Effectiveness Index for this alternative is 63, although specific winter ranges will have much higher values than average. This effect is masked by application of the Habitat Effectiveness Index model to the entire Forest A road closure program, combined with minimal road construction helps to maintain high overall HEI values.

Alternative F brings a moderate improvement in cover spacing throughout the 5 decades because of additional acres under management Cover quality is reduced by the fifth decade, as regeneration harvests have been delayed due to economic incentives A road closure program helps maintain only a slight increase in habitat conditions over time, as estimated using the HEI model. By the end of the fifth decade, the Habitat Effectiveness Index for this alternative is .59

Alternative I also brings a fairly rapid improvement in cover spacing over the 5 decades, while retaining moderately high levels of satisfactory cover A road closure program limits open road densities such that the overall HEI increases over the 5 decades By the end of the fifth decade, the Habitat Effectiveness Index for Alternative I is .64

Mule deer summer habitat on the Forest would improve with the increase in shrubs and hardwoods in riparian areas expected in all alternatives, except Alternative A Opportunities to enhance browse species like mountain-mahogany, bitterbrush, and forbs for mule deer, would occur under Alternative C-Modified, and to a lesser degree under other alternatives Increased emphasis for uneven-aged management under Alternatives C-Modified and I, would provide the small patches of cover and forage, which could make ideal summer habitat for mule deer

b. *Range Management Effects on Big Game*

Competition for forage appears less important than competition for space on summer range To assess carrying capacity and management needs solely by forage assignment does not appear valid on forested and nonforested ranges grazed concurrently by elk and cattle. Making grazing areas available is more practical and ecologically sound than assignment of forage At this time, forested communities within the Malheur National Forest provide some of the most productive summer habitat for elk in eastern Oregon. Numbers of elk are increasing while permitted cattle use remains fairly constant Cattle use is limited to a 4-month to 4.5-month grazing season during June, July, August, September, and October

Based upon current elk populations and Forest management activity levels, competition for space does not appear to be a limiting factor on summer ranges During the summer use period, permitted cattle favor forage and resting areas on flat to gentle slopes adjacent to water. Cattle use of steeper slopes under existing management levels, permitted season of use, and numbers is light, therefore, these slopes are fully available for big-game use Permitted cattle are moved from pasture-to-pasture as the growing season progresses and as the desired level of utilization is attained Positive livestock control is achieved by maintaining effective unit fences, water developments, and the physical distribution

of use within each grazing unit. Mitigation of any impacts resulting from this use is achieved by alternate annual treatments of use and deferment (rest).

Field studies of competition between elk and livestock provide more evidence of coexistence than of competitive exclusion. Elk preferentially avoid areas with active cattle grazing and/or areas where cattle grazing recently occurred. Biologists have spent considerable time and effort over the past several years gathering data about this topic, but to date it remains largely an issue of conjecture (Lonner and Mackie 1983)

Permitted cattle use on winter range is limited to the same season as that allowed on summer ranges. Winter range is available to elk yearlong, however, concentrated numbers of elk use this range during the winter period depending upon the depth and duration of snow cover and availability of lower-elevation ranges (often not on National Forest land) Cattle are not permitted on winter range during the winter period, therefore, competition for space cannot occur Grazing management attempts to relate cattle stocking rates and big-game use levels to the capability of winter range to produce desired kinds and amounts of vegetation indefinitely. Where conflicts or potential conflicts betweenbig game and cattle occur on forage utilization, the Forest Service may recommend to the State of Oregon a reduction in the population numbers of big game.

Potential conflicts exist between livestock grazing and wildlife habitat needs in that they require the same vegetative component To achieve a predetermined, carefully calculated balance of use between livestock, wild horses, and wildlife, the amount and type of vegetation needed by each must be evaluated Wildlife and livestock may occupy the same land, but due to differences in forage preferences, livestock and wildlife may be using different plants in different locations at different times of the year To resolve conflicts in habitat requirements for all dependent species, the allotment management plan must be adjusted to allow compatible use by each and still maintain health and vigor of the ecosystem. The needs of all wildlife, whether abundant, sensitive, threatened, or endangered, must be identified and met Because habitat is essential for wildlife and livestock, each proposed management practice will be examined to avoid or mitigate possible adverse effects The allotment management plan documents action needed to improve the range and implements the selected alternative. The objective behind each management plan and grazing system is to maintain a vigorous, healthy, and productive plant community for all resources

The majority of harvested acres each year in all alternatives is on flat to gently sloping ground (less than 35 percent slope) Because these areas are favored by livestock and because the alternatives potentially support larger big-game herds, there is increased potential for competition for forage in these areas. However, livestock use is limited on clearcuts for 5 years following harvest, thus increased forage is available to big game Roads constructed for timber harvest activities also help to disperse livestock use to steeper areas previously used only by big game

In alternatives with high permitted livestock levels and/or large potential increases in summer big-game populations, such as Alternatives A and B-Modified, deteriorating range condition could result, especially on winter range.

c. *Mitigation Measures*

In Alternative C-Modified, the previously described effects are partially offset by management of all winter ranges, which includes such practices as forage seeding and burning to enhance vegetation growth In addition, permitted livestock use of degraded riparian areas will be modified or curtailed to allow for recovery of the vegetation in these areas. Increased grazing by big game during winter and/or early spring could slow shrub growth along streams

In other alternatives, range forage condition will be monitored to determine any need for other mitigation measures (see Forest Plan, Chapter V) These would be developed on a

case-by-case basis

As available forage for each alternative increases through timber harvest activities, areas which are not harvested have an increasingly important role in providing both thermal cover (ie., satisfactory and marginal cover) and escapement (ie , hiding cover) for bulls and bucks during hunting seasons. Habitat Effectiveness Index standards will require maintenance of big-game cover within subwatershed areas of 3,000 to 15,000 acres Cover is also located in wilderness and unroaded areas of the Forest as well as in old-growth stands. The unthinned understories of old-growth stands provide big-game hiding cover, and when the crown closure is better than 40 percent old-growth stands provide cover The acres of unroaded areas retained in each alternative are shown in Figure IV-13 The acres of old-growth habitat retained in each alternative are shown in Figure IV-4

In alternatives which intensively manage timber on much of the Forest, such as Alternatives NC, B-Modified and F, dedicated old-growth stands (managed in the case of Alternative NC) will be increasingly important in distribution of cover among the forage provided by timber harvest activities

The medium intensity of timber management in most alternatives (see Section E 2.b in this chapter) creates an assortment of tree age-classes, including older successional stages and openings, which would provide a desirable mixture of cover and forage on a Forest-wide basis Improvements in herbaceous vegetation, especially of hardwoods and shrubs, in riparian areas would also provide hiding cover for mule deer and elk, and quite possibly thermal cover for mule deer The main variation between alternatives is in the number of acres in these areas (See Figure IV-3 and Table IV-2.)

The main thrust of big-game management in coordination with timber management is in implementing Habitat Effectiveness Index standards to achieve desirable balances of cover quality and spacing while providing some security from the potential disturbance of road use Some of the effects of timber management activities can be mitigated Created openings normally will not exceed 40 acres in size, suitable cover stands will be left between openings, harvest units will be considered openings until reproduction reaches 4 5 feet in height, etc Also, big-game habitat improvement projects help mitigate adverse impacts by providing other needed habitat components; the development of water sources, planting of palatable shrubs, browse and forbs, underburning of browse and grassy areas and open timber stands, the removal of barriers to big-game movements, and other strategies.

5 *Effects on Wildlife/Cavity-Dependent Species*

If at least three natural snags per acre were retained on the Forest, that could supply habitat for 100 percent of the potential populations of cavity-dependent species On a managed Forest, however, snags and potential snags are harvested for timber, wood fiber, or firewood Some are removed for the safety of woods-workers or recreationists As demand for timber increases, especially wood fiber and firewood, managing snags will require more effort The main variation between alternatives is in the percent of total potential populations of cavity-dependent species for which snags are managed.

Outside the wilderness and unroaded areas, snag levels are provided in specific management areas of the Forest Each alternative provides habitat to carry 80 percent of potential cavity nesting species populations in riparian areas, and 50 percent with 600 feet of riparian areas, except for Alternatives A, NC, and I. All alternatives would provide snags at or near natural levels in wildernesses, Research Natural Areas, scenic areas, bald eagle winter roosts, and dedicated old-growth areas Alternatives A and NC provide a 60 percent snag level in wildlife emphasis areas and 40 percent on the rest of the Forest. Old-growth habitat contributes to these snag habitat levels Alternative I provides for 40 percent of the potential cavity dwelling species Forest-wide, 60 percent of the potential in riparian areas, and 60-100 percent in wildlife emphasis areas

Alternative B-Modified provides for a Forest-wide average of at least 40 percent of potential cavity-nesting populations Alternative F also provides for a Forest-wide average of about 40 percent of the potential cavity-nesting population Alternative C-Modified provides for a Forest-wide average of 60 percent of the cavity-nesting population A 20 percent level of potential populations is considered the lowest level which could provide for viable populations However, due to regional Forest Service requirements, all viable alternatives have been designed to exceed this minimum level

In Alternative B-Modified, the majority of unroaded areas will be developed within the first decade and roads will provide access for woodcutters to these areas, further increasing the risk to snag levels there The role of snags in riparian areas in Alternative B-Modified then is critical to maintaining these populations at viable levels Excessive loss of those trees to woodcutting, salvage sales, or natural catastrophes could reduce cavity-dependent populations below the minimum level

Alternatives A, F, and I will develop much of the available unroaded areas in the first decade, but snag levels will not be reduced as severely as in Alternative B-Modified Access management design would limit the amount of open road miles, thus mediating snag removals Alternative C-Modified provides for the highest level of snags of any alternative

Mitigation Measures

Mitigation measures for snag management will include protection of existing snags and creation of snags by natural or artificial means in snag-deficient areas Protection measures available are (1) leaving snag numbers at higher levels than required to maintain minimum populations of cavity-dependent species, (2) public education, (3) marking of snags for protection, (4) changes in firewood cutting policy, (5) area closures to firewood cutting, and (6) leaving live trees as future winter roosts, and dedicated old-growth areas

Based on experience, protection of snags during commercial timber harvest and prescribed fire is expected to be about 80 percent effective This includes designating live trees to provide future snags, as well as identifying existing snags for protection As timber harvest prescriptions change toward an emphasis on regeneration in later decades, the designation of live trees to provide future snags will become more important Creating snags in snag-deficient areas can be over 90 percent effective where suitable trees are available (Umpqua NF, Diamond Lake RD, 1983 Project Report)

Loss of snags due to firewood cutting is less easily controlled, however, due to the easy availability of dead lodgepole pine, this has not yet become a general concern across the Forest By the end of the first decade, most dead lodgepole pine will have been harvested. By that time, changes in fuelwood cutting policy or restrictions on wood gathering may be needed in specific areas to maintain snag numbers at desired management levels Because of easy access to most of the Forest, administration and enforcement of such restrictions may be a challenge for Forest administrators Effectiveness of these measures will depend on policy changes, the success of public education, and the level of administration

6 *Effects on Wildlife/Old-Growth Indicator Species*

The acres of old growth provided in each alternative are shown in Figure IV-4 Old growth is provided in designated old-growth units distributed across the Forest and within wilderness, roadless areas, and the bald eagle winter roost areas All alternatives maintain 35,239 acres of old-growth in wilderness (37,697 acres in Alternative C-Modified) and 3,350 acres in the bald eagle winter roost areas The amount of old-growth in roadless areas and designated old-growth units varies by alternative Alternative B-Modified maintains the least in roadless areas, with 8,486 acres Alternatives A, F, I and C-Modified have increasing amounts, with Alternative C-Modified having 89,950 acres, corresponding to 50% above Management Requirement levels Alternatives A and B-Modified retain sufficient old growth distributed across the Forest to provide for viable populations of old-growth indicator species (this is the Management Requirement level,

see Appendix G of this FEIS for Management Requirements) Alternatives F and I provide 30 percent above the Management Requirement level. These units are outside of unroaded areas and wildernesses. Based on available information, Alternative NC will provide old growth on suitable forest lands Old growth will be provided on approximately 8 percent of the Forest or 10 percent of the forested acres, with some variances between alternatives.

Natural events, such as the recent mountain pine beetle epidemic which virtually eliminated mature and old-growth lodgepole pine from this Forest, can have a significant effect on the availability of viable old-growth stands. Young lodgepole pine stands will eventually grow into the later seral stages which conform to old-growth and will once again provide this habitat Species which prefer such habitat will have less than optimal conditions for the next 30 years and their populations may decline Remnant populations of these species will probably be maintained under the assumptions. (1) some unaffected amount of old-growth lodgepole pine is available and providing minimum habitat needs to support the breeding population, and/or (2) these species are adaptable to other habitat types for some of these minimal needs No alternative in this Final Environmental Impact Statement provides minimum levels of old-growth lodgepole pine habitat, since this habitat is almost non-existent All alternatives would incorporate a management standard to identify any existing and potential old-growth lodgepole pine stands as per Regional Management Requirements

Natural and escaped fires are also a threat to old-growth If fires eliminated habitat in the fifth decade or later, it would take several decades to replace that lost habitat

Thus, Alternative B-Modified, which has the least old-growth in unroaded areas and designates a Management Requirement level of old-growth outside of unroaded and wildernesses, has the least buffer for maintaining viable populations of old-growth indicator species after a major natural or human-caused event resulting in the loss of old-growth stands.

Mitigation Measures

Old-growth retention above the Management Requirement level is the basic form of mitigation. Also, low-intensity timber management in visually sensitive areaswill maintain stands with some large trees, in riparian areas snag levels are to be maintained at higher levels than on upland forested areas. Therefore, where these areas overlap, the combination of scattered old-growth trees and a higher number of snags will provide some features of old-growth.

Research is ongoing to better define the Management Requirement (MR) levels for old-growth Some reasons for maintaining old-growth levels above the Management Requirement levels are: (1) risk associated with managing at minimum viable population levels, (2) maintain future options for adjustments when better information on old-growth habitat requirements is available, (3) not all of the old-growth units may have 100 percent occupancy, as is the planning assumption, and (4) until all the dedicated units have been field surveyed, there is not the complete assurance that units selected will meet all of the old-growth habitat requirements A discussion of the research used as the basis for the Management Requirement direction is included in Appendix G

The assumption is, based on professional judgment, that unaltered and stable ecosystems such as designated old-growth areas, with little human use, will be 100 percent effective in providing old-growth habitat needs. Monitoring is planned if changes are observed in old-growth condition and mitigation measures will be applied A possible effect on old-growth areas will be the reduction in snags and down woody material due to firewood cutting Administration of the firewood cutting policy will lessen the potential impact of snag and down woody material removal Mitigation measures such as this are generally very effective.

7 Effects on Riparian Areas and Fish Habitat

All forested riparian areas which are available for timber management activities, receive a moderate intensity of activity. Some riparian areas are located in scenic viewsheds These will receive a moderate intensity of timber management which will meet visual quality objectives (See Section E2 a in this chapter for descriptions of these riparian and visual prescriptions) Each alternative has some riparian areas which are located in wilderness, old-growth, or unroaded areas These will not receive timber management treatments All riparian areas are also available for livestock grazing except as specifically noted

a *Timber Management Effects*

Discussions of the effects of timber management activities on riparian areas and fish habitat are found in Chapter III In all alternatives with timber management activities occurring within riparian areas, a modified form of uneven-aged management is employed, except in lodgepole pine stands In those riparian areas which are within visual corridors, much of the large tree component will be retained Where moderate-to-high levels of fish habitat improvement are identified, two to three large trees per acre will be retained to provide instream woody material Otherwise, most large trees will be harvested from timbered riparian areas over time, and there will be a gradual shift to more shade-tolerant species such as Douglas-fir and white fir

Timber harvest can affect water quality and fish habitat in many ways Two important factors are shade for water temperature regulation, and instream large woody material which creates pools for rearing fish Timber harvest can remove both of these important fish habitat components

Standards for timber management activities in riparian areas are designed to address concerns for other resource values associated with riparian areas, especially water quality and fish habitat The riparian timber harvest prescription was developed in part to not only maintain sufficient shade to regulate water temperature to meet water quality standards (Forest Plan, Chapter IV, Section F, Management Area 3), but also to provide in-stream woody material This is done by limiting the amount of shade removed in any given timber harvest entry Any long-term reduction in amount of instream large woody material is mitigated by the addition of structural fish habitat improvement projects to maintain pools over time Thus, there will be changes in water temperature and fish habitat quality, but these changes are relatively small and localized The overall trend has been estimated to be stable or upward in all alternatives

Riparian areas will receive a lower-intensity level of timber management than that proposed in the Draft Environmental Impact Statement For viable alternatives, geographical boundaries of riparian areas as a minimum will be approximately 100 feet from the edge of all Class I, II, III streams and those Class IV streams supporting significant riparian vegetation Under Alternative C-Modified, no timber harvest from any tentatively suitable riparian lands adjoining Class I, II, or III streams is programmed For Alternative I, no timber harvest is scheduled within the interior one-third of all Class I, II or III streams (33 feet either side of the stream) Additionally, on Class I and II anadromous streams, no timber harvest would be scheduled for the entire riparian zone (100 feet each side of the stream) Alternatives A, B-Modified, and F have scheduled timber harvests on all tentatively suitable riparian acres associated with Class I, II and III streams Under all alternatives, for Class IV streams and for other riparian areas, such as around meadows, lakes and springs, the size of the area to receive a modified timber harvest will be determined with a site specific analysis For suitable acres, uneven-aged timber management would be featured, but site-specific silvicultural prescriptions would be tailored to meet riparian objectives

When applying group selection harvests (uneven-aged management), created openings larger than one-half acre in riparian zones would rarely occur Limiting the lineal distance of created openings alongside streams to 150 feet or less, while ensuring that adequate

stream surface shading remains would provide greater riparian resource protection For any Class I, II, or III stream, limiting the cumulative total acres of created openings to 10 percent or less of the riparian area acres along any given stream would also afford greater resource protection.

The effect of these prescriptions on water quality is to maintain shade, provide for streambank stability by designing timber harvesting activities along streams to provide for a future supply of large woody debris, maintain a filter strip to prevent sediment from reaching the streamcourse, and most important to ensure that timber harvests are subordinate to riparian-dependent resources

b. *Grazing Management Effects*

Livestock prefer to graze in riparian areas because of the relatively flat terrain and proximity to water. Typically, riparian zones provide 20-30 percent of the forage from only 3-5 percent of the area in a pasture The general effects of grazing on riparian areas are discussed in Chapter III.

In Alternative A, forage utilization of grass and grasslikes in riparian areas will be 70 percent of available forage Utilization of shrubs is not to exceed 67 percent of annual growth. An objective of this alternative is to achieve a stable or upward trend of riparian vegetation condition. Methods to reach this objective include upland water developments, salting, and riders.

Based on a literature review (Kauffman et al , 1983, Platts 1984, Platts and Wagstaff 1984), there remains the question of whether an upward trend of riparian vegetation can be achieved with 67 percent utilization on shrubs However, studies done at the Starkey Experimental Range indicate that these two objectives may be achieved concurrently. A high level of permit administration and monitoring is needed to accomplish these two objectives concurrently. At historic funding levels, this level of administration and monitoring would not be possible Therefore, there is a possibility that with planned livestock use levels, it would not be possible to achieve a continued stable or upward trend of riparian vegetative condition in all riparian areas on the Forest.

This potential problem could become more difficult over time At current funding levels, not all existing range improvement structures could be replaced as they reach the end of their useful life Thus, livestock control would tend to decrease over time This would make it more difficult to achieve the desired objective in the future

In all other alternatives, except Alternative A (possibly NC), riparian forage utilization is decreased from 70 percent to 45 percent. Utilization of shrubs is limited to 40 percent. Therefore, abundance and diversity of riparian vegetation, especially shrubs and hardwoods, should increase gradually over time This is assuming adequate funding for range administration and improvements to achieve good livestock distribution. This is a major factor in the expected steady increase in abundance and diversity of riparian vegetation Riparian areas in less than satisfactory condition are projected to attain a satisfactory condition within 50 years. Utilization objectives are not available for Alternative NC

In all alternatives except Alternatives A, and NC, additional range management practices result in accelerated vegetation recovery in anadromous riparian areas which are currently in unsatisfactory condition In alternatives B-Modified and F, these measures would be applied primarily in anadromous riparian areas In alternatives C-Modified and I, they would be applied in both anadromous and non-anadromous riparian areas. These measures are displayed in Table IV-7 and Table IV-8

There will also be investment in fish habitat improvement and watershed rehabilitation in riparian areas in less than desirable condition This instream and streamside structural work for watershed and fisheries also helps to accelerate vegetation recovery by stabilizing streambanks and raising the water table locally In all alternatives except Alternative

C-Modified and I, priority for this work is on streams with anadromous fish Thus, vegetative condition should visibly improve in a large portion of the riparian areas along streams with anadromous fish within the first two decades Improvement will occur at a slower rate in other riparian areas The rate of improvement for Alternative NC is not available

Increased abundance and diversity of riparian vegetation, especially the deciduous woody component, will give riparian areas a more aesthetically pleasing appearance for most Forest visitors. It will increase habitat diversity for a variety of wildlife species, and it will contribute substantially (over 80 percent of the increase) to increased anadromous fish outputs projected for these alternatives

In the Draft EIS, Alternative B would have 20,000 acres of range seeding to improve livestock forage occurring on relatively flat, nonforested range. These areas include moist meadows, but seeding would not occur in riparian zones along Class I and II streams For the Final EIS, this level of range improvement forage seeding was dropped from Alternative B-Modified due to a broad lack of public support for this proposal

In Alternative B-Modified, limited livestock grazing is prescribed along approximately 70 miles of anadromous streams with riparian areas in less than satisfactory condition This is to be continued until substantial recovery of riparian vegetation occurs After recovery, woody riparian vegetation should be of sufficient size and density to maintain growth and vigor with 40 percent utilization of the available annual production Rapid vegetation improvement is expected in these areas. Fish production is expected to increase by 200 percent within two decades (Hall and Baker 1982, Platts 1981) This is in addition to the increase in fish production due to vegetative improvement in other riparian areas, which should occur due to the change from 70 percent to 45 percent utilization of riparian forage

In Alternatives F and I, limited livestock grazing could occur on about 60,000 acres These areas would encompass about 150 miles of streams, including the 70 miles of anadromous streams with unsatisfactory riparian areas described previously for Alternative B-Modified. Limited use would be staged over a 30-year period The objective for riparian vegetation condition is to achieve the desired future condition in 30 years

In Alternative C-Modified, livestock would be limited or excluded from existing pastures containing less than desirable riparian areas In this alternative, priority does not necessarily go to those streams with anadromous fish Thus, improved riparian condition would be more evenly distributed across the Forest Because of the distribution of less than desirable riparian areas, it is estimated that 20-25 percent of existing pastures would be affected This alternative results in the greatest potential increase in fish production (very close to Max Fish Benchmark amounts), but also results in the largest reduction in livestock Animal Unit Months

Alternative I has features of Alternatives C-Modified and F As in Alternative F, it is expected that riparian pastures with lower forage utilization standards, or livestock exclusion for a few years, will be a common approach to achieving accelerated riparian recovery, with other techniques available to fit site specific needs. As in Alternative C-Modified, limiting, or excluding livestock to achieve accelerated riparian recovery is not limited to anadromous streams, although these streams will still generally receive higher priority due to the economic value of the anadromous fisheries The number of pastures and streams which will be affected this way is not known precisely at this time The inventory, evaluation and management recommendations (for livestock, timber and other resource management activities) to achieve the desired riparian condition, will be part of the Allotment Management Plan updates scheduled for completion in the first decade of the Forest Plan implementation

c. *Fish and Wildlife Management Effects*

Most wildlife habitat improvement projects occur on upland areas, so they do not generally affect riparian areas. One exception would be aspen and/or other hardwood regeneration projects, which would have the effect of improving vegetation vigor and diversity in riparian areas

The amount and quality of rearing area available during summer low-flow and winter icing periods are common limiting factors for fish carrying-capacity in streams on the Forest. Therefore, instream and streamside structures to improve the pool/riffle ratio and improve pool quality for rearing fish are common types of structural fish habitat improvement projects These structures also improve bank stability and raise the water table locally, thereby helping to improve riparian vegetation condition in the areas treated

Water temperature and overhead cover are important factors affecting the availability and quality of pool habitat Riparian vegetation is usually the key to water temperature regulation and cover Therefore, to receive the full benefit of structural fish habitat improvements, overall riparian vegetation condition must be good. Measures to improve riparian vegetation are also important fish habitat improvement projects

The overall improvement in riparian vegetation condition projected for all alternatives (except Alternative NC) plus about 60 miles per decade of fish habitat improvement (40 miles in Alternative I, approximately 30 miles in C-Modified) as mitigation for any loss of natural large woody material in the streams due to past activities, will meet or exceed *the Management Requirements and maintain fish habitat capability at or above current* levels Past success of this mitigation work is high Miles of fish habitat improvement in Alternative NC are not available.

It is assumed that funding by the Bonneville Power Administration (BPA) for fish habitat improvement as mitigation for dams on the Columbia River will continue through about 1994, with the possible exception of Alternative NC. This would result in a total of about 10 miles of stream treated on the Forest in the first decade If this funding is terminated prior to completion of all planned work, other funding sources, such as K-V funds, would need to be used to attain projected fisheries outputs

Planned structural habitat improvements for the first decade, in addition to the Bonneville Power Administration funded work, are shown in Table IV-6. In all alternatives except Alternative C-Modified and I, priority for fish habitat improvement above the Management Requirement level will be in anadromous fish streams. Fish habitat improvement work will also be accomplished with Knutsen-Vandenberg funds generated from timber sale receipts For all alternatives, except C-Modified, lower intensity habitat improvement work as mitigation for timber harvest in riparian areas would occur on about 60 miles of stream in the first decade (40 miles in Alternative I).

TABLE IV-6: Structural Fish Habitat Improvements in the First Decade
(Miles Treated. in addition to BPA funded work and mitigation)

Alternatives					
NC (No Change)	A (No Action)	B-Mod	C-Mod	F	I (Preferred)
N/A	20	30	50	20	20

d. *Mining Effects*

The combined effects of timber management, range management, watershed improvement, fish and wildlife habitat management and mining are all important factors affecting riparian areas and fish habitat. The amount of riparian improvement and increased

fish production potential varies by alternative In all alternatives except Alternatives C-Modified and I, vegetative condition should visibly improve in some portion of the riparian areas along streams with anadromous fish within the first two decades Improvement will occur at a slower rate in other riparian areas In Alternatives C-Modified and I, this improvement will be more evenly distributed across the Forest. Increases in the abundance and diversity of riparian vegetation, with the associated geomorphic recovery of the stream channel, will account for the larger part of the expected increases in fish habitat capability over time, in all alternatives Since this type of recovery generally takes several decades to achieve, fish habitat capability is expected to increase throughout the planning period The changes in potential anadromous fish production resulting from the combined effects of all of these management activities are displayed in Table II-5 The Smolt Habitat Capability Index numbers are displayed in Figures IV-7 and IV-8.

FIGURE IV-7: Smolt Habitat Capability Index - Steelhead

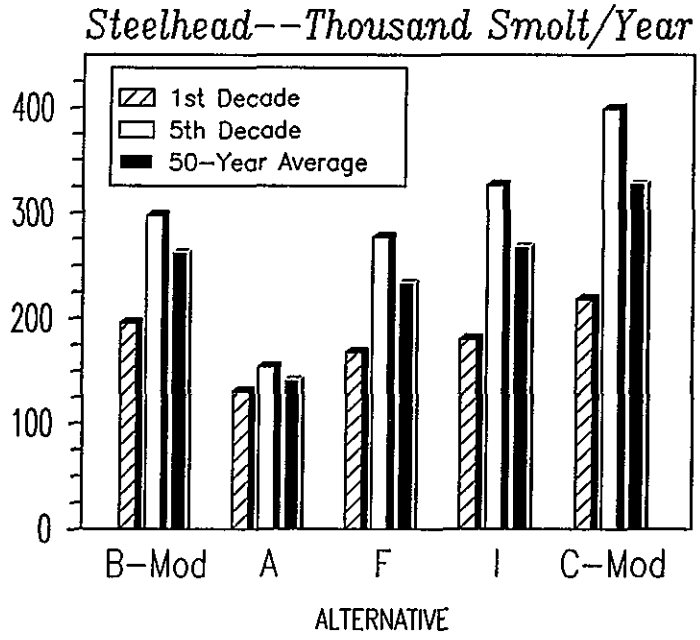
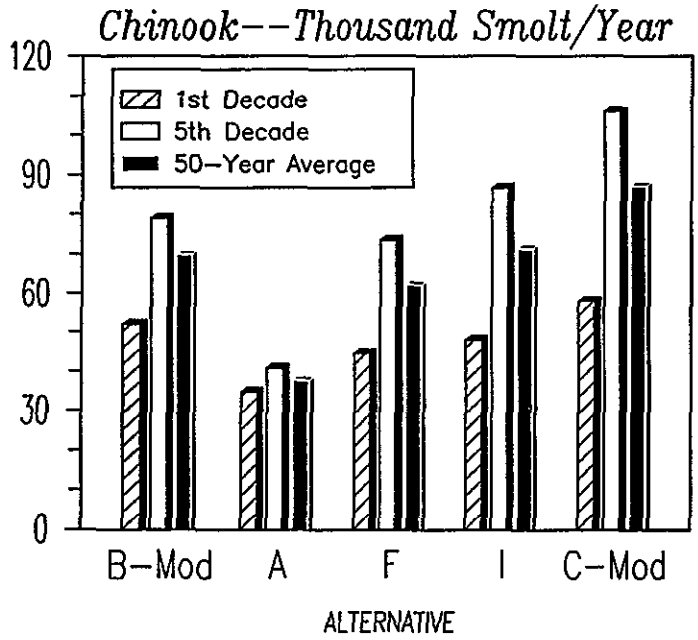


FIGURE IV-8: Smolt Habitat Capability Index - Chinook



Mining operations may have a significant impact on vegetation in riparian zones. Placer mining may particularly reduce riparian vegetation needed for soil stability and stream shading

Mitigation measures used in riparian areas to alleviate mining disturbances will include seeding to stabilize soil and re-establishment of brush to provide stream shading. In some instances, fencing to exclude grazing will be required to allow reestablishment of vegetation.

8. *Effects on Water*

Water quality and water yield changes are potentially affected by timber management. Although timber harvest can increase annual water yield, these increases are typically an insignificant part of the total runoff and are generally unmeasurable Research projects in watersheds managed for full sustained yield timber harvest have shown water yield increases by as much as six percent (Harr 1983) However, under the various alternatives, portions of every watershed will be unsuitable for timber production and have Management Areas that have less than full sustained timber yield applied. Therefore, water yield increases Forest-wide will be significantly less. Implementation of any of the alternatives will not have a measurable effect on water yield Implementation of any of the alternatives will have no measurable effect upon the municipal watersheds of the towns of Long Creek and Canyon City See Chapter III for additional information.

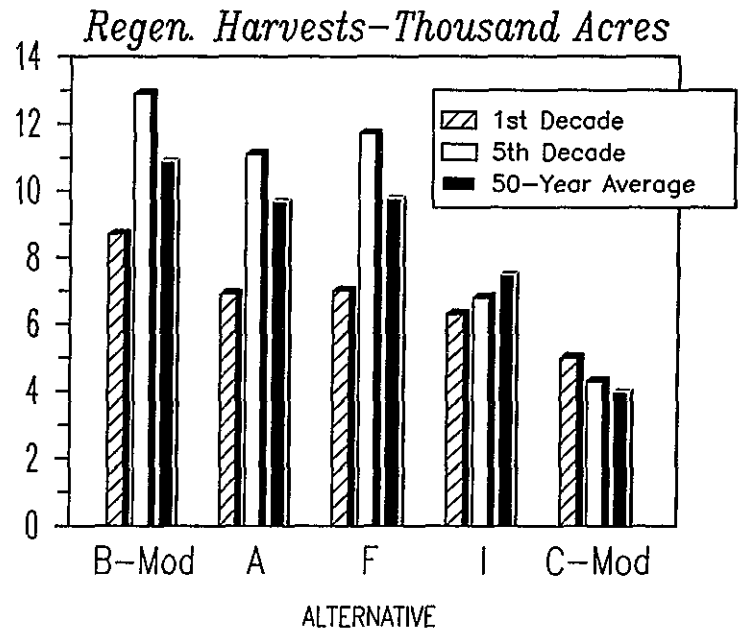
Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A

The water quality goal in all alternatives will be to protect beneficial uses for all decades of the planning period, through implementation of the Forest Standards (Forest Plan, Chapter IV, Sections E and F) and other Best Management Practices.

a. *Timber Management Effects*

The risk of impacts to water quality increases in those alternatives which propose the greatest amount of timber removal, allocate the most land base to timber harvest, have the largest acreages under intensive timber management, treat the most acres under a clearcut/regeneration harvest method, and have the most acres harvested on steep slopes greater than 35 percent. Figure IV-9 displays the acres of regeneration harvest in each decade by alternative Table IV-7 displays the percentage of timber harvest occurring on steep slopes in each alternative Sediment production, with the risk of this sediment reaching a live stream, is probable whenever logging occurs. Increases in turbidity/suspended sediment are the result. Water temperature could also increase from the excessive removal of streamside vegetation Water quantity yield increases could occur because water yield increases are a function of the degree of vegetation removal. This could lead to an increase in streamflow with possible streambank and streamchannel erosion. The consequences of increased water yield need to be evaluated on a site-specific basis In a small watershed heavily impacted by timber harvest, water quality degradation could occur which would be "masked" when evaluated in the overall effect to major watersheds Refer to Table II-5 timber outputs, Table IV-1, Table IV-2, Table IV-3, Figure IV-2, Figure IV-5, and Figure IV-6 for additional information about specific practices designed into alternatives

FIGURE IV-9: Regeneration Harvest by Alternative



The percentage of the timber harvest occurring on steep slopes in each alternative is shown in Table IV-7.

TABLE IV-7: Harvest Occurring on Steep Slopes
(Percent of Acres over 35 Percent Slope)

Decade	Alternatives NC (No Change)	A (No Action)	B-Mod	C-Mod	F	I (Preferred)
First	N/A	4	4	4	4	4
Fifth	N/A	6	10	6	6	8

The type of logging system used also has various effects on water quality. The trend for all alternatives except Alternatives C-Modified and I is for more regeneration harvests occurring using ground-based skidding equipment (tractors). Tractor logging creates more surface disturbance which increases the potential for impacts on water quality.

The trend for Alternative C-Modified is for fewer overall entries because the large-sized ponderosa pine will be favored over other species Fewer entries and less total timber volume removed means less ground-disturbing activities, which will potentially maintain or increase water quality

b. *Range Management Effects*

The range program will have no significant effect on water yield or streamflow. All alternatives have the same base acres (1,351,275) available for cattle grazing. The differences among alternatives are a function of the number of acres assigned to various range resource management levels, utilization standards on grass and shrubs, and the livestock strategy to be implemented in those riparian zones currently in a less than desirable condition The following definitions explain range resource management levels

Level A (No Livestock) Management excludes livestock grazing from designated allotments to protect other values or eliminate conflicts with other uses.

Level B (Some Livestock) Management controls livestock so that livestock use is within present grazing capacity Improvements are minimal and constructed only to the extent needed to protect and maintain the range resource

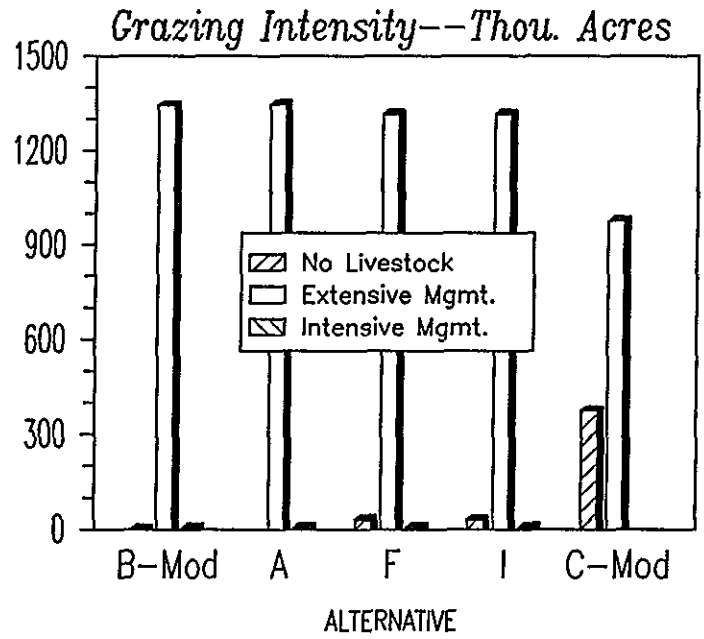
Level C (Extensive) Management seeks full utilization of forage available to livestock Cost-effective management systems and techniques, including fencing and water development, are designed and applied to obtain relatively uniform livestock distribution, use of forage, and maintenance of plant vigor

Level D (Intensive) Management seeks to optimize production and utilization of forage available for livestock use consistent with maintaining the environment and providing for multiple use of the range Cultural practices such as brush control, type conversion, or seeding may be combined with fencing and water developments to implement complex grazing systems

One of the purposes of different levels of management is to prevent over utilization of the riparian zone favored by livestock (see Chapter III for additional discussion) When over utilization occurs, higher stream temperatures, sedimentation, and channel instability can result For purposes of monitoring, less than desirable riparian area improves to satisfactory when water temperatures do not exceed the State standard of 68° Fahrenheit.

The following figure displays acres allocated to grazing by management level for the first decade of each alternative

FIGURE IV-10: Acres Allocated to Grazing by Management Level



Animal unit months output is displayed in Table II-5 in Chapter II

In Alternative A, riparian area grass and grasslike forage will be 70 percent utilized to 3/4-inch "stubble" height following livestock and big-game use in both the satisfactory and less than desirable riparian zones Shrub utilization can be up to 67 percent of available current year's growth Forage seeding in areas disturbed by timber management activities will occur on 6,000 acres a year A by-product of this treatment is that forage establishment will help to prevent erosion on those acres which might contribute sediment to adjacent streamcourses The less than desirable riparian areas will continue to contribute sediment, and recovery will not occur The improving trend now occurring in other riparian areas will continue at a slow pace over a long time span No additional investment is required to implement this alternative

Alternative B-Modified limits livestock use on all vegetation (grass and shrubs) on 2,000 acres immediately adjacent to anadromous fish streams which are in a less than desirable condition To attain 0-40 percent utilization where less than desirable conditions exist, controlled use of pastures or additional fencing will be required This alternative has the second highest outputs in Animal Unit Months of the alternatives. To obtain this rather high use-level, corridor fencing would most likely be employed This would only limit livestock use on 2,000 acres out of a total of 1,351,275 acres available Approximately 150 miles of new corridor fences would probably be constructed for the purpose of vegetative recovery. This would require a fairly high level of initial investment plus maintenance costs

The remaining 4,000 acres of less than desirable riparian areas that occur on resident trout streams would be grazed at 45 percent utilization rate on grasses and 0-40 percent utilization on the available current year's growth of shrubs Eventually, an acceptable condition will occur because the utilization rate for both grasses and shrubs would decrease from present The result of these modified grazing practices should be a decrease

in sediment levels and in low-flow summer stream temperatures, especially on anadromous fish streams Less than desirable resident trout streams would show the same improvement effect but not as rapidly Other satisfactory riparian areas would also show improvement in water quality because the utilization rate for both grasses and shrubs would decrease from present

To achieve reduced utilization standards when compared to existing forage utilization, the assumption must be made that there will be a sufficient budget to adequately administer livestock use Otherwise, the rate of vegetative recovery would be much slower or nonexistent. Adequate administration would also have to include monitoring utilization of the riparian shrub community. No more than 50 percent utilization can occur if rapid vegetative recovery is to occur. The consequences of insufficient budgets to administer livestock utilization apply to all alternatives and especially to Alternative A, because it has the highest use and therefore the greatest risk to the water resource

Alternative B-Modified also has the potential to increase sediment levels on a short-term basis by converting existing unpalatable vegetation (sagebrush) to a more palatable species (grass) for cattle These activities would occur on land that is less than 35 percent slope. If ground-disturbing activity such as disking or chaining is necessary to prepare the site for seeding, the land is susceptible to erosion until the seeded grasses become established. Forage seeding in areas disturbed by timber management activities will also occur on 6,000 acres a year in this alternative A by-product of this treatment is that forage establishment will help to prevent erosion on those acres which might otherwise contribute sediment to adjacent streamcourses

Alternative C-Modified requires controlled cattle use in entire pastures that contain less than desirable riparian areas until they improve to satisfactory condition This affects both anadromous and resident fish streams on 375,000 acres which are in this category Vegetative recovery, stabilization of streambanks, and water quality improvement take the least amount of time when no utilization occurs This not only applies to Alternative C-Modified, but also to all other alternatives where controlled use by livestock in the riparian zone is part of the treatment. After recovery, riparian zone grasses can be utilized up to 45 percent and shrubs can be utilized up to 40 percent of the available current year's growth. This should decrease the amount of sediment caused by cattle. When the vegetation becomes more established, it will start to provide stream shade which will lower water temperatures during the low-flow summer period. No additional investments in structural and nonstructural improvements are required to implement this alternative. However, additional monitoring will be required to assure that utilization objectives are met.

In Alternative F, grasses in satisfactory riparian zone can be utilized at 45 percent and shrubs utilized to not greater than 40 percent of the annual available year's growth Forage seeding in areas disturbed by timber management activities will also occur on 6,000 acres a year in this alternative A by-product of this treatment is that forage establishment will help to prevent erosion on those acres which might contribute sediment to adjacent streamcourses In less than desirable riparian zones, this alternative has a utilization standard of 0-40 percent on the grasses and 0-30 percent livestock utilization of the shrubs Streams are treated on a priority basis whether they are anadromous or resident fisheries. All methods can be used to obtain the reduced utilization standard. The method used will fit site-specific requirements for improving the riparian zone to a satisfactory condition Any one method or combination of methods might be incorporated to treat a less than desirable riparian zone such as corridor fencing, range riders, extra water developments, extra salting, nonuse of pasture, early- or late-season grazing, short-term grazing rather than season long, reduced livestock numbers, control of grass and shrub utilization, or fencing to create additional pastures Treatment of a total of 60,000 acres would be spread out over 30 years as would be the beneficial effects of treatment. The recovery period would therefore take longer to achieve reduced sediment and stream temperatures when compared to implementing all the treatments during the first decade.

No information about grazing management practices is available for Alternative NC

Forage utilization standards for Alternative I are somewhat different from the other alternatives, as it includes utilizing grasses in satisfactory riparian areas to 45 percent and up to 35 percent in less than desirable riparian areas Shrub utilization in less than desirable riparian areas are at a maximum of 30 percent, as there are more restrictive utilization standards than other alternatives Allotments which are found to have riparian areas in less than desirable condition would be identified through a process keyed to the Forest Plan.

Alternative I has riparian standards for both non-anadromous and anadromous riparian areas The major difference between the two is in the recovery period, 30 years for non-anadromous and 15 years for anadromous, for improving a less than desirable riparian area to a satisfactory condition. Riparian habitat recovery will be planned, designed, and implemented to reduce or eliminate the impacts of management activities that may slow recovery

Range management effects for Alternative I will improve riparian vegetative communities, benefit all riparian-dependent resources, and improve water quality more than other alternatives, with the exception of C-Modified

A schedule for updating all Allotment Management Plans (AMPs) on the Forest is listed in the Forest Plan, Appendix A, Activity Schedules Riparian objectives will be set for each Allotment Management Plan, identify management actions needed to meet the objectives, a time frame for recovery, and the monitoring needed to determine if the desired rate of improvement is occurring. A riparian inventory will be undertaken for key parameters, such as stream surface shade, streambank stability, and streambank vegetation The process used for doing this inventory will be the procedure described in "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" (1979)

The following tables, Table IV-8 and Table IV-9, display the livestock strategy in riparian zones by alternatives.

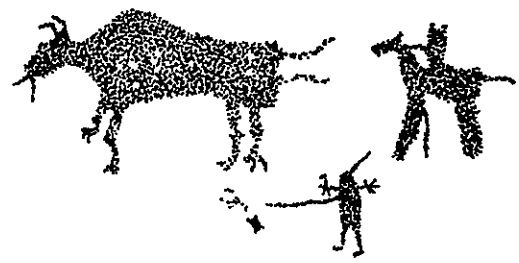


TABLE IV-8: Livestock Strategy in Less than Desirable Riparian Zones by Alternative

Utilization Standards[1]	Alternatives NC	A	B-Modified	C-Modified	F	I
Kentucky Bluegrass	N/A	70%	0-40%	0-40%	0-40%	0-35
No added emphasis on riparian zone management		Limit or	Limited or exclude use on all vegetation immediately adjacent to streams desirable riparian areas until they improve to satisfactory	Vary use no use on entire pastures that contain less than they improve to satis-factory, treatment of streams is on a priority basis	Vary use between 0-40 percent on less than desirable riparian areas until they improve to satis-factory, treatment of streams is on a priority basis	between 0-35 percent on less than desirable riparian areas until
Shrubs (Available current year growth)	N/A	67%	0-20% use within stream corridor	0-40%	0-20% within riparian pasture	0-30% within riparian pasture
Additional investment level	N/A	None	High	None	Moderate	Moderate

1/Livestock and big-game combined use

TABLE IV-9: Livestock Strategy in Satisfactory Riparian Areas by Alternative

	Alternatives NC	A	B-Modified	C-Modified	F	I
Kentucky Bluegrass	N/A	70%	45%	45%	45%	45%
Shrubs (Available current year growth)	N/A	67%	0-40%	0-40%	0-40%	0-40%

NOTE Use standards for shrubs will take precedence when shrubs are present in the riparian area Percentage figure is the average for the decade and may vary on a yearly basis as prescribed in the Allotment Management Plan Percent use is combination of livestock and big game

c *Fishery Management Effects*

On those anadromous streams where fish habitat improvement projects occur, there will be beneficial changes in water quality and streamflow. The structures used to improve fisheries habitat will also trap sediment, improve streambank stability, raise the water

table, and encourage riparian vegetation growth There are short-term degradations in water quality which arise from the construction phase of these projects. Streambanks and streambeds are disturbed by heavy equipment operating within the wetted perimeter of the stream. High levels of sediment are produced from these activities for a short time during construction Within those drainages where fish habitat improvement projects are completed, there will be a cumulative improvement from these projects which should continue through the first decade.

d *Watershed Management Effects*

Watershed improvement projects will have a beneficial effect on water quality and quantity Sedimentation will be reduced and water retention increased as gullies are check dammed and streambanks stabilized Watershed improvement projects are identified and prioritized on the Watershed Improvement Needs (WIN) inventory (see Appendix A of the Forest Plan) WIN projects will be coordinated with fisheries and wildlife when they occur in less than desirable riparian areas

Alternatives I and C-Modified will each treat 100 acres per year per decade, Alternative F will treat 50 acres per year per decade, and Alternatives B-Modified and A will each treat 20 acres per year per decade

FIGURE IV-11: Acres of Watershed Improvement by Alternative

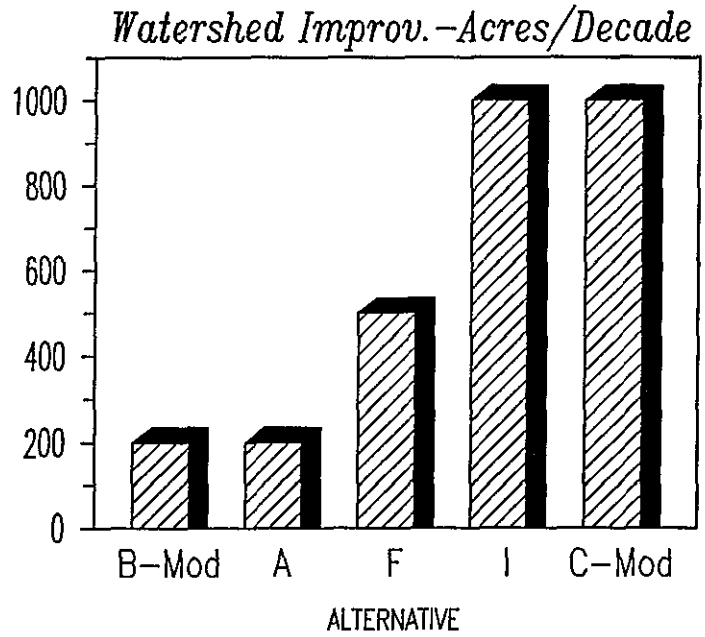


Table IV-10 provides a summary of watershed projects in less than desirable riparian areas by alternative.

TABLE IV-10: Watershed Projects in Less than Desirable Riparian Areas (Miles Treated per Year)

	Alternatives					
	NC (No Change)	A (No Action)	B Mod	C Mod	F	I (Preferred)
First Decade	N/A	0 2	2	2 5	1	3.3
Decades 2 - 4	N/A	0 2	1	2 5	1	3.3

If these additional sources of funding are available, then the target acres per year may be higher and the activity schedule adjusted as the projects are completed regardless of the source of the dollars These WIN projects are prioritized by each Ranger District. Projects will be accomplished throughout the entire Forest by working through the Ranger District's priorities from high to low

e *Visual Management Effects*

In all alternatives, those stream reaches in a visual management corridor will have the same effects as noted for timber harvesting, except there will be more entries on a smaller land base to meet the visual objective More stream-surface shading should result because more vegetation is left In mixed conifer stands the shade-tolerant species will be more prevalent.

f *Recreation Management Effects*

In all alternatives, potential exists for sanitation problems from dispersed recreation because limited sanitary facilities exist for Forest users These problems are expected to be very site-specific and insignificant overall

g *Transportation Management Effects*

Table IV-11 displays the miles of road built by alternative, comparing the miles of road construction and reconstruction by alternative. The ranking of alternatives in the first decade, from highest to the lowest number of roads built, is Alternatives B-Modified, A, F, NC, I and C-Modified The alternatives which propose more roads have a higher potential to adversely impact water quality

The potential effect on water quality is from sediment derived from the road prism during construction, with the majority occurring during the first two years. There should be less potential for delivering sediment to streams from road reconstruction, because it disturbs fewer acres Roads also have the potential to increase the efficiency of runoff when compared to an unroaded watershed Road water management structures (culverts) speed the time of concentration to the stream channel, which may increase the peak streamflow from a rainstorm or rapid snowmelt event This can cause stream channel erosion.

Table IV-11 displays the miles of road built by alternative Alternatives which propose more roads have a higher potential to adversely impact water quality

TABLE IV-11: Miles of Road Constructed and Reconstructed by Alternative

Decade	Alternatives NC 1/ (No Change)	A (No Action)	B-Mod	C-Mod	F	I (Preferred)
First	740/2120	810/1567	811/1585	489/1082	800/1563	618/1320
Second	N/A	328/1413	378/1372	103/1003	356/1423	297/1202
Fifth	N/A	45/1214	85/1200	72/992	35/1210	90/1169

1/Road miles are from the 1979 Timber Resource Management Plan and are not directly comparable to the figures for all other alternatives

h *Mining Effects*

Various mining activities can affect the pH, metals concentration, and chemical content of water in Forest streams Suspended sediment load in streams can also occur and is the most common mining impact, coming from placer gold processing operations. All operators are required to comply with State water quality laws, but accidents may occur Lode (hard rock) mining operations may change pH of water and, consequently, its capacity for carrying metal ions. Metal recovery operations may use chemicals which could pose a threat to water quality if not managed properly

i *Cumulative Effects*

The fish habitat improvements installed to date are serving the intended purpose of improving rearing and spawning habitat for resident and anadromous fish Water depth is often increased and should serve to maintain acceptable water temperatures

Concentrated cattle grazing in riparian areas may reduce the diversity of vegetation available as forage. Plants such as Kentucky bluegrass may increase in density, while native species such as tufted hairgrass could decline A change in plant composition, combined with soil compaction and reduction in litter coverage, may cause increased surface flow, erosion, and sedimentation

One cumulative effect of timber harvest, in particular clearcuts, applied on a continuing rotational basis is an increased water yield from larger forested watersheds, however, the increase will be small The cumulative effect of timber harvest on low flow will be small and difficult to measure Continued research and monitoring is necessary to determine the cumulative effects of timber harvest on peak flow Water yield is expected to increase from larger watersheds during spring snowmelt This is a cumulative effect of continued timber harvest in the areas of snow accumulation Increases in snowmelt runoff would probably be small (Geppert et al , 1985)

Timber harvest may cause a downstream effect by increasing nutrient levels as harvest progresses. However, because of the distance water must travel from harvest units, nutrient accumulations in the mainstem rivers will be small (Geppert et al , 1985).

A cumulative effect on water temperature is likely in larger watersheds if they are harvested within a short timeframe Large, continuous harvest blocks which contain streams may lack shade If future harvest is scheduled over a longer time period and spaced out, an effect is not anticipated (Geppert et al , 1985) The cumulative effects of reforestation on water are not presently known.

Currently, watershed improvements are very limited and the cumulative effects are not known.

The cumulative effects could be highly variable depending upon location, intensity, and duration of mineral extraction activities. If toxic contaminants are allowed to enter streams, these materials will create effects of various magnitude to water quality

The cumulative effect of roading any watershed is the increasing potential to change peak flows as the transportation system is completed To mitigate erosion, roads are designed and maintained to manage the water intercepted and concentrated upon the roadway Roadcuts intercept upland subsurface waterflow which becomes surface water upon the roadway. Surface water from the road prism is rerouted off the roadway through culverts. Increased peak flows will be influenced most by any road located adjacent to the stream channel network This is because water discharged from the ditch relief culverts will not be able to infiltrate slowly back into the ground. This water will then become readily available for streamflow rather than being slowly supplied by groundwater. Roads add additional artificial drainage channels to the watershed which deliver water more efficiently (faster) when compared to an unroaded watershed The road density, use pattern, and type of designed road-drainage features all affect delivery time.

Road construction, season of use, and road maintenance can increase suspended sediments in streams receiving road water drainage Increases are the greatest when roads are new or in active use during wet conditions The mitigation for roads is discussed in the following mitigation measures section.

The cumulative effect of wildfires cannot be anticipated and cannot be addressed. Repeated use of prescribed fire on individual sites should not cause adverse cumulative effects to either water quality or quantity (Geppert et al , 1985)

Changes between the Draft to Final Environmental Impact Statement have updated the mechanism for evaluating the effects of harvest activities on subwatersheds over time In watersheds where project scoping identifies an issue or concern regarding the potential for adverse cumulative effects of activities on water quality or stream channels, a cumulative effects assessment will be made An issue that occasionally arises is one which addresses the effects of timing on water runoff within certain subwatersheds. To facilitate this analysis work, the Forest will be further divided up into roughly 150 logical subwatersheds, varying in size from approximately 300 to 20,000 acres in size (third order watersheds).

A harvest effects model will be applied which converts a range of harvest activities to a common factor and applies a recovery rate to simulate hydrologic or watershed recovery over time. Timber harvest is the driver for cataloging watershed impacts. Harvest activities alter the vegetation on a watershed bringing about changes in interception, snow accumulation and snow melt, soil moisture, infiltration, exposing mineral soil to erosion, potentially affecting water quality, quantity and timing The following displays how the model will be used on the Forest

(a) It is a picture of harvest activity within an area over time
(b) It can be a measure of harvest dispersion effects within an area over time.
(c) It relies heavily on professional judgment and the evaluation process that is the basis of the interdisciplinary team approach.
(d) It identifies potential "red flag" situations
(e) It is not a decision maker. It does not provide a number that is the final answer but rather is another tool that is used to provide information for the decision maker to use
(f) It provides for the first time calculations of harvest effect which set a baseline to assist the Forest in monitoring and evaluating the effects of harvest management activities over time. Based on monitoring results, adjustments can be made to the Model to improve its accuracy

j. *Mitigation Measures*

Forest Service management practices will meet, as a minimum, the substantive State, Bureau of Land Management requirements, and other considerations required by the National Forest Management Act (NFMA), and other authorities, for the protection of the soil and water resource. For further discussion of Best Management Practices, see the Forest Plan, Chapter IV, Sections E and F.

Forest-wide Standards have been developed to protect the water resource and riparian areas (Forest Plan, Chapter IV, Sections E and F). These state that riparian resources will receive emphasis over other resources Other resource activities may occur to the extent that riparian resources are not adversely affected in the long-term Refer to the mitigation measures section in Chapter II which apply to specific alternatives, and those mitigation measures which apply to all alternatives, for additional information.

Range allotment plans also will include objectives for riparian areas When the current riparian condition is in less than the desired future condition, the plan will include a time schedule for improvement, actions needed to meet riparian objectives, and monitoring needed to determine that the desired rate of improvement is occurring Mitigation actions include reduced forage use, utilization standards, reduced livestock numbers, modified season of use, additional fencing of allotment pastures, development of water sources away from live streams, salt placement, and herding Local Forest experience and professional judgment have determined that forage mitigation measures can be 75 percent effective if sufficient resources are available to plan, administer, and monitor use If resources are not available, management intensity will be reduced and mitigated through reduced numbers of grazing and browsing animals

Timber harvest activities next to streams will maintain vegetation which is needed to provide cover/shade, root strength for bank stability, and future supply of woody debris. Logging equipment will be kept out of Class I streams; on Class II-IV streams, equipment will be kept out when practicable (see Chapter III, Section 5 for an explanation of stream classifications) When unavoidable, equipment use will be conducted at times of minimum flow and at previously determined locations where bank and channel disturbances are minimized Woody debris deposited in stream channels from logging will be removed unless it is allowed as a result of environmental analysis Site-specific water quality and hydrologic concerns are addressed during the timber sale planning process (environmental analysis) Locations of timber harvest units and logging systems are modified where potentially adverse water quality impacts are identified High erosion hazard areas, unstable landforms, and temperature-sensitive segments of streamcourses are avoided Streamcourse protection needs and riparian areas are delineated on timber sale area maps and marked on-the-ground during unit layout

A riparian area is the stream and the adjacent area where management practices, which might affect water quality and other aquatic resources, are modified as necessary. Management practices are generally more restrictive for Class I streams than they are for Class II, III, and IV streams However, the appropriate land management practices which will be applied are analyzed on a site-specific basis It is possible to have more restrictive measures applied to Class III and IV streams than a Class I or II stream based on the characteristics or sensitivity of the site in question

The timber sale contract provides for the unique nature of riparian areas through standards and special clauses designed to meet water resource objectives. The following clauses are frequently used streamcourse protection, erosion prevention and control, erosion control structure maintenance, operating period, protection of reserve trees, special felling objectives and special yarding objectives, location of temporary roads, landings, skid trails, firelines, and current operating activities

Mitigation measures for the potential effects of roads on water quality and quantity include avoidance, reduction, and minimization measures For example, fragile areas are generally avoided and the obstruction of stream channels by slash resulting from road

building is avoided by disposing of it by burning, chipping, or burying it away from the floodplain.

Other effects are reduced by mitigation measures. For example, the erosive effect of surface water concentrated by road drainage features is reduced by installing water bars, drain dips, and other physical means. Runoff is dispersed by outsloping, water spreading ditches, etc., and sediment loads further reduced by vegetative filter strips and settling ponds. Vegetative filter strips also maintain shade to avoid high water temperatures and retain stream channel stability. Closure and obliteration are mitigation measures to reduce road surface disturbance and resulting erosion. Other methods of mitigating erosion by reducing road surface erosion include treatment of the surface with water, oiling, sealing, or paving, and by conducting operations during minimal runoff periods

The risk of occurrence of potential effects is also minimized by mitigation measures For example, the possibility of cut and fill slope failures is minimized by installing underdrains and other stabilizing structures, and use of various construction techniques such as layer placement and controlled compaction. The risk of pollutants, such as fuels and lubricants, entering streams is minimized by selecting service and refueling areas well away from wet areas and surface water, and by the use of berms around such sites to contain spills.

Settling ponds or some other acceptable method of water clarification are required for mining operations in which a large amount of suspended sediment is generated Lode mines must have water quality measurements taken, and any problems in pH or metal content must be corrected before the water is allowed to enter the waterways Metal recovery operations must obtain all necessary State Department of Environmental Quality permits, and comply with all pertinent safety regulations for use of hazardous chemicals

The application of these various types of mitigation measures is determined on a site- and project-specific basis. No mitigation measure is 100 percent effective; however, professional judgment and experience indicate that measures to reduce sediment are 70 to 80 percent effective. When catastrophic events occur, there could be resultant localized slope failures, culvert blockages, and erosion

9. Effects on Recreation

Recreation opportunities are influenced by assignment of lands to other resources. Timber management has the most influence on the type of recreation opportunities available. The amounts of logging activity and road building determine how much area will be available for semiprimitive and roaded recreation opportunities. Where semiprimitive recreation opportunities are desired, it would not be appropriate to schedule timber harvest or build roads.

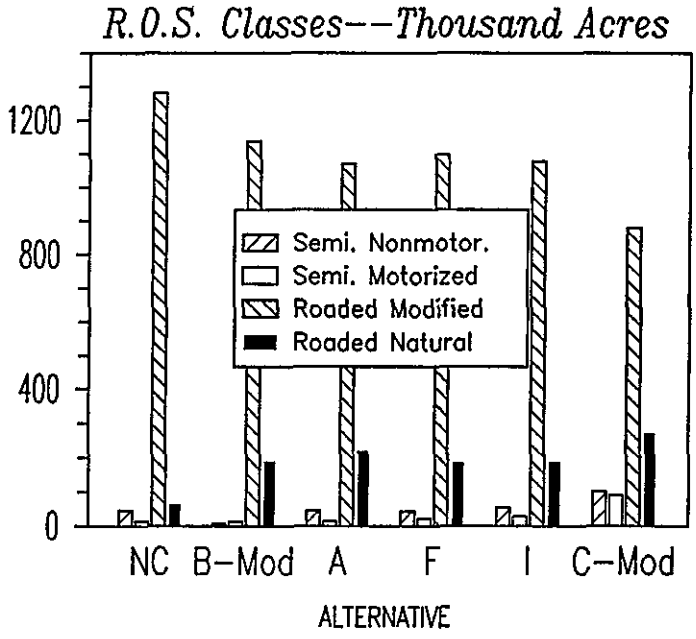
Alternative NC would manage all 25 campgrounds as developed sites Alternative I would manage 20 campgrounds as developed sites with the remaining 5 sites being managed as dispersed campsites. The other alternatives would manage 11 campgrounds as developed sites and 14 campgrounds would be managed as dispersed sites With 11 campgrounds, the capacity is 132,055 person-at-one-time days and with 13 campgrounds the capacity is 144,295 person-at-one-time days. Each of these management proposals will accommodate a projected demand of 105,972 person-at-one-time days in the fifth decade

Each alternative provides capacity to accommodate the projected demand for developed campgrounds. Even though there is substantial capacity for developed facility camping on the Forest, there may still be demands that exceed the supply at some individual campgrounds and for specific facilities

The capacity in visitor days for each recreation setting will vary by alternative Alternatives NC, A, B-Modified, F and I will not meet projected demand for semiprimitive motorized recreation opportunities through the fifth decade All alternatives will provide the capacity to meet projected demands for semiprimitive nonmotorized (outside

wilderness) and roaded recreation opportunities Figure IV-12 displays the recreation opportunity outside the Wilderness for each alternative

FIGURE IV-12: Recreation Opportunity Outside Wilderness



1/Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A

a *Timber Management Effects*

The most suitable forested areas within roadless areas allocated to timber management will be roaded within the first decade, except for the Pine Creek, Shaketable, and Baldy Mountain roadless areas in Alternative F. In this alternative, timber harvest is not scheduled in these three roadless areas in the first decade Project activities such as timber sales and road building will alter the physical setting in those portions of the roadless areas entered, making them unsuitable for semiprimitive recreation experiences Most nonforested and unsuitable forested portions of roadless areas allocated to timber management will remain essentially unroaded These undeveloped areas will generally consist of noncontiguous parcels within each roadless area, with the size of individual parcels varying from a few hundred acres to several thousand acres Roads or areas may be temporarily closed to provide nonmotorized recreation opportunities during periods of high use (i e , hunting seasons)

All alternatives except Alternative C-Modified will reduce the amount of land available for semiprimitive motorized and nonmotorized recreation opportunities Cumulatively, areas allocated to semiprimitive nonmotorized recreation would be reduced the most in Alternative B-Modified followed by Alternatives F, A, NC, and I Cumulatively, the most reduction in semiprimitive motorized recreation would occur in Alternatives NC, A, and B-Modified, where these opportunities are eliminated completely

Currently, the Forest has approximately 828,000 acres providing a roaded, natural-appearing recreation setting In each of the alternatives, this setting will be provided by assignments to visual resource management and old growth Therefore, each alternative will reduce the number of roaded, natural-appearing acres from what is currently available The acres available will vary from a high of 294,091 acres in Alternative A to a low of 128,813 acres in Alternative B-Modified

Alternative C-Modified emphasizes mature ponderosa pine These acres will provide a recreation setting very similar to a roaded natural setting

b. *Range Management Effects*

All alternatives maintain a livestock grazing program. Livestock grazing and the facilities to support these operations have an effect on recreation use The most common conflicts between grazing and recreation stem from the presence of livestock near desirable fishing streams, on trails, and near favored campsites To some visitors, particularly those driving for pleasure, seeing livestock may be a welcome part of the recreational experience. To others, generally hikers, anglers, and dispersed campers, livestock detracts from their experience Alternative NC has the most potential to generate conflicts between recreation and grazing followed by Alternatives A, B-Modified, F, I and C-Modified

c. *Fish and Wildlife Management Effects*

Fish and wildlife improvement projects are designed to maintain or increase wildlife populations Increased opportunities to view or harvest fish and wildlife are beneficial to recreation visitors

Big-game hunting is the major recreation activity that occurs on the Forest (approximately 36 percent of the dispersed recreation use). Alternatives that provide high-quality big-game habitat have the potential for benefiting many recreation users. Habitat improvement often involves vegetative manipulation which normally requires timber harvesting and road building These activities reduce semiprimitive recreation opportunities and create roaded recreation opportunities. A discussion of the effects of each alternative on big-game is in Section E 4 of this Chapter

Anadromous fish habitat improvement projects provide recreation benefits primarily off Forest There are also benefits to resident fish habitat as a result of anadromous fish habitat improvements These benefits provide improved fishing opportunities on the Forest

Fish habitat is improved by various methods (e g , placing structural improvements in the stream, improving riparian conditions adjacent to streams) These methods increase fish numbers which increases potential for fishing opportunities.

Alternative B-Modified improves fish habitat with emphasis on high investments for instream structures Fishing opportunities under this alternative will occur on sites where there is noticeable evidence of human activities Alternative C-Modified improves fish habitat with emphasis on riparian enhancement Fishing opportunities in this alternative will occur in natural-appearing settings

Alternatives A and F also emphasize fish habitat improvement with instream structures while Alternative I emphasizes riparian area enhancement Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives. Based on available information, Alternative NC will closely approximate Alternative A.

Old-growth management benefits recreation by providing opportunities for viewing wildlife and by providing dispersed recreation opportunities in a roaded, natural-appearing setting. Alternative C-Modified provides high levels of old-growth that provide roaded natural opportunities, followed by Alternatives I, F, B-Modified, NC and A Due to the

lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives. Based on available information, Alternative NC will closely approximate Alternative A.

In 1986 the Oregon Department of Fish and Wildlife published the Oregon Bighorn Sheep Management Plan in which the introduction of California bighorn sheep was proposed for McClellan Mountain.

d. *Other Effects*

Management of the visual resource provides for recreation opportunities in roaded, natural-appearing settings Approximately 19 percent of recreation use on the Forest is sightseeing. Visual resource management will maintain or enhance scenic quality around recreation areas (lakes) and around developed recreation facilities (campgrounds). Alternatives A and C-Modified provide for high levels of visual management and roaded natural settings followed by Alternatives I, F and B-Modified.

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A

The treatment of fuels created by logging activities will not have major impacts on recreation If there is much burning activity during the fall, there could be some reduced air quality during the Forest's highest dispersed recreation use period Where slash is accumulated over large areas and is not treated, it would present barriers and a nuisance to cross-country travelers such as hunters These effects would be most prevalent in alternatives that have high timber harvest levels, primarily Alternative B-Modified followed by Alternatives NC, A, F, I and C-Modified Prescribed fire would have minimal effects on recreation. Fall burning could cause some reduction in air quality during the hunting seasons

Wilderness provides primitive and semiprimitive recreation opportunities where motorized use is not permitted. All alternatives maintain Strawberry Mountain and Monument Rock Wildernesses. Alternative C-Modified, in addition, recommends the Pine Creek Roadless Area for wilderness designation

Transportation management has an effect on recreation opportunities available on the Forest The development of roads in previously unroaded areas replaces semiprimitive recreation opportunities with roaded recreation opportunities Not all recreation activities are compatible with each other. The most noticeable conflict on the Forest is between recreationists wanting areas with road access and those wanting unroaded areas. For those looking for roaded recreation opportunities, Alternatives NC, A and B-Modified provide the most access For those looking for unroaded recreation opportunities, Alternative C-Modified maintains the most acres in an unroaded setting

Building roads into previously-unroaded areas generally reduces the number, and use, of existing trails and the potential for new trails Future trail construction and maintenance will be given priority in roadless areas and wilderness Alternatives that allocate more acres to a semiprimitive setting will provide more opportunity for trails. Alternative C-Modified provides the highest potential for trail construction and maintenance followed by Alternatives I, F, A, and B-Modified Where practical, trails may be relocated or restored when disturbed by road construction or timber harvest activity

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A.

10. Effects on Scenery

Timber management and associated road construction have the greatest potential to affect the visual appearance of the Forest On lands where timber harvest prescriptions and road designs are developed to maintain or enhance the visual resource, the scenery will have a natural appearance. On lands where timber harvest is conducted with little attention to the affect on scenery, the effect of this activity will be very evident, thus creating an unnatural-appearing landscape. In all alternatives except Alternative C-Modified, Forest visitors will experience a change from the existing condition of natural stands with larger trees and mixed ages to a more uniform, managed forest with smaller trees

Each alternative places different emphasis on maintaining or enhancing scenic quality. In each case, the scenery viewed from State highways will be managed to maintain a natural appearance Alternatives that allocate larger quantities of land to scenic corridors, old growth, and semiprimitive areas will maintain more of the Forest in a natural-appearing condition. Where more emphasis is placed on timber harvest, the Forest will have an altered appearance.

Alternative C-Modified, with its combination of scenic corridors, old-growth, semiprimitive areas, and growth of large diameter ponderosa pine, will manage a large portion of the Forest in a natural appearing to slightly altered appearance. Alternatives A, I, and F will have moderate levels of natural-appearing landscapes Alternative B-Modified provides emphasis on wood production which will result in a highly altered-appearing Forest. Table IV-12 identifies the expected visual condition from natural appearing to heavily altered for selected viewsheds on the Forest by alternative. Figure IV-13 gives graphic examples of landscapes varying from natural appearing to heavily altered

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A.

The management of livestock will have little effect on the scenery of the Forest. There may be isolated cases where mitigation will be needed to lessen impacts of grazing activities or structural developments in visually sensitive areas. Fish and wildlife habitat improvement can enhance the visual experience by increasing the potential to view wildlife Habitat improvement projects that emphasize returning habitat to a natural condition, such as riparian area improvement, enhance the scenic resource. Instream structural improvements can add to scenic variety and enjoyment, provided they do not create unnatural-appearing modifications to the stream Alternative C-Modified emphasizes rapid improvement of riparian habitat through natural processes on anadromous and resident fish streams. Alternatives B-Modified, F and I place emphasis on structural improvements and slower improvement of riparian areas on anadromous streams Alternative A primarily uses structures to improve anadromous fish habitat.

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A.

Fuels treatment and prescribed burning will have short-term effects on the visual resource During periods of concentrated burning, smoke could cause reduced visibility

In the long-term, scenic quality will be maintained in recreation-related areas. Semiprimitive areas will provide natural-appearing landscapes. Developed areas may have localized decreases in scenic quality Construction activities at developed sites may cause some short-term decrease in scenic quality Wildernesses have the effect of maintaining natural-appearing landscapes.

Mineral development may have a short-term adverse impact on scenic values Remnants of historic mining activity are now often viewed as scenic attractions by members of the public

Mitigation Measures

Mitigation measures for scenery are found in several National Forest Landscape Management handbooks. The following is a list of handbooks specifically addressing landscape management design and implementation techniques.

National Forest Landscape Management	Vol. 1	USDA Handbook 434
Ch 1, The Visual Management System	Vol. 2	USDA Handbook 462
Ch 2, Utilities	Vol 2	USDA Handbook 478
Ch 3, Range	Vol 2	USDA Handbook 484
Ch 4, Roads	Vol 2	USDA Handbook 483
Ch 5, Timber	Vol 2	USDA Handbook 559
Ch 6, Fire	Vol 2	USDA Handbook 608
Ch. 7, Ski Areas	Vol. 2	USDA Handbook 617

These handbooks are kept in the National, Regional, Supervisor's, and District offices of the USDA Forest Service

Implementation of these mitigation measures will greatly reduce the adverse impact of management activities on the visual resource. In some cases, these measures may actually improve scenic quality Applying these mitigation measures is somewhat subjective, because interpretation is based on the sensitivity of personnel responsible for their application Errors in judgment will normally result in a greater length of time for a return to natural-appearing conditions In the case of structures, errors in judgment could result in higher costs of corrective action To minimize errors in judgment, mitigation measures are applied under the guidance of a professional landscape architect Projects are designed and analyzed utilizing the most current computer simulation methods Examples of computer aids are the Viewit and Perspective Plot programs. These activities will be monitored for effectiveness When the principles of visual management are applied, they are very effective in maintaining visual quality This is based on 15 years experience in applying the visual management system.

Designated scenic areas and semiprimitive areas will have additional restrictions placed upon mineral operations to mitigate visual impacts during mining, and to ensure restoration of scenic values upon termination of mining

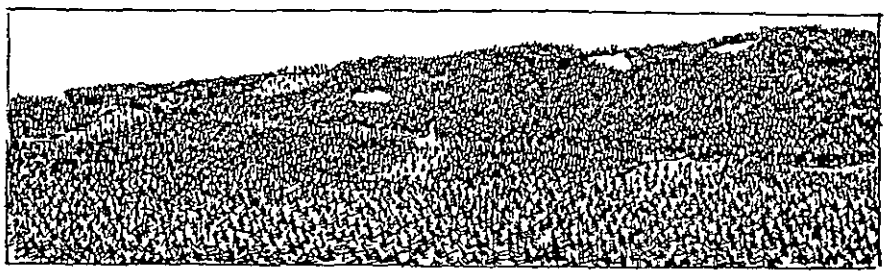
TABLE IV-12: Expected Condition of Viewsheds by Alternative 1/

Viewsheds	Total Acres	Existing Condition	Recommended 2/ Condition	Alternatives NC&A	B-Mod	C-Mod	F	I-Pref
Highway 395	38,248	NA	SA	SA	SA	SA	SA	SA
Highway 26	28,107	SA	SA	SA	SA	SA	SA	SA
Highway 7	11,399	SA	SA	SA	SA	SA	SA	SA
County 20	25,506	SA	SA	SA	SA	SA	MA	MA
Wilderness Loop	62,691	MA	SA	SA	SA	SA	SA	SA
Canyon Creek	3,550	SA	SA	SA	SA	SA	MA	MA
Fawn Springs	455	SA	SA	MA	HA	MA	HA	SA
Strawberry	366	NA	NA	NA	NA	NA	NA	NA
Emigrant	4,142	MA	MA	MA	MA	MA	MA	MA
FS RD 37	9,166	MA	MA	MA	HA	MA	HA	HA
FS RD 31	12,124	MA	MA	MA	HA	MA	HA	HA
FS RD 24	9,994	SA	MA	MA	HA	MA	HA	HA
Yellowjacket	4,675	SA	SA	SA	SA	SA	SA	SA
John Young	2,778	MA	HA	HA	HA	MA	HA	HA
FS RD 21	8,746	SA	MA	MA	HA	MA	HA	HA
Izee	7,190	SA	MA	MA	MA	MA	MA	MA
King Mountain	4,451	MA	HA	HA	HA	MA	HA	HA
FS RD 28	8,110	SA	MA	MA	HA	MA	HA	HA
FS RD 17	3,680	SA	MA	MA	HA	MA	HA	HA
FS RD 15	5,490	MA	MA	MA	HA	MA	HA	HA
FS RD 16	9,468	SA	MA	MA	HA	MA	MA	MA
Malheur River Tr.	1,627	NA	SA	SA	SA	SA	SA	SA
N.F Malheur R.Tr.	8,603	NA	NA	NA	SA	NA	NA	NA
Glacier Loop	12,470	MA	MA	MA	HA	MA	MA	MA
Table	1,122	SA	HA	HA	SA	SA	SA	SA
Skyline Trail	958	SA	SA	SA	MA	SA	SA	SA
Roads End	3,475	MA	SA	MA	HA	MA	MA	MA
Middle Fork Canyon	1,587	SA	HA	HA	HA	MA	HA	HA
FS RD 45	5,771	SA	MA	MA	HA	MA	HA	HA
FS RD 36	3,035	MA	MA	MA	HA	MA	HA	HA
Long Creek	3,787	SA	MA	MA	HA	MA	HA	HA
FS RD 18	4,724	SA	MA	MA	MA	MA	MA	MA
Magone	4,173	SA	SA	MA	MA	MA	MA	MA
FS RD 3160	4,286	MA	MA	MA	HA	HA	HA	HA
FS RD 47	5,668	MA	MA	MA	HA	HA	HA	HA
FS RD 3750	3,038	MA	MA	MA	HA	HA	HA	HA
FS RD 46	3,664	MA	MA	MA	HA	HA	HA	HA
Vinegar	5,492	MA	MA	MA	HA	HA	HA	HA
FS RD 2640	7,276	MA	MA	MA	HA	HA	HA	HA
Wiley Creek	4,027	MA	MA	MA	HA	HA	HA	HA
Four Corners	1,689	MA	MA	MA	HA	HA	HA	HA
Fox Valley	2,015	MA	MA	MA	HA	HA	HA	HA
Cedar Grove	3,146	MA	MA	MA	HA	HA	HA	HA
Starr Ridge	4,557	MA	MA	MA	HA	HA	HA	HA
Lake Creek Plus	2,373	MA	MA	MA	HA	HA	HA	HA
FS 16 to Boundary	3,391	MA	MA	MA	HA	HA	HA	HA
Malheur Ford Rd	3,736	MA	MA	MA	HA	HA	HA	HA
FS RD 3770	4,134	MA	MA	MA	HA	HA	HA	HA

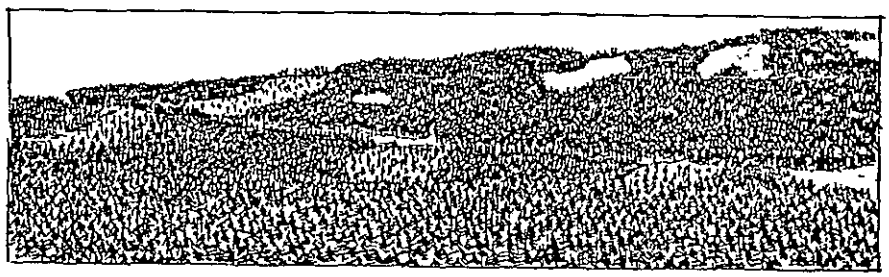
1/NA = Natural Appearing, SA = Slightly Altered, MA = Moderately Altered, HA = Heavily Altered

2/Recommended visual condition is based on application of the visual management system which does not consider other resource objectives

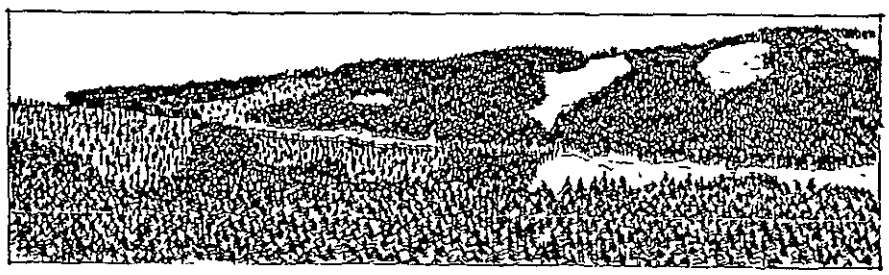
FIGURE IV-13: Viewshed Appearance



Natural Appearing



Slightly Altered



Moderately Altered



Heavily Altered

11. Effects on Cultural Resources

Cultural resources are unique, fragile, and nonrenewable features of the environment As such, they are recognized by a special set of historic preservation laws, regulations, and policies. Consequently, efforts will be made in every alternative to inventory, evaluate, preserve, and protect the significant cultural resources of the Forest

In all alternatives, the decision whether to practice site avoidance or to carry out mitigation in lieu of avoidance will be based on both the nature and uniqueness of cultural values at the site and the costs of desired treatment (avoidance or mitigation).

Effects on cultural resources range from disturbance, to destruction or loss of part or all of the resource, to modification of the environmental setting around the site so that the feeling of the place is altered or destroyed The greater the number of known or potential sites that fall within management areas which allow a high level of modification, the greater is the risk of adversely impacting cultural resources

Some kinds of cultural resource properties on the Forest that could be affected by undertakings are

Prehistoric· Heavy concentrations of lithic sites which include quarries, quarry workshops, seasonal camps, hunting stations, cambium-peeled trees, fire hearths, house pits/villages, kill/butcher sites, middens, ovens, rock art, rock shelters, and rock structures such as cairns, hunting blinds, alignments, etc

Historic· Such as placer ditches, railroad grades, trails, wagon roads, and stock driveways; buildings and structures, including log cabins and Depression-era administrative sites; dendroglyphs; livestock management sites such as log troughs, salt licks, etc , and mines

The alternatives fall into three general groupings of their consequences on cultural resources These groupings are high, moderate, and low potential for impact The groupings are based on location and number of acres within each type of management area and on the type of effect that any particular management area is likely to have on cultural resources

High-potential alternatives (Alternatives NC, A, B-Modified, and F) could have major alterations of the environmental setting of significant sites; future management options constrained; direct impacts likely to occur to nonsignificant sites through timber harvest, road construction, livestock grazing, and increased accessibility, and high potential for disturbance of currently unidentified sites Opportunity for the identification of new sites, however, is also the greatest at this level

With moderate-potential, Alternative I alters the environmental setting of significant sites; direct impacts may occur to nonsignificant sites through timber harvest, recreational developments, road construction, and motorized recreational use, thereby increasing risks to unprotected sites Future management options are varied and there is substantial opportunity for interaction of the public with cultural resources

A low-potential alternative, Alternative C-Modified could have adverse impacts from land-modifying activities, although timber harvesting is limited, and motorized recreational use is constrained. This alternative has less emphasis on identification of new sites but more opportunities for preservation of sites in place

The primary effect of wilderness management will be to standing structures, but overall these constitute a small proportion of the cultural resources in the Wildernesses

The Oregon State Historic Preservation Office (SHPO) is presently preparing a Statewide Preservation Plan for cultural resources. Since it is in the preliminary stages, potential

conflicts between the effects of the Forest management alternatives and the objectives of the plan cannot be determined

Mineral operations can have a tremendous effect on cultural resources. Surface mining (placer, or open pit hard rock) have the potential to destroy a cultural resource site. The Forest is responsible for conducting a cultural resource inventory prior to approving mineral plans of operation. The mineral operator is responsible for mitigation of any adverse impacts to cultural resources

Many of the cultural resources on the Malheur National Forest are unique. They may provide the sole record of a former environment or past way of life In several instances, the cultural sites of the Forest are also part of a larger complex of past cultures which once extended northward into the Columbia Plateau and southward into the Northern Great Basin. Each site within this whole is a vital link to the others in interpreting patterns of human use through time

These same sites are also part of a rapidly diminishing, nonrenewable resource base. The combination of impacts from past landscape modifications, private developments, natural deterioration, and other projects has already destroyed much of this record in eastern Oregon. The exact extent of the loss and the range of site types affected cannot be determined since there was no cultural resource inventory preceding most of these activities. There are likewise few opportunities today to mitigate the cumulative effects of the past Once destroyed, a cultural resource cannot be resurrected. This points to the need for even more careful consideration of cultural resource values in the future

Within the Forest, cumulative effects can be analyzed on the basis of· (1) impacts of activities to the visual settings surrounding the cultural resources, (2) alterations that activities may create in above-ground objects, features, and structures, and the spatial relationships between these, and (3) impacts which activities may have on subsurface cultural deposits.

The existing cultural resource compliance review process incorporates the consideration of cumulative effects to cultural resources of any proposed action taking place on National Forest land. These effects are subsequently avoided or mitigated through a variety of measures However, there is no adequate compensation for the physical loss of some sites These are resources which, in part, are aesthetically significant. They convey, by their existence in place, a special human link with the past and they are rare because of their tremendous depletion in the past

Mitigation Measures

Mitigation most often involves the use of methods or techniques that will minimize disturbance to cultural resources and their environmental setting A variety of potential mitigation measures exist These range from special project design criteria to be followed during ground-disturbing activities, to protective enclosures or exclosures around significant cultural sites, or to systematic monitoring of project activities Each would require further consultation with the Advisory Council on Historic Preservation and/or the State Historic Preservation Officer if the resource is determined eligible for the National Register of Historic Places The most desirable measures are those which effectively protect the cultural resources in place, are economically prudent, and are compatible with other resource management needs

In implementing mitigation measures, the Forest will follow guidelines, policies, and procedures listed in 36 CFR parts 60, 66, and 800, FSM 2361 and 2363, and the following memorandums of agreement

a Memorandum of agreement between the State Historic Preservation Office, State Parks Branch, Department of Transportation, State of Oregon and the USDA Forest Service (Pacific Northwest Region), 1979, and Amendment No 1 dated 1982

b. Regional Management Strategy for identification and treatment of Lithic Scatter Archaeological Sites Programmatic Memorandum of Agreement (Draft PMOA 1986)

c. Programmatic Memorandum of Agreement for management of Depression-era Administrative Structures on National Forest Lands in Oregon and Washington, 1983.

d. Other appropriate memorandums of agreement that are or may be implemented in the future.

In descending order of preference with respect to protection of cultural resource values, possible mitigation measures may include:

a. Adjustment of project boundaries to completely avoid cultural resources and minimize alteration of the environmental setting

b. Adoption of methods or techniques that will minimize disturbance to cultural resources and their environmental settings.

Frequently, activities may be carried out around a cultural site with minimal disturbance through creation of a protective buffer zone, through use of special techniques, or through reduction of the actual area of ground disturbance Such methods include:

(1) Use of an aerial or full-suspension yarding system.

(2) Where tractor logging is necessary, restriction of the overall number of skid trails and designation of a planned system of trails to reduce impacts In previously harvested areas, *reuse of existing skid trails wherever possible*

(3) Use of a buffer between equipment and the ground surface (such as snow)

(4) Removal of the cultural (historic) property to another appropriate location (if physically possible) after adequate documentation of the property and provisions for protection of its historic values and integrity.

(5) Mapping, photo documentation, and scaled drawings of the cultural resource (historic properties only) before proceeding with project implementation (and loss of the resource)

c. Data recovery, using professionally sound techniques, to reverse an adverse effect prior to implementing the project activities over or in the immediate vicinity of a site.

The nature of the data recovery effort, its scope, and its boundaries must be determined on a case-by-case basis There is no standard as to how much data recovery is sufficient *Excavation and/or surface collection of archaeological resources must use a professionally* sound research design in conformance with the Statewide Preservation Plan When properly implemented, this will be 100 percent effective in protecting and recovering the resource.

12 Effects on Roadless Areas

The specific environmental consequences of the alternatives on each roadless area on *the Forest are detailed in Appendix C of this Final Environmental Impact Statement.* Generally, the alternatives have various levels of retention of the areas from a portion of one area (13,322 acres in Alternative B-Modified) to all of the roadless areas (193,064 acres in Alternative C-Modified) Figure IV-14 displays, by alternative, how much of the areas are retained in an unroaded status The acres retained in each alternative are also shown in Table II-5 and Appendix C of this Final Environmental Impact Statement

In every alternative except Alternative C-Modified, the boundaries of the areas retained have been modified to improve manageability of the areas The goals in delineating these boundaries were to identify portions of the areas which provide high quality semiprimitive recreation experiences and to locate the boundaries where they would be most effective in protecting the integrity of those recreation opportunities In general, the manageable boundaries follow identifiable features such as ridges and streams, which the RARE II boundaries did not These adjustments will make it easier for both Forest managers and the public to identify the location on the ground, reducing chances that activities which detract from the unroaded dispersed recreation experience will occur in the area by mistake.

Alternative C-Modified retains every roadless area within RARE II boundaries and extends these boundaries in specific areas. The other alternatives retain various combinations of the areas, all within manageable boundaries. The acres noted as semiprimitive motorized will provide semiprimitive motorized recreation opportunities The acres noted as semiprimitive nonmotorized will provide semiprimitive nonmotorized recreation opportunities In Alternative F, additional semiprimitive recreation opportunities will be provided in the first decade in the Pine Creek, Shaketable, and Baldy Mountain roadless areas, where timber harvest is not scheduled in the first decade In Alternative NC, additional semiprimitive recreation opportunity would be provided in Pine Creek area, where timber harvest is deferred In Alternative C-Modified, the Pine Creek Further Planning Area is recommended for wilderness designation In Alternative I, wildlife emphasis areas will also provide semiprimitive recreation opportunities

Mining laws as applied to all alternatives, provide the right to "reasonable" access for mineral exploration and development This right may cause the roading of a roadless area, if it can be shown that a road is the most reasonable means of access to accomplish the goals of the mineral operator When selecting the most reasonable means of access, variables considered include the stage of exploration/development, the proposed activity, and the value of surface resources which will be impacted The effects of roading may be lessened by visual screening, route selection and obliteration upon termination of activity.



FIGURE IV-14: Acres of Unroaded Areas by Alternative

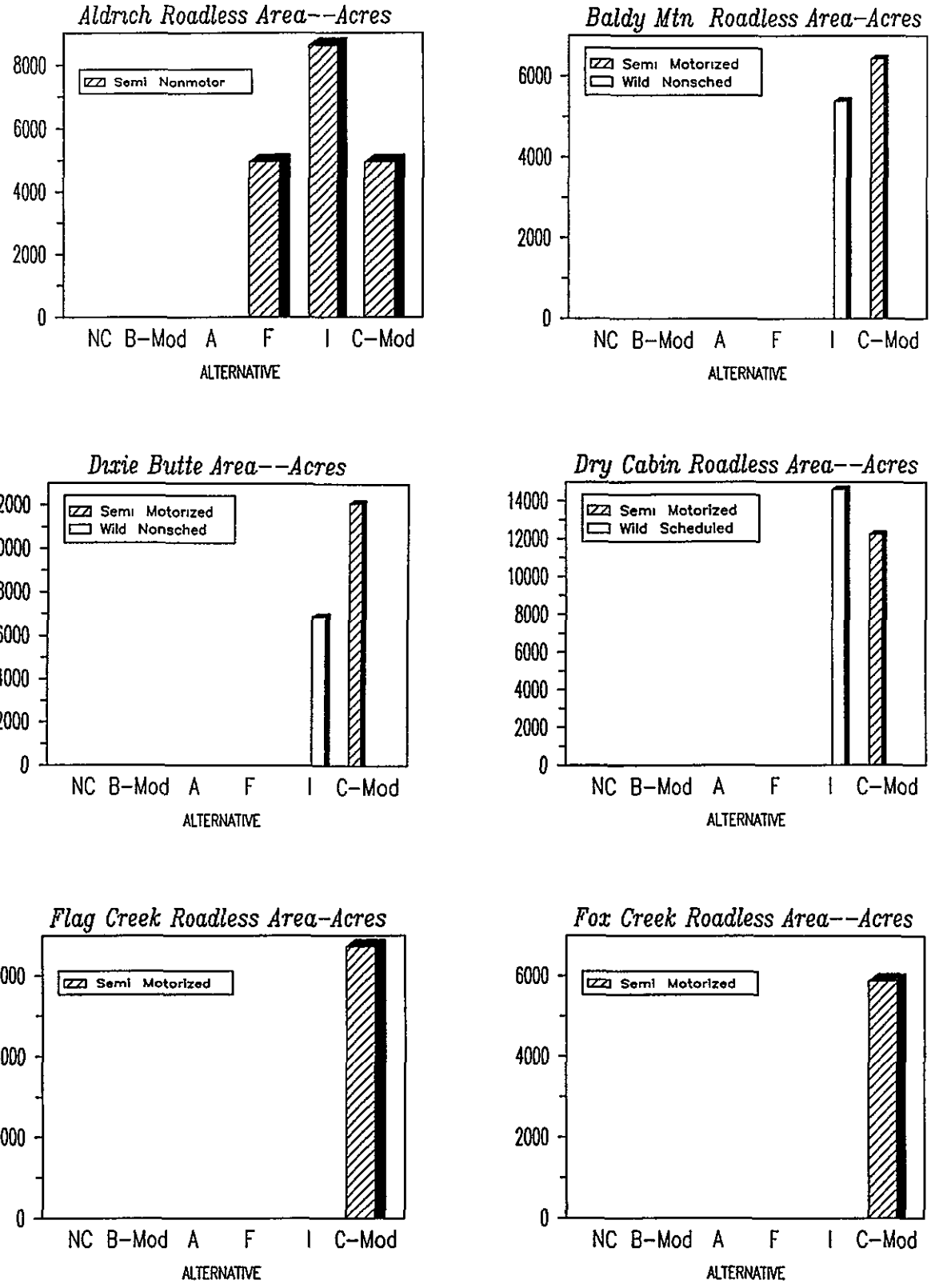
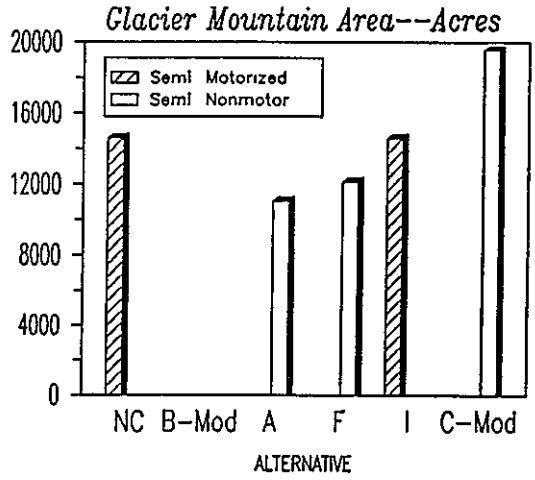
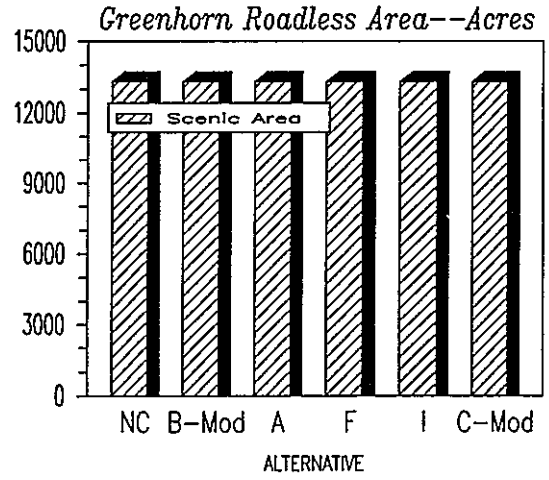
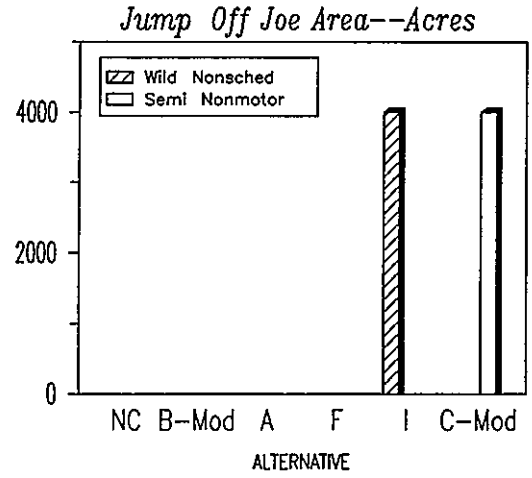
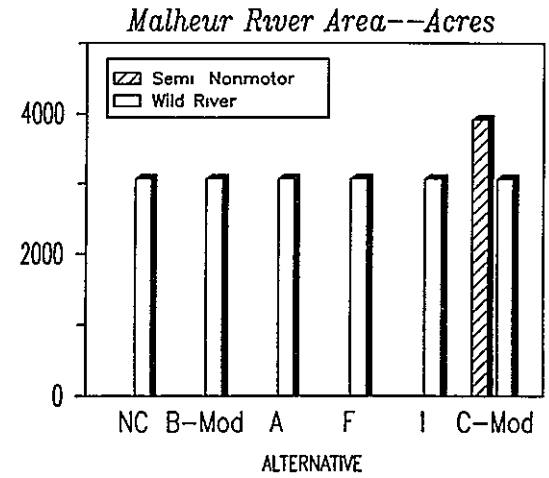


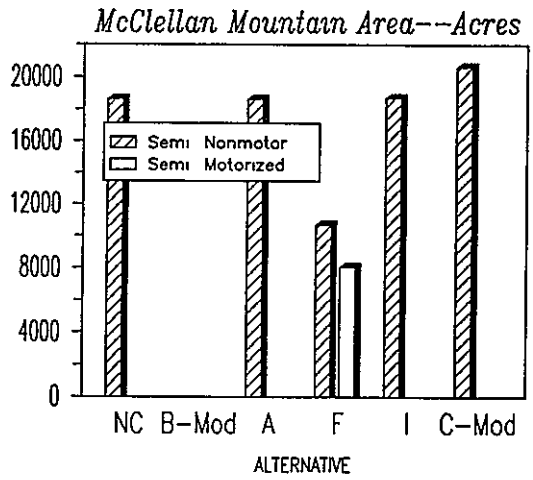
FIGURE IV-14: Acres of Unroaded Areas by Alternative (continued)











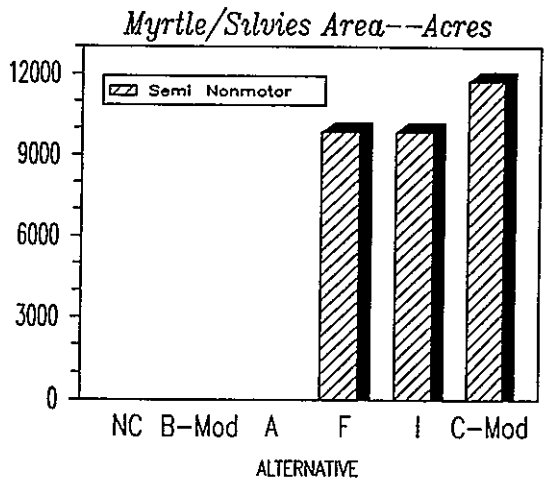
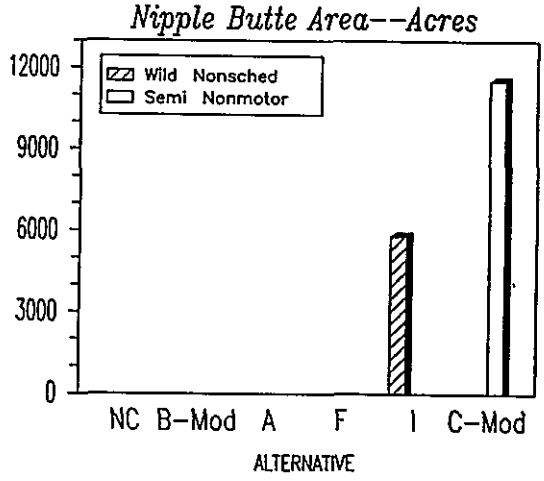
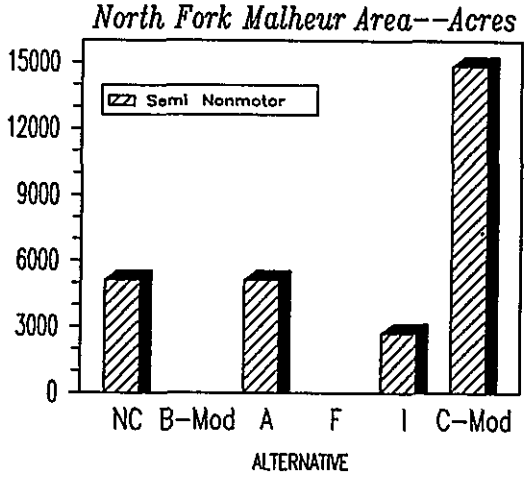
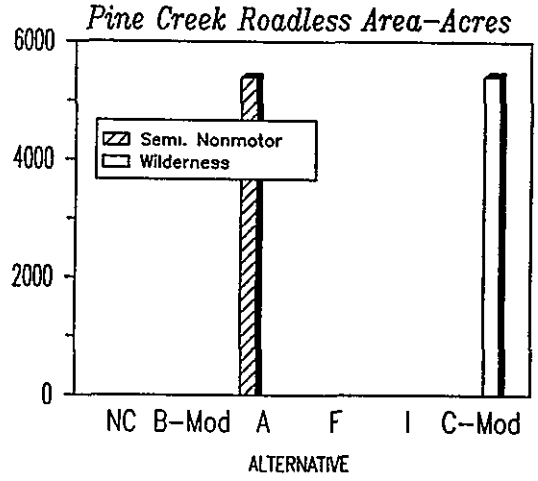
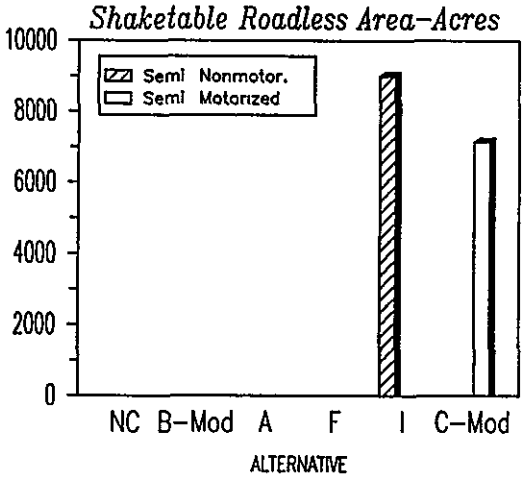


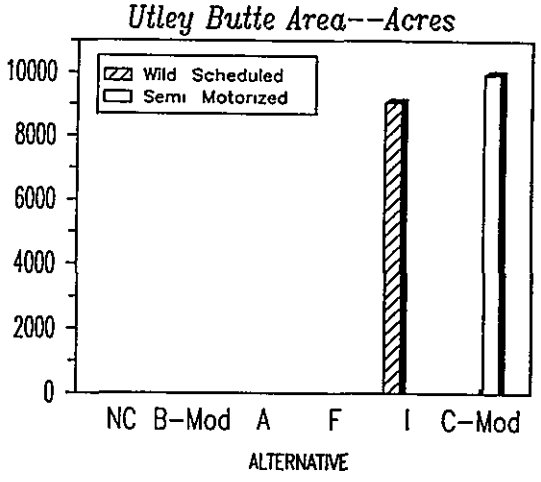
FIGURE IV-14: Acres of Unroaded Areas by Alternative (continued)











13 Effects on Wilderness

All alternatives maintain the 81,320 acres in the Strawberry Mountain and Monument Rock Wildernesses Alternative C-Modified also recommends the 5,420-acre Pine Creek area as wilderness Remaining areas retaining wilderness characteristics in the future vary by alternative. Alternative C-Modified provides the most area retaining wilderness characteristics, followed by Alternatives I, F, A, NC and B-Modified

The anticipated recreational demand for wilderness on the Forest is estimated to be 30,783 Recreation Visitor Days by the year 2030 All alternatives provide sufficient wilderness to accommodate this demand

There will be no timber harvest activity inside the Wildernesses The social and physical settings of the Wildernesses could vary by alternative based on the type and intensity of resource management adjacent to them and the type and degree of access afforded. This would affect both the solitude and the recreation experience The higher the rate of resource management activities which take place adjacent to the Wildernesses, and the greater the ease of access, the greater the effect upon the wilderness experience It will also mean a potential need to increase management controls in order to maintain the social attributes needed to provide an experience level consistent with the Wilderness Recreation Opportunity Spectrum (WROS) zone

Each alternative provides a different mix of Wilderness Recreation Opportunity Spectrum classes They vary from providing semiprimitive and primitive-trailed environments to primitive-trailed and primitive-trailless environments Alternatives with emphasis on semiprimitive and primitive-trailed settings will have a higher capacity to accommodate wilderness users Alternative B-Modified provides high emphasis on a semiprimitive setting. Alternatives A and F provide a blend of WROS settings while alternatives C-Modified and I emphasize a primitive setting

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A

New livestock grazing allotments will not be created in Wilderness by any alternative Livestock-grazing operations and activities are allowed to continue at levels in existence at the time of Wilderness designation Riparian areas are the most productive forage areas on the Forest. Because of this, livestock tend to congregate there In the Wildernesses, any adjustments in the number of livestock will be made through the Forest Service's normal grazing, land management planning, and policy-setting processes

Monument Rock Wilderness lies within the boundaries of three livestock grazing allotments, Spring Creek and Malheur River, North Fork, on the Malheur National Forest, and Bullrun on the Wallowa-Whitman National Forest. Permitted numbers totaling 1,314 head of livestock can use this Wilderness at specified times during a grazing cycle

Portions of three livestock grazing allotments occur within the 1984 Strawberry Mountain Wilderness addition These allotments are Indian Creek, Sugarloaf, and Fawn Springs Livestock numbers permitted to graze are normally Indian Creek - 75 head, Sugarloaf - 364 head, and Fawn Springs - 97 head. A portion of Rail Creek Allotment is also located within the 1984 and the original 1964 Strawberry Mountain Wilderness boundaries. A total of 150 head of livestock is currently permitted on Rail Creek Allotment.

There were no mineral claims filed at the time of establishment (June 26, 1984) of the Monument Rock Wilderness. There were no mineral claims filed by
January 1, 1984, for the original Strawberry Mountain Wilderness Therefore, mineral exploration and development is prohibited within the Monument Rock Wilderness and the original boundary of the Strawberry Mountain Wilderness As of April 1988, there

were 11 claims which appear to be all or partially within the 1984 additions to the Strawberry Mountain Wilderness. Valid existing rights in the Strawberry Mountain Wilderness additions are any which may have existed prior to June 26, 1984

All alternatives would provide an environment where wildlife habitat is determined by natural causes and selection. The visual quality objective for wilderness is preservation.

The use of prescribed fire in wilderness is subject to preplanned and specified conditions which meet the objectives outlined in Chapter 2320 of the Forest Service Manual. Use of prescribed fire in its natural role in the wilderness ecosystem could cause a loss of visitor solitude, reduction of visibility, reduction in air quality, disturbance of the land surface, and alteration of the wilderness landscape

Alternatives that reduce the amount of available semiprimitive nonmotorized settings could increase the demand on the Wildernesses to provide this setting Concentrations of wilderness users could cause degradation of the wilderness environment. The lakes basin of the Strawberry Mountain Wilderness is one area where users concentrate due to its attractive setting and the ease of access to the area Alternative B-Modified has the greatest potential to impact the Wildernesses followed by Alternatives NC, A, F, I and C-Modified.

Alternatives that provide higher-standard roads to trailheads or additional roads adjacent to Wilderness boundaries will create a potential for increased use within the Wildernesses. This increased use could exceed the limits of acceptable change in parts of the Wildernesses, such as the lakes basin within the Strawberry Mountain Wilderness

All alternatives propose activities adjacent to the Wildernesses that could develop roads near the boundary The only variation between alternatives will be how rapidly the development takes place This development will make it easier for people to access the Wildernesses, which could have the positive effect of better distribution of use This could also have the effect of increasing illegal entry by motorized users. The activity adjacent to the Wildernesses also has the potential of increasing the sight and sound of these activities, reducing the quality of the wilderness experience

The Wilderness Act calls for "The preservation of their Wilderness character" (P.L 88-577). *Changes in ecological and social qualities are inevitable.* "*Limits of Acceptable* Change" (LAC) are established to assure that ecological and social changes that occur as a result of human use do not reduce the wilderness character of the wilderness. These limits have been established in the Forest Service Manual System (in Regional Supplement 81) and have been adopted by each Forest Modifications to the Regional limits of acceptable change can be adopted by a Forest with Regional Forester approval

Mitigation Measures

Establishment and monitoring of limits of acceptable change for various wilderness recreation opportunity spectrum classes will aid in reducing impacts on the wilderness environment The limits of acceptable change process gives primary attention to acceptable existing wilderness conditions and prescribing actions to protect or achieve those conditions. If the conditions are not met, action is taken to bring them into the acceptable range. Actions may include closure of access roads and moving trailheads away from the problem area or requiring entry permits

Overuse by people may cause wilderness conditions to deteriorate below acceptable levels The most effective measures for controlling use are to make heavily used areas less accessible or to control use by requiring entry permits and controlling the number of permits used Making popular areas less accessible has been used effectively in the Pasayton Wilderness in Washington and the permit system is effectively used in the Boundary Waters Canoe Area.

The same rationale may be used for decreasing impacts to wilderness from activities on adjacent lands If these lands are made less accessible and activities such as logging are designed to protect scenic vistas and are scheduled during periods of low wilderness use, the potential for conflict with wilderness objectives will be effectively diminished

14 Effects on Mineral Resources

The U S. Mining Laws of 1872 and Federal Land Policy and Management Act of 1976 provide for mining on Federal lands Exploration and development of National Forest minerals may be encouraged by assigning lands to management areas which allow access or other types of development The relative ease by which a prospector or miner obtains access to an area is largely dependent on the restrictiveness of the management for that area The less restrictive management areas also generally have less-stringent surface protection requirements and fewer administrative approval processes

The majority of the Forest (approximately 95 percent) has low or unknown potential for mineral development, although locatable minerals may exist almost anywhere on the Forest Areas of the Forest with known mineral potential have been classified according to their potential from Category IV-Low to Category I-High. Criteria for these categories can be found in Appendix F of this Final Environmental Impact Statement There are no acres in Category I There are 4,780 acres in Category II, 20,650 acres (5,330 in the Wildernesses) in Category III, and 50,784 acres in Category IV

Table IV-13 displays the acres in each category which are either open under minimal restriction, under restrictive management, as described above, or withdrawn in each alternative Generally, the semiprimitive management areas (motorized & nonmotorized) and scenic areas will be the most restrictive toward mineral development Road construction will be minimized, and allowed only when necessary Resource protections and reclamation stipulations will be more stringent in these areas Additionally, mining companies may be more reluctant to pursue exploration in areas which are viewed as potential inclusions in the wilderness system

The two Wildernesses on the Forest are withdrawn from mineral entry and no new mining claims or mineral leases may be made within them Any valid claims which existed prior to the creation of the Monument Rock and Strawberry Mountain additions may continue to be operated However, requirements for environmental protection and reclamation are more strict than on other areas of the Forest. In addition to the Wildernesses, most recreation and administrative sites and the Research Natural Areas (RNAs) are either withdrawn from mineral entry or will be proposed for withdrawal The one existing Research Natural Area is within wilderness and one of the proposed RNAs is also within wilderness and will not need to be withdrawn Alternative C-Modified recommends wilderness designation for the Pine Creek area, which is in an area considered prospectively valuable for oil and gas and for geothermal resources Table IV-13 displays the acres with potential for natural oil and gas within restrictive assignments by alternative. Otherwise, the areas of mineral withdrawal vary little between alternatives

TABLE IV-13: Acres with Potential for Oil and Gas in Restrictive Assignments

Alternative	Open	Restrictive	Withdrawn
NC	563,390	15,310	0
A	563,390	15,310	0
B-Modified	578,700	0	0
C-Modified	524,220	49,060	5,420
F	558,240	20,460	0
I	557,760	20,940	0

Mineral exploration and development will be more easily accomplished in areas which are roaded for other management activities However, the mining laws provide a statutory right of reasonable access to operations within any lands open to mineral entry. Access to mineral resources could prove to be an exception in keeping an area roadless Alternatives which are commodity oriented, such as Alternative B-Modified, will be most favorable for mineral development Amenity alternatives, such as Alternative C-Modified, will be least favorable. Large acreages of unroaded management will place additional access expense on mineral exploration, and may make large mineral firms reluctant to invest their funds due to the risk that these areas could be designated as wilderness

TABLE IV-14: Mineralized Area Categories in Restrictive Assignments

Alternative	Amount of Restriction	Acres by Category II	III	IV
NC	Open	3,572	16,887	45,666
	Restrictive	1,108	203	7,094
	Withdrawn	20	5,510	340
A	Open	3,572	16,887	45,666
	Restrictive	1,108	203	7,094
	Withdrawn	20	5,510	340
B-Modified	Open	3,572	16,887	45,666
	Restrictive	1,108	203	7,094
	Withdrawn	20	5,510	340
C-Modified	Open	3,619	10,848	41,949
	Restrictive	1,061	6,242	10,811
	Withdrawn	20	5,510	340
F	Open	3,572	16,887	45,666
	Restrictive	1,108	203	7,094
	Withdrawn	20	5,510	340
I	Open	3,572	16,887	45,666
	Restrictive	1,108	203	7,094
	Withdrawn	20	5,510	340

15 Effects on Air Quality

On-Forest sources of air quality degradation can be smoke from burning logging slash, prescribed burning for other resource purposes such as range management, or wildfires. Smoke from slash burning is the only significant source in Alternatives A, B-Modified, F

and I. This can be mitigated by confining burning to periods when atmospheric conditions cause rapid smoke dispersal The potential significance of this source varies in direct relation to the level of the timber harvest in each alternative

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will closely approximate Alternative A

Burning of logging slash will be a contributing factor in Alternative C-Modified In addition, prescribed underburning could be used to some extent as a tool in selectively thinning associated fir species to maintain a predominant ponderosa pine timber stand. The amount that fire would be used for this purpose is unknown; however, it could not be used to the point where it would have a significant impact on air quality or violate State or Federal Laws

Aside from that potential exception, it is doubtful that any difference in effect between alternatives would be noticeable

In recent years, use of wood-burning stoves for home heating has increased in communities within a day's drive of the Forest Much of the fuelwood used comes from this Forest, and effects of fuelwood smoke in those communities could be considered an indirect effect of use of this Forest Local communities have not identified a significant effect with woodstove use on air quality, however, the Boise, Idaho, metropolitan areas do have significant air quality concerns, to which woodstove use contributes Because use of wood stoves and firewood gathering is not directly related to implementation of any alternative, it is not possible to estimate the effects of the alternatives on woodstove use in the Boise, Idaho, area Relative availability of fuelwood in each alternative is discussed in Table II-5 in Chapter II

16 Energy Effects

The net Forest resource energy balance is the difference between energy produced and energy expended in utilizing a Forest resource or service The energy consumption component encompasses the energy required to produce and utilize Forest resources and to provide services and protection from natural calamities Both Forest Service and non-Forest Service energy inputs are included, but only that portion of non-Forest Service energy input which relates to Forest Service activities or resources is counted The energy yield is based on present forms of resource utilization

Following is Table IV-15 which displays the energy balance by resource group and by planning alternative

TABLE IV-15: Energy Balance by Resource Group and by Planning Alternative
(Trillion BTUs over 50 years)

	Timber		Biomass		Range		Recreation		Water1/	
	Consume	Yield	Consume	Yield	Consume	Yield	Consume	Yield	Consume	Yield
NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	274 8	130 1	3 1	101 9	1 0	1 3	2 9	0 0	0 0	14 7
B-Mod	316 8	145 2	3 0	101 9	1 3	1 8	2 9	0 0	0 0	14 7
C-Mod	165 0	78 2	3 0	101 9	0 8	1 0	2 9	0 0	0 0	14 7
F	280 2	132 7	3 0	101 9	1 0	1 2	2 9	0 0	0 0	14 7
I	234 6	111 1	3 0	101 9	0 9	1 1	2 9	0 0	0 0	14 7

	Minerals		Roads		Fire		Total		Net Energy
	Consume	Yield	Consume	Yield	Consume	Yield	Consume	Yield	Balance
NC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	0 8	0 0	1 9	0 0	0 7	0 0	285 2	248 0	-37 2
B-Mod	0 8	0 0	2 3	0 0	0 7	0 0	327 8	263 6	-64 2
C-Mod	0 7	0 0	2 3	0 0	0 6	0 0	175 3	195 8	+20 5
F	0 8	0 0	2 3	0 0	0 7	0 0	290 9	250 5	-40 4
I	0 8	0 0	2 3	0 0	0 7	0 0	245 2	228 8	-16 4

1/Consumption of water is so low that it is not measurable in tenths of a trillion British Thermal Units (BTUs)

17. Economic Effects

The economic effects of implementing the alternatives can be measured in various ways. Key indicators of effects on the local economic environment include: (1) projected changes in numbers of jobs related to timber and range sectors, and (2) projected changes in income in Grant and Harney counties. Other indicators of the effects of implementing the alternatives include payments to local governments, size of the Forest budget, and net cash flow resulting from the alternatives The characteristics of these indicators are briefly described below

a *Changes in Jobs*

The economy is heavily resource based, with logging and ranching as the principal sustaining industries These industries are typically cyclical and are subject to many external forces. Despite the National Forest policies or outputs, the cyclical nature of these industries was clearly evident in unemployment rates at around 20 to 30 percent in Harney and Grant Counties in the early 1980's. Unemployment rates in these counties are now ranging from 5 to 18 percent seasonally The changes resulting from implementation of any of these alternatives will be of much less magnitude than changes caused by external influences on these industries

Several aspects of Forest management do affect employment opportunities, level of timber harvest is the most significant component. For each additional million board feet of timber harvested from the Forest, approximately eight to nine jobs are predicted to be added to the local economy (Additional employment opportunities are created outside the local economy by Forest timber harvests, although no attempt has been made to account for those jobs)

b *Changes in Income*

Income is generated from implementation of the alternatives by converting raw materials from the Forest (e g , trees, forage) into products which are sold within or exported outside the local region. Other income-producing factors could include desirable attributes of the Forest which attract recreationists, hunters, and such Positive changes in income indicate added income to the local region, negative changes indicate losses (refer to Appendix B).

c *Payments to Local Governments*

The Forest contributes to the finances of local counties primarily through Forest Reserve Fund (FRF) payments By law, 25 percent of each National Forest's gross receipts is returned each year to the counties in which the National Forest lies (Grant and Harney). For this Forest, almost all receipts (99 percent) are generated by the sale of timber As a result, payments to counties, primarily used to finance roads and schools, can fluctuate substantially with level of timber harvest.

d *Forest Budget*

Annual projected costs of managing the Forest according to each alternative are displayed in Figure IV-15 for the first decade The economic effects of this expenditure are substantial because a large portion of the Forest budget enters the local economy through employee expenditures Shortfalls in the funding of any alternative may result in lowered outputs, employment, income, and payments to counties

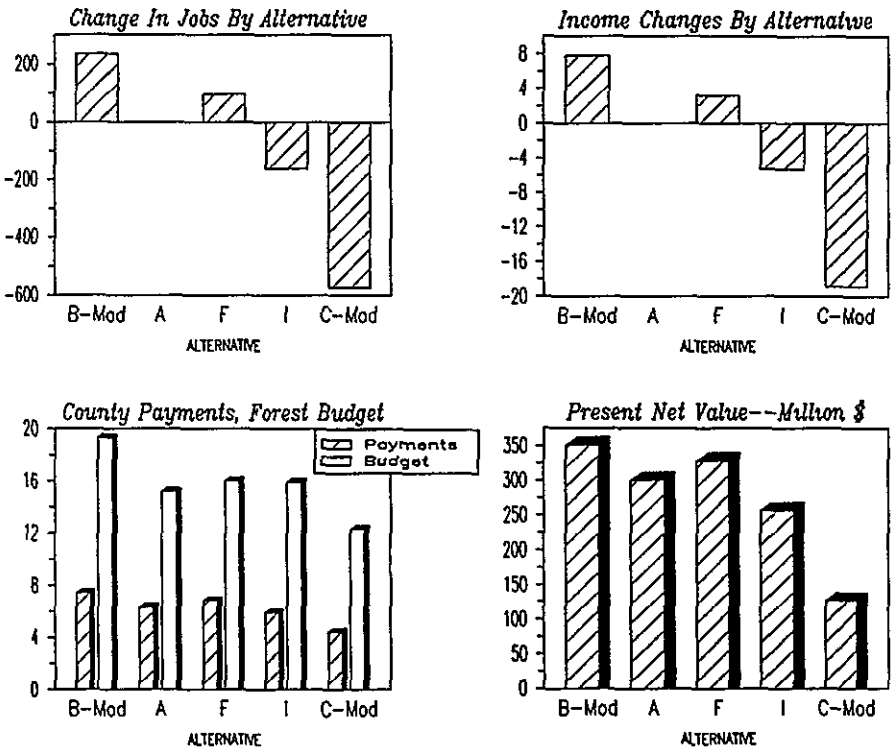
e *Net Cash Flow*

Net cash flow, which is total revenue minus total Federal cost, is an important indicator for two reasons First, net cash flow measures the ability of the Forest to "make money" for the American people. After Receipt Act payments (i.e., payments to counties) are deducted from net cash flow, the remainder, if any, can be applied toward reducing the Federal debt A second application of net cash flow is as an indicator of the economic viability of the Forest's timber sale program. Timber sales account for about 99 percent of the total revenue generated from the Forest; timber-related expenditures account for about 70 percent of the Forest budget. In every alternative, significant cash flow is generated, indicating that the timber program generates revenue in excess of expenses Below-cost timber sales would be very infrequent

f *Summary*

Displayed in Figure IV-15 are the results by alternative Following the figure is a discussion of the most significant economic effects expected for each alternative

FIGURE IV-15: Summary of Economic Indicators for the First Decade



1/The No Change Alternative is based upon the 1979 Timber Resource Management Plan This plan was not an integrated resource management plan, and not all resource uses and outputs were valued Consequently, some economic indicators of the NC Alternative are not strictly comparable to the economic indicators of all other alternatives

Employment and income prospects would continue to trend upward under the No Change (NC) Alternative (when compared to the 1980-89 averages) Payments to local government, projected in the 1979 Timber Resource Management Plan, are in the higher end of the range of alternatives. However, differences in economic assumptions between this alternative and all other alternatives make comparison of these economic indicators suspect. In general, Alternative NC would result in substantial returns to the Treasury (because of the high timber harvests).

Alternative A would maintain income and employment prospects at about the current level. Moderate growth in the local economy would occur, and local school and road budgets would increase over time resulting from increased payments to counties from Forest receipts This alternative would continue to generate a high amount of net receipts for the Government.

Alternative B-Modified would generate about a 14 percent increase in local timber and range employment in the first decade, and over time the highest employment level of all alternatives would be sustained; income generated would parallel employment trends Over five decades, the highest rate of growth in the local economy would occur. Net cash flow is near the midpoint of all alternatives because of the high expenditures and investments proposed by this alternative.

Under Alternative C-Modified, local employment in the timber and range sectors would be reduced by about 33 percent, the most severe of all alternatives, and substantial decreases in income would occur as a result of reduced timber and range outputs Other

economic indicators are the lowest of all alternatives This alternative has the potential to destabilize the existing local economy more than any other alternative

Employment opportunities in timber and range would increase by about 6 percent under Alternative F, and income generated would increase substantially Other economic indicators would increase to varying degrees over historic levels, the local economy would incur moderate growth New cash flow would be near the highest of all alternatives.

Alternative I employment in timber and range jobs would decrease by approximately 9 percent This alternative provides timber availability at lower levels than during the last 10 years on this Forest (however actual timber production could be at levels higher than that realized during the last 10 years), with emphasis on ponderosa pine production to ensure future revenues to counties Range outputs would be slightly lower, but with outputs near recent average historic levels, employment and income would remain fairly stable. Other economic indicators are near the midpoint of the range of all alternatives In general, this alternative would result in a stabilized local economy, accompanied by a slow growth rate

18. Social Effects

Social groups are categories of people who share the same interests and concerns There are several social groups that may be affected by Forest outputs and land management, including ranchers, timber industry workers, hunters, and people who enjoy nonmotorized recreation activities These groups are not mutually exclusive, and individuals may be included in more than one group

Because these groups may be affected by Forest policies and management practices, the alternatives raise social issues When social groups within the Forest's zone of influence differ significantly in their expectations for Forest resource use, conflict may arise. For example, alternatives that emphasize timber harvest and livestock grazing are most acceptable to ranchers, timber industry workers, and others whose livelihood is linked to resource utilization On the other hand, alternatives that emphasize amenities and reduced resource outputs are most acceptable to recreationists and other people who expect the Forest to provide a attractive recreation experience, or natural setting

To estimate the effects of the alternatives on the social environment, four variables were examined. These variables are detailed below

a *Changes in Population*

Population is primarily affected by economic conditions. For example, as growth occurs in the local economy resulting in new or additional jobs and occupations, people are attracted to the area to compete for those jobs Similarly, in a declining economy, population drops as people lose their jobs and move out of the area to seek employment elsewhere The historical pattern for both Grant and Harney counties has been a fluctuation in the health of the economy based on the typical cycle of the resource-based industries

b *Changes in Lifestyles*

For purposes of this analysis, changes in lifestyles are defined as changes in the patterns of work and leisure of the local population Lifestyles can be affected by the quantity and mix of Forest outputs. For example, a segment of the local population may be affected because of a direct economic relationship to the Forest resources, as in the case of employment in the timber or ranching industries Ranchers themselves represent a way of life symbolic of the American West. The Forest is also important because of the environmental quality which it adds to the area Clean air, open spaces, and scenic vistas are all important to local quality of life and the opportunity for outdoor-oriented self sufficiency The importance of such opportunities is expressed by people who hunt, fish, and gather firewood in the Forest

c *Attitudes, Beliefs, and Values*

Individuals have a relationship with the Forest based on personal choices. Those choices comprise the expectations people have about the Forest and management of specific areas within the Forest. These expectations represent the individual's deeply held attitudes, beliefs, and values. The reality of how on-the-ground management of the Forest meets an individual's expectations affects that person's sense of personal freedom, self sufficiency, and sense of control over the future In order to measure this relationship, an estimate is made of the effect on an individual's ability to pursue a preferred activity (e g , to cut firewood, to graze cattle, to hike in remote areas, etc) This estimate is called *"opportunities foregone" because it measures the loss of opportunity to engage in an* activity in the future

d. *Social Well-Being*

Social well-being occurs when the people in a community hold each other and their community in high regard; in other words, the community is cohesive The degree to which a community of people can be considered cohesive depends on the degree of unity and cooperation among those people in achieving common goals When a community is not cohesive, people divert time, energy, and resources from common goals and use them in opposing each other's goals

e *Summary*

The following is a discussion of the most substantive social effects expected for each alternative.

Under Alternatives A and NC, the local population would continue to increase, primarily due to employment opportunities in timber-processing industries The traditional lifestyles of most local residents would be supported and continued, as growth would generally occur in the traditional industries The growth in population would generally increase diversity of local communities as individuals each bring unique backgrounds and interests to the area

Implementation of these alternatives would affect future opportunities of wilderness advocates, people who enjoy nonmotorized recreation in backcountry settings, people who expect the Forest to provide the opportunity for spiritual renewal or ties to Native American cultural activities such as root-gathering or berry-picking, and people interested in fish habitat improvement These impacts are primarily the result of roading and development of nearly all of the currently unroaded areas on the Forest and the high intensity of timber and grazing activities that would occur across the Forest Community cohesion would be reduced as a result of this alternative because the above groups would find themselves opposed to the goals of those who favor resource development and use

Under Alternative B-Modified, the local population would increase more than any other alternative because of greatly expanded employment prospects during the 50 year planning period The traditional lifestyles of most local residents would be supported and continued as growth would occur in the traditional industries The resulting growth in population would increase diversity of the local communities as individuals bring unique backgrounds and interests to the area.

Implementation of this alternative would greatly affect the future opportunities of wilderness advocates, people who enjoy nonmotorized recreation in backcountry settings, and people who seek spiritual renewal or cultural ties from the Forest. This is due to the high level of timber activity, as well as the development of virtually all unroaded areas on the Forest People interested in fish habitat improvement would not be as adversely affected as they would in Alternative A, because of the emphasis on salmon and steelhead fish production through artificial improvement measures. However, ranchers may feel some adverse impact due to the measures needed to improve some anadromous fish habitat on the Forest. Community cohesion would be reduced as a result of this alternative because of the uneven split of costs and benefits between commodity and amenity users

Alternative C-Modified would result in the largest decrease in local population, primarily due to reduced employment opportunities in the timber and ranching industries Associated declines in retail employment opportunities would also contribute to population losses Lifestyles throughout the community would be adversely affected as some long-term residents became unemployed or suffered income reductions

Implementation of this alternative would affect the future opportunities of people in ranching and timber industries as well as local business people because of the significant reduction in both timber and grazing activities on the Forest Local governments would also be affected by reduced revenue and by secondary economic effects in the local communities People who rely on logging for firewood supplies would also have a somewhat reduced opportunity to engage in that activity because no additional Forest area would be developed and there would be less logging slash available Community cohesion would be reduced as a result of this alternative, although not as much as in Alternative B-Modified. This is because in Alternative B-Modified, adverse impacts would fall disproportionately among commodity and amenity users.

Under Alternative F, increases in local population would occur, primarily due to increased employment opportunities in timber processing industries. Traditional lifestyles of most local residents would be supported and continued as growth would generally occur in the established industries Growth in population would increase diversity of local communities as individuals each bring unique backgrounds and interests to the area

Opportunities for wilderness advocates, nonmotorized recreationists, and people seeking spiritual renewal or ties to Native American cultural values would be moderately reduced by implementation of this alternative because of development of over 60 percent of the currently unroaded area of the Forest and the intensive timber harvest activity occurring across the Forest Ranchers will also likely feel some adverse impact to their activity due to an emphasis on riparian area improvement in specific areas Community cohesion would be slightly reduced as a result of the uneven distribution of costs and benefits among groups, although this effect is less than in Alternatives B-Modified and C-Modified

Alternative I would result in slight decreases to the local population as compared to the past 10 year period (1980-89), accompanying reductions in timber and range employment opportunities projected under this alternative Existing lifestyles throughout the local community would generally be maintained or enhanced

Future opportunities of wilderness advocates, people who enjoy nonmotorized recreation in backcountry settings, and people who seek spiritual renewal or Native American cultural ties from the Forest would be affected moderately by this alternative because of development activities throughout the forest People engaged in the timber industry would also be moderately affected by the reduction in future opportunity for timber harvest opportunities. Some ranchers may feel a moderate adverse impact as a result of changes in riparian area management and reductions in permitted grazing People who seek wildlife or fish-oriented recreation experiences would continue to enjoy a sustained supply of high-quality experiences. The benefits and adverse effects of this alternative are distributed among the Forest user groups, with slight to moderate adverse impacts expected, community cohesion would be expected to remain stable or be enhanced

19. Cumulative Effects

Discussions on cumulative effects are included to set a framework to review alternative designs for potential cumulative environmental effects These are effects that are projected on the physical, biological, economic and social environmental factors, specific to the Malheur National Forest. Similar to non point source pollution outputs, cumulative effects are difficult to ascertain To predict the sum total of many different activities, over many years, one must know the processes involved Generally, these are the sum of direct and indirect effects, spatial and temporal distance between effects, and natural or

artificial response (often rehabilitation) to the effects. Below are summary discussions of predicted cumulative effects, by alternative, for key Forest resources related to the four environmental factors

a *Cumulative Effects on Soils*

The direct effect of land management activities on soils is typically a loss of productivity. Early grazing practices resulted in accelerated erosion Tractor logging compacts the soil Both conditions are examples of direct effects that are known to reduce productivity. The Forest-wide Standards applicable to all alternatives and strict Forest policy ensure that the loss of soils, and associated productivity, will be within acceptable limits. The cumulative effect of all land management activities is likewise, a loss or potential loss of productivity depending on the magnitude of each activity (timber harvesting, grazing, road construction, etc) planned for each alternative

The cumulative effects of each alternative can be determined on a relative basis by ranking and evaluating livestock grazing levels (related to Animal Unit Months), miles of new road construction, and timber management factors including the intensity of timber harvest prescriptions (acres of clearcut and shelterwood regeneration harvests), tractor logged acres, and acres of machine piling The planning horizon for this cumulative effects discussion is 50 years It should be noted here that the results of intensive soil monitoring completed on the Malheur National Forest have shown excessive amounts of compaction on tractor units that have been logged and machine piled more than once. This is a cumulative effect of multiple entries on the soil resource

Table IV-16 presents the ranking of alternatives by output level for five major soil disturbing activities Ranking is from highest to lowest potential to reduce soil productivity

TABLE IV-16: Ranking of Outputs for Major Soil Disturbing Activities. Ranking is from highest to Lowest Potential to Reduce Soil Productivity.

Range Outputs For Decade 5 (Thousand AUMs)		Road Construction Total in 50 Years (New Road Miles)		Regeneration Cuts Total in 50 Years (Thousand acres)		Tractor Logging Total in 50 years (Thousand acres)		Machine Piling in Decades 1 thru 5 (Thousand acres)	
Alternative	AUMs	Alternative	Miles	Alternative	Acres	Alternative	Acres	Alternative	Acres
A	131	B-Mod	1541	B-Mod	546	B-Mod	1500	F	79
B-Mod	119	F	1432	F	491	A,F	1450	B-Mod	77
F	118	A	1383	A	486	I	1050	A	76
I	116	I	1159	I	376	C-Mod	950	I	65
C-Mod	105	C-Mod	843	C	200	C-Mod	52		

Table IV-17 gives an overall summary of the cumulative effects analysis for each alternative as related to key factors used to evaluate potential adverse impacts on soils conditions across the Forest Alternatives B-Modified and, to a lesser degree, F and A will have the greatest adverse cumulative effect on soils since they have the highest level of management activity of all the alternatives Alternative I will have an intermediate level of adverse cumulative effects, while Alternative C-Modified will have the least effects. As it is the management objective of the Forest to keep adverse cumulative effects to a minimum and always within the Forest-wide Standards, no alternative is anticipated to exceed any threshold level All alternatives are expected to have cumulative effects that are within acceptable levels of change However, those alternatives that result in greater adverse impacts are considered to have higher potential for long term risk to Forest soils resources.

TABLE IV-17: Cumulative Effects Assessment for Soils by Alternatives

Alternatives	Potential for Adverse Cumulative Effect
B-Mod	Greatest
F	
A	to
I	
C-Mod	Least

b *Cumulative Effects on Vegetation*

Vegetative manipulation, generally from silvicultural practices, will have direct effects on Forest conditions for all alternatives Additionally, the cumulative effects of timber harvest and thinning will eventually reduce the amount of big-game cover across the Forest. Effects will vary by specific area, but the overall change on the Forest will tend to be a reduction from current conditions

Alternative B-Modified will have the most profound effect on reducing cover over time There will be a steady decline in vegetative cover, until regenerated stands begin providing cover at a future point in time. Alternative C-Modified will also reduce cover, but not at the faster rates of the other alternatives The remaining alternatives fall within these bounds and are believed to have moderate effects Along with cover reductions, the structural composition of the Forest will also change as a result of timber harvest and associated cultural practices (thinning, weeding, planting) Included in this are the cumulative effects of reducing old growth across the Forest. Forage vegetative conditions across the Forest follow similar trends as timber harvest and cover changes Generally, alternatives that remove cover tend to increase forage quantity.

The cumulative effect of each alternative can be determined on a relative basis by ranking and evaluating acres of timber harvests, percent of Forest in cover after five decades, acres of old growth remaining after five decades, and acres of precommercial thinning. Note that these are estimates of variations between alternative designs, and although may closely resemble the effects of an alternative for the entire Forest, specific and localized effects are not identified As cumulative environmental effects are the result of specific and localized impacts, this analysis is limited to broad general conditions

Table IV-18 presents the ranking of alternatives by output level for five major vegetative manipulation activities

TABLE IV-18: Output Rankings of Acres Available for Major Vegetative Manipulation Activities.
Ranking is from Highest to Lowest Potential Adverse Cumulative Effect.

Timber Harvest Land Available (Thousand acres)		Thinned acres in Decades 1 thru 5 (Thousand acres)		Total Cover Amts Remaining after Decade 5 (Forest)		Old Growth Stands after Decade 5 (Thousand acres)		Timber Management Intensity1/ (Thousand acres)	
Alternative	*M ac*	*Alternative*	*M ac*	*Alternative*	*%*	*Alternative*	*M ac*	*Alternative*	*M ac*
NC	1117	F	872	B-Mod,I	41%	B-Mod	91	NC	965
B-Mod	987	B-Mod	841	A,F	46%	NC,A	105	B-Mod	910
A	967	A	839	C-Mod	50%	F,I	121	F	860
F	951	I	683			C-Mod	179	A	824
I	905	C-Mod	459					I	700
C-Mod	831							C-Mod	573

1/ Acres prorated by timber management intensity, where high intensity is weighted 1 0, moderate intensity 0 67, and low intensity 0 33 For alternative summaries of management intensities, see Figure IV-3

Table IV-19 gives an overall summary of the cumulative effects analysis for each alternative as it relates to vegetative conditions across the Forest Rankings of alternatives are listed in order from greatest to least potential adverse cumulative effect An alternative with greater adverse effects than another alternative is considered to have a higher potential for long term impact on Forest resources Alternative NC is not summarized due to non-comparability to other alternatives, and lack of information beyond the first decade of analysis

TABLE IV-19: Cumulative Effects Assessment on Vegetation by Alternative

Alternatives	Adverse Cumulative Effects on Vegetation
B-Mod	*Greatest*
F	
A	to
I	
C-Mod	Least

c *Cumulative Effects on Wildlife Habitat*

Forest management activities, specifically silvicultural practices, will have direct effects on vegetation, which will affect wildlife resources, including big game habitat. This is a general trend for the Forest in all alternative designs The cumulative effects of timber harvest and thinning will immediately reduce the amount of vegetative cover across the Forest and, for the first two or three decades, there is the potential to improve the cover spacing conditions that exist at present. As the spacing may actually improve for all alternatives, the quality of this cover will generally decrease. Effects will vary by specific area, but the overall change on the Forest will be a reduction from current conditions, as dense, overmature stands are replaced by second-growth or manipulated stands. In many cases, satisfactory cover conditions will be replaced by stands of marginal cover This is the result of applying intensive timber management practices to extensive amounts of the Forest land base. Effects vary slightly by alternative, and are described below

In terms of elk habitat, all alternatives would have decreases in habitat effectiveness values for open road densities if road closures were not employed, as more roads would be constructed/reconstructed. Alternatives A, B-Modified, and F retain the highest amount of open road densities, while Alternatives C-Modified and I maintain somewhat lower levels.

The cumulative effect of each alternative can be determined on a relative basis by ranking and evaluating the factors that influence habitat effectiveness indices for elk This includes the amount of cover (percent of Forest remaining in cover, which is related to cover spacing) after five decades, the quality of the cover that remains, and open road densities In addition, other wildlife resource factors include the disposition of old growth acres remaining after five decades, and the provisions for cavity nester habitat. It should be noted here that these are estimates of variations between alternative designs, and although may closely resemble the effects of an alternative for the entire Forest, specific and localized effects are not identified As cumulative environmental effects are the result of specific and localized impacts, this analysis is limited to broad general conditions across the Forest However, this generalized cumulative effects array should be effective in describing some of the more profound differences between alternatives

Table IV-20 presents the ranking of alternatives by output level for five major activities that have potential for adverse cumulative effects on wildlife.

TABLE IV-20: Ranking of Alternatives by Output Level for Five Major Activities.
Ranking is from Highest to Lowest Potential Adverse Cumulative Effect.

Satisfactory Cover Remaining after Decade 5		Average Elk Cover Quality in 50 yrs (5 low 1 0 high)		Open Road Density after Decade 5 (miles/sq mile)		Old-Growth Stands after Decade 5 (Thousand acres)		Cavity Nesting1/ Habitat (Snags in Potential Pop'ns)	
Alternative	%	Alternative	Index	Alternative	mi/mi^2	Alternative	M ac	Alternative	%
B-Mod	10%	B-Mod	56	B-Mod	3 1	B-Mod	91	B-Mod	41.3
F	12%	F	59	A,F	2 6	A	105	F	41.5
A	13%	A	61	C-Mod,I	2 2	F,I	121	I	41 7
I	15%	I	66			C-Mod	179	A	42.6
C-Mod	20%	C-Mod	70					C-Mod	61.0

1/ Potential snag levels listed here are strictly for comparison purposes as they indicate only those acres in General Forest (MA 1) and Riparian (MA 3) Management Areas Old Growth, Wilderness, roadless areas and scenic areas, where snag levels are naturally higher, would increase the absolute values of snags across the Forest

Table IV-21 gives an overall summary of the cumulative effects analysis for each alternative as it relates to wildlife conditions across the Forest Alternatives are ranked in order of their potential for adverse cumulative effects An alternative with greater adverse effects than another alternative is considered to have a higher potential for long term risk to Forest resources Alternative NC is not summarized due to non-comparability to other alternatives, and the lack of information beyond the first decade of analysis

TABLE IV-21: Cumulative Effects Assessment on Wildlife Habitat by Alternative

Alternatives	Adverse Cumulative Wildlife Effects
B-Mod	Greatest
F	
A	to
I	
C-Mod	Least

d *Cumulative Effects on Watershed and Riparian Zones*

The effects of land management activities on riparian and watershed conditions can be direct, indirect, and cumulative in nature. The typical detrimental impacts are adverse impacts on water quality (sedimentation, increases in stream temperatures, and the resulting loss of fish and wildlife habitat productivity). Water quantity is assumed to be a more general function of climatic fluctuations and not management activities. Early timber harvests and associated road construction along with grazing practices resulted in accelerated erosion and streambank instability These impacts are known to reduce productivity of fish habitat. The Forest-wide Standards applicable to all alternatives and strict Forest policy ensure that the loss of soils, vegetation, and associated productivity, will be within acceptable limits Stream temperature standards and thresholds for sedimentation and turbidity ensure that all land management activities on National Forest land are within acceptable levels. However, the cumulative effect of all land management activities is likewise, a loss or potential loss of productivity depending on the magnitude of each activity (timber harvesting, grazing, road construction, etc) planned for each alternative.

The cumulative effects of each alternative can be determined on a relative basis by ranking and evaluating the potential for sedimentation, the total amount of acres available for timber harvest within riparian zones, the gross amount of timber harvests planned within riparian zones, watershed improvement activities, and the relative response of the fisheries resource to all of these activities and practices The best use of the ranking of alternatives and subsequent alternative summary of anticipated outputs is that of risk analysis. If the assumptions that are used to form the anticipated outputs are correct, then the alternatives with the highest potential to adversely impact watersheds are also those alternatives with higher environmental risks. The planning horizon used for this cumulative effects discussion is 50 years.

Table IV-22 presents the ranking of alternatives by output level for five key riparian and watershed impacting and ameliorating activities.

TABLE IV-22: Ranking of Alternatives by Output Level for Five Key Riparian and Watershed Indicators. Ranking is from Highest to Lowest Potential to Adversely Effect Watershed Resources.

Sediment Outputs Decades 1 thru 5 (Relative Index)		Harvest Potential in Riparian Zones (Thousand acres)		Scheduled Harvest in Riparian Zones (MMCF per decade)		Improvements Made to Watersheds (Amt per decade)		Anadromous Fish Improvement Decade 5 (Thousand lbs)	
Alternative	Value	Alternative	Acres	Alternative	MMCF	Alternative	Acres	Alternative	M lbs
B-Mod	2552	B-Mod	40	B-Mod	16 9	A,B-Mod	200	A	46
F	2378	F	36	A	15 4	F	500	F	193
A	2291	A	34	F	14 2	C-Mod,I	1000	B-Mod	218
I	2255	I	20	I	8 6			I	253
C-Mod	2155	C-Mod	0	C-Mod	0 0			C-Mod	340

Table IV-23 gives an overall summary of the cumulative effects analysis for each alternative as it relates to watershed conditions across the Forest. All alternatives are expected to have cumulative effects that fall within acceptable levels of change However, those alternatives that are assessed as having greater adverse cumulative effects are considered to have higher potential for long term risk to Forest resources

TABLE IV-23: Cumulative Effects Assessment on Riparian and Watershed Conditions by Alternative

Alternatives	Adverse Watershed Cumulative Effect
B-Mod	Greatest
F	
A	to
I	
C-Mod	Least

e *Cumulative Effects on Economic Indicators*

The cumulative environmental effects of each alternative on several economic indicators are briefly described below Although there may be a range of differences between alternatives, the potential for understanding direct and indirect economic effects that influence the cumulative effects on the economy are somewhat difficult to describe The economic indicators used to portray these differences between alternatives in this analysis include the total amount of land suitable for timber production, allowable sale quantity, payments to local governments, livestock grazing capacity, and wildlife and fish user days To put these direct and indirect relationships into the cumulative effects perspective, a planning horizon of 50 years is used Given this, the relationship between alternatives is estimated and described at a point in time after the fifth decade Differences in the cumulative effects of each alternative are anticipated to show more clearly at that time.

Alternative C-Modified will have the greatest adverse effect on most economic indicators, and cumulative economic effects would generally follow. On the other extreme, Alternative B-Modified would maintain the greatest economic returns after five decades, a result of retaining the highest timber harvest levels. Returns to county governments are also anticipated to be the highest of any alternative Payments to the Federal Government are considered to be beyond the scope of this cumulative effects analysis The other alternatives fall between these extremes and are anticipated to have intermediate adverse impacts associated with cumulative environmental effects concerning the economic outputs of the Forest.

Additionally, the cumulative effects of each alternative from other factors is more difficult to determine. It is a general assumption that the potential for adverse cumulative effects on the economy increases as less timber land is determined suitable for timber harvest. The general assumption taken is that the major economic outputs are related to the supply of available timber and livestock forage, potentially both a direct and indirect result of the amount of land allocated to these activities, as well as the intensity of the management activities

Effects of each alternative can be determined on a relative basis by ranking and evaluating the previously-mentioned economic attributes in place after five decades of each alternative. It should be noted here that these are estimates of variations between alternative designs, and should closely resemble the economic effects of the alternatives for the area of effect (Forest). Any change in economic indicators of response, such as new sources of revenue (tourism, recreation, etc.) are not identified A change in assumptions related to economic factors has the great potential to result in significantly-different cumulative effects, and hence variations to what is portrayed here. If the general assumption is false that the major economic indicators in the local area are not related strongly to timber harvest and livestock grazing, then a suitable cumulative effects analysis would be quite different However, using other assumptions would be outside the range of historical information and is not currently available for discussion here.



Table IV-24 presents the ranking of alternatives by output level for five key economic indicators used to describe potential cumulative effects

TABLE IV-24: Ranking of Alternatives by Output Level for Five Key Economic Indicators. Ranked from Highest to Lowest Adverse Cumulative Economic Effect.

Timber Harvest Suitable Land (Thousand acres)		Allowable Timber Sale Quantity (1,000,000 cu ft)		Payments to Local County Government Decades 1 thru 5		Annual Livestock Grazing Capacity (1,000 AUMs Dec 5)		Wildlife and Fish User Days (WFUDs) (1,000 Fish-Game)	
Alternative	M ac	Alternative	MMCF	Alternative	MM$	Alternative	M AUM	Alternative	WFUDs
C-Mod	770	C-Mod	26	C-Mod	21	C-Mod	105	A	152
I	836	I	35	I	31	I	116	B-Mod	167
A	898	A	39	A	35	F	118	F	171
F	919	F	41	F	37	B-Mod	119	I	189
B-Mod	957	B-Mod	44	B-Mod	39	A	131	C-Mod	198

Table IV-25 gives an overall summary of the cumulative effects analysis for each alternative as it relates to economic indicators across the Forest. As can be seen, Alternative C-Modified results in the greatest risk of adverse cumulative effects, while Alternative B-Modified would have the least adverse effect Those alternatives that are assessed as having greater cumulative effects on the key economic indicators are considered to have higher potential for adverse long-term economic impacts

TABLE IV-25: Cumulative Effects Summary of Economic Indicators by Alternative

Alternatives	Adverse Cumulative Economic Effects
C-Mod	Greatest
I	
A	to
F	
B-Mod	Least

f *Cumulative Effects on Roadless Areas*

The cumulative environmental effects of developing currently unroaded areas are briefly described below As there is a broad range of differences in the total amount of unroaded areas between alternatives, the potential risk of adverse environmental effects that are cumulative are readily described For all alternatives there will be a general reduction in the amount of unroaded areas that are retained across the Forest The sole exception to this is Alternative C-Modified, which will maintain all roadless areas to at least RARE II boundaries

Alternative B-Modified will have the most profound effect on reducing the total amount of roadless areas on the Forest By decade 5, the opportunity for semiprimitive recreation activities outside of Wilderness will be the lowest for all alternatives In addition, the retention of old-growth stands within roadless areas will be less than any other alternative. In contrast, Alternative C-Modified will maintain the highest level of potential nonwilderness semiprimitive recreation opportunities The cumulative effects of reducing old growth across the Forest are ameliorated by the retention of all unroaded acres, and the subsequent old growth within these roadless areas The other alternatives run between these extremes and are anticipated to have intermediate risks associated with cumulative environmental impacts on potential for recreation opportunities and retention of old growth

Additionally, the cumulative effects of each alternative on other physical effects is more difficult to determine It is a general assumption that the potential for adverse cumulative effects on watersheds increases as more road construction and reconstruction occurs. As roads are most often the greatest contributor to adverse soil movement, the alternatives that develop the greatest amount of unroaded areas have the highest potential to trigger adverse cumulative effects. This is independent of mitigation measures that are designed to reduce this risk. The analysis of cumulative effects of roadless area development on downstream watersheds is thus based directly on the amount of roadless area retained.

Effects of each alternative can be determined on a relative basis by ranking and evaluating acres of roadless area retained unroaded, acres of old growth remaining after five decades, and the potential for adverse watershed impacts. It should be noted here that these are estimates of variations between alternative designs, and although may closely resemble the effects of an alternative for the entire Forest, specific and localized effects are not identified. As cumulative environmental effects are the result of specific and localized impacts, this analysis is limited to broad general conclusions.

Table IV-26 presents the ranking of alternatives by output level for three key roadless area attributes

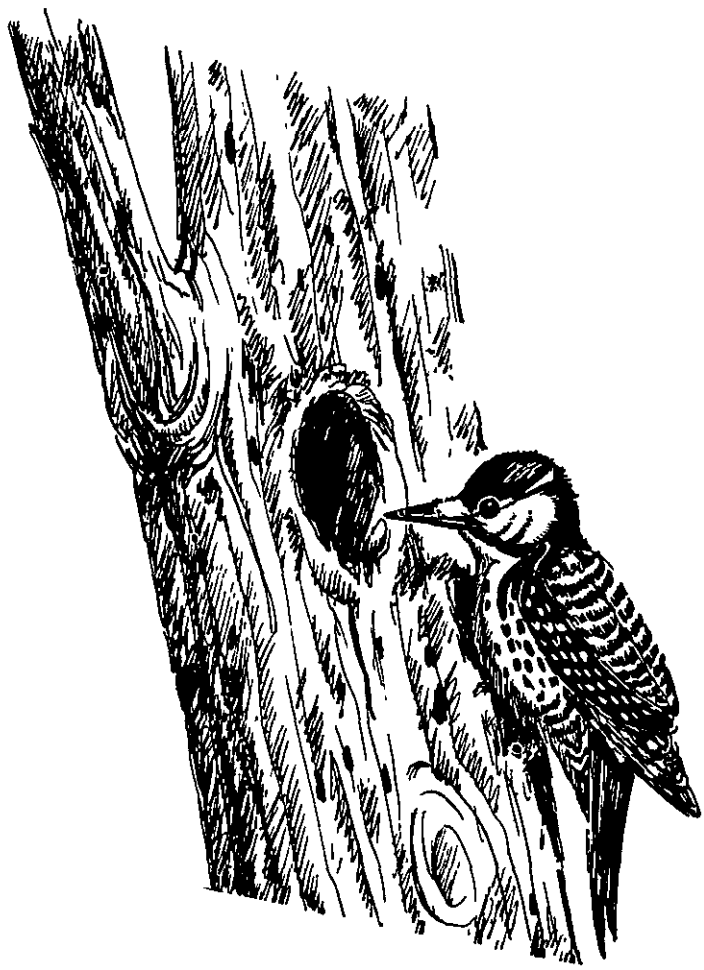


TABLE IV-26: Ranking of Alternatives by Output Level for Three Key Roadless Area Attributes. Ranking is from Highest to Lowest Potential Adverse Cumulative Effect.

Unroaded Areas after Decade 5 (Thousand acres)		Old-Growth Within Unroaded–Decade 5 (Thousand acres)		Adverse Impact on Forest Watersheds (Relative risk)	
Alternative	M ac	Alternative	M ac	Alternative	Index
B-Mod	13	B-Mod	8	B-Mod	93
A	59	A	25	A	67
F	67	F	33	F	63
I	80	I	35	I	56
C-Mod	193	C-Mod	90	C-Mod	0

Table IV-27 gives an overall summary of the cumulative effects analysis for each alternative as it relates to roadless area management across the Forest As can be seen, alternatives that are assessed as having greater adverse cumulative effects from roadless area indicators are considered to have higher potential for long-term resource impacts.

TABLE IV-27: Cumulative Effects Risk Assessment of Roadless Areas by Alternative

Alternatives	Adverse Physical Cumulative Effects
B-Mod	Greatest
A	
F	to
I	
C-Mod	Least

20 Environmental Consequences of the Alternatives on Civil Rights, Consumers, Minority Groups, and Women

None of the alternatives have significant effects on Civil Rights The effects on consumers, minority groups, and women are primarily a result of effects on available jobs, returns to counties, and lifestyles These effects are discussed on the preceding pages
Probably, the most significant change between alternatives is in the amount of work in reforestation and timber stand improvement which would be available This type of Forest work employs crews that have greater than the average number of minority contractors and employees

All alternatives propose between 1,900 and 6,900 areas of planting annually over the planning horizon Alternatives B-Modified and F have the highest acres and Alternative C-Modified has the lowest acres

Indirect but minor effects that would change by alternative are fuelwood availability and housing

21. Effects on Plans of Others

a *State and County Planning*

In Oregon, city and county comprehensive management plans are designed to carry out Statewide planning goals A purpose of the plans is also to incorporate plans and programs of various governmental units into a single management tool for the planning area The State governmental body responsible for reviewing county comprehensive plans is the Oregon Land Conservation and Development Commission

County plans recognize the National Forest as "primary forest," "timber/grazing," or similar designation. Although counties do not have responsibility for regulating use on Federal lands, the Forest Service and county governments attempt to coordinate planning efforts to avoid conflicts. The alternatives discussed in this Environmental Impact Statement are generally compatible with local governmental plans

Following are the Statewide planning goals to which county plans must adhere, and a statement of how the Forest Plan alternatives meet the goals (State of Oregon, 1980):

Goal No 1 "To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process "

The public involvement process used to develop this environmental impact statement is consistent with the State of Oregon's emphasis on citizen participation in the planning process

Goal No. 2 "To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions."

The Statewide goal for the planning process is consistent with the process established by the National Environmental Policy Act of 1969 (NEPA) and the National Forest Management Act of 1976, the guiding policies for the National Forest Land and Resource Management Planning program

Goal No. 3. "To preserve and maintain agricultural lands "

Livestock grazing potential on National Forest lands varies by alternative However, National Forest lands which, by State definition, qualify as agricultural land are maintained as such in all alternatives.

Goal No. 4: "To conserve forest lands for forest uses."

The land management areas of the various alternatives for areas defined as "forest lands" and "forest uses" are consistent with this Statewide goal However, guideline B 2 states that "Forest lands should be available for recreation and other uses that do not hinder growth." In many Forest Plan management prescriptions, consideration for use other than wood production has resulted in less than maximum wood growth. In this sense the preferred alternative does not comply with the Forest lands goal

Goal No. 5 "To conserve open space and protect natural and scenic resources."

This goal is incorporated by all alternatives Protection of cultural resources is required by law and Forest Service policy. The protection of scenic resources will vary by alternative but will provide various levels of protection. By their nature and purpose, National Forests provide open spaces

Goal No. 6· "To maintain and improve the quality of air, water, and land resources in the State "

All alternatives are supportive of this State goal.

Goal No. 7: "To protect life and property from natural disasters and hazards "

No actions included in any of the alternatives are projected to contribute significantly to the potential for loss of life or property due to natural disaster

Goal No 8: "To satisfy the recreational needs of the citizens of the State and visitors."

Recreational needs are considered in all alternatives Dispersed recreation use is emphasized on National Forest lands

Goal No 9: "To diversify and improve the economy of the State "

The alternatives are projected to contribute to the economy of the area and State at varying levels Depending on the objectives of the alternative, the economy may or may not be improved

Goal No 10 "To provide for the housing needs of citizens of the State "

This goal refers primarily to the availability of suitable land for housing The Forest Plan is not likely to affect housing land needs. The alternatives do provide for various amounts of wood products for use in housing construction

Goal No 11 "To plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve as a framework for urban and rural development "

None of the alternatives are likely to have significant effect on this Statewide goal The Forest provides land for utility corridors and other facilities that are in the public interest

Goal No 12 "To provide and encourage a safe, convenient and economic transportation system "

The Forest does and will continue to coordinate the needs of the Forest transportation system with those of the State and local governments

Goal No 13 "To conserve energy "

There are no prohibitions placed on development of potential geothermal or mineral power sources except in areas withdrawn from entry for such purposes

Goal No 15: To provide for an orderly and efficient transition from rural to urban land use

None of the alternatives are projected to affect the Statewide goal

Goals 14, 16, 17, 18, 19. These goals pertain to resources which are not applicable to the Malheur National Forest

b *Confederated Tribes of the Umatilla*

1 The Umatillas are concerned that management to protect and enhance natural fish habitat should have top priority. None of the alternatives conflict with this goal.

2 Another concern of the Umatillas is that Forest Plans should emphasize land uses and management practices which reduce watershed runoff during winter/spring high-flow periods and increase discharge during the summer/fall drought periods

Opportunities are limited to affect runoff and groundwater recharge due to the relatively low elevation of the Forest, limited snow zones, and lack of high-elevation terrain suitable for timber harvest activities which would delay snowmelt runoff

c *Water Resources Department (State of Oregon)*

John Day River Basin Objectives (9/12/86)
1 Achieve better seasonal distribution of runoff to reduce high streamflows and increase low streamflows

2 Protect groundwater quality and quantity

3 Encourage water conservation, efficient use of water, and elimination of waste.

4 Protect existing high-quality riparian areas and improve degraded riparian areas.

Existing Forest Service policy and Manual direction subscribe to all of the above objectives. The Forest embraces the concept of multiple use where all resources are considered during the planning and implementation of any management project. The alternatives developed for the Environmental Impact Statement differ, concerning the emphasis by resource as to where, when, and how they will be accomplished.

Implementation of the State Water Quality Management Plan on lands administered by the USDA Forest Service is described in a Memorandum of Understanding between the Oregon Department of Environmental Quality and the U.S. Department of Agriculture (2/79) Water Quality Standards for the State of Oregon are met through the application of Best Management Practices

d *Department of Environmental Quality (State of Oregon)*

Coordination is accomplished through a slash burning smoke management system State plans include a smoke management system for minimizing the impact of smoke from use of fire in management of forest and rangeland on areas designated or others sensitive to smoke The designated areas of restriction include all forest lands west of the summit of the Cascades and the fire protection areas of the Mt Hood and Deschutes National Forests east of the Cascades. Sensitive areas include areas such as certain designated wildernesses

The alternatives considered in the Malheur National Forest land management planning effort treat removal of forest debris as a necessary part of forest environmental management One objective while using fire in debris disposal is to minimize the impact of smoke from controlled burning while achieving specific resource management goals

The Malheur National Forest will provide slash disposal management to maintain a satisfactory environment within wildernesses To accomplish this task, consideration will be given to the number of acres involved, amount of slash, evaluation of potential smoke column vent height, direction and speed of smoke drift, mixing characteristics of the atmosphere, and distance from designated area for each burning operation Slash disposal through burning in smoke-sensitive areas such as mountain recreation areas will include minimizing the effect to users Air quality is a consideration during all slash-burning operations to facilitate smoke dispersion, without regard to project location These considerations pertain to time of ignition, condition of slash, and rate of burning The objectives of the smoke management system are to vent most of the smoke to high elevations and to minimize the amount of smoke drift

These objectives are fully compatible with Oregon air quality and smoke management objectives. The effect of all alternatives where debris disposal is done through burning is increased amounts of smoke in the atmosphere

e. *Forestry Program for Oregon*

A summary of the response of alternatives to the basic objectives of the Forestry Program for Oregon can be found in Table IV-4

f. *Bureau of Land Management (BLM)*

Coordination with the Bureau of Land Management was accomplished through review of and comments on Bureau of Land Management Resource Management Plan proposals, especially the John Day Resource Management Plan proposal for land use alternatives which may directly or indirectly affect or influence land management programs of the Forest. The Burns District BLM Office shares with the Forest the responsibility for wild horse management on the Murderers Creek Wild Horse Territory Common objectives

and population numbers were agreed upon during the review and input period utilizing this process

g. *Federal, State, and County Weed Control Planning*

In Oregon, a coordination process exists that includes the State Department of Agriculture, formally organized County Weed Control Districts, and all interested parties concerned with noxious weed control, including the Malheur National Forest

The alternatives considered address the policy of the Oregon Department of Agriculture and organized County Weed Control Districts, which is

1 Prevent establishment and spread of noxious weeds

2 Encourage and implement eradication of infestations of designated noxious weeds.

3. Encourage and assist in organization of noxious weed control programs.

4 Cooperate with county and State weed control officers, Oregon State University, and others in developing control measures, conducting surveys, and making project analyses.

5 Develop programs for biological control of noxious weeds

A new program for managing competing and unwanted vegetation is being developed by the Pacific Northwest Region (Oregon and Washington) of the USDA Forest Service The Environmental Impact Statement is being developed for this new program. This new program is the result of a lawsuit filed against the USDA Forest Service by Northwest Coalition for Alternatives to Pesticides, Oregon Environmental Council, and Audubon Society District Court Judge Burns issued an injunction in 1984 banning use of herbicides in the Pacific Northwest Region of the Forest Service until a "worst case analysis" was completed and properly considered by decisionmakers The Forest Service completed a Human Health Risk assessment for herbicides which included a "worst case analysis" The Forest Service is now incorporating the risk assessment into their programs for managing competing and unwanted vegetation The scoping process for preparation of the Environmental Impact Statement is currently underway to identify issues, concerns, and opportunities The goal is to have a thorough and balanced Environmental Impact Statement and vegetation management program. The program will establish Regional policies, standards, and guidelines for management of vegetation on the Malheur National Forest. The Forest will then develop plans for its own site-specific projects in accordance with the Regional Environmental Impact Statement

22. Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented

Implementation of the preferred alternative would result in some adverse environmental effects These effects have been discussed in detail earlier in this Chapter The severity of the adverse effects can be minimized by adhering to the direction in Forest-wide and Management Area Standards in Chapter IV of the Forest Plan

Some adverse impacts will unavoidably occur to soils, mature and old-growth dependent wildlife species, riparian vegetation, fish habitat, cavity-nesting species habitat, some recreation experiences, and some cultural resources.

Some temporary adverse impacts will occur to insect-dependent birds and air quality.

Most adverse impacts will be within acceptable limits

23. Relationship Between Short-Term Uses of the Human Environment and Enhancement of Long-Term Productivity

The relationship between the short-term uses of the human environment and the maintenance and/or enhancement of long-term productivity is complex For the purposes of this assessment, short-term uses are those that generally occur on a yearly basis on some area of the Malheur National Forest "Long-term" refers to longer than a 10-year period. Productivity refers to the capability of the land to provide market and amenity outputs and values for future generations. For example, maintenance of long-term soil productivity requires that activities whichcause excessive erosion, compaction, and other adverse impacts to soil be mitigated. Occasionally, short-term uses will cause substantial damage to isolated areas Forest direction in Chapter IV of the Land Management Plan contains Management Requirements designed to protect soil and water resources so that long-term productivity is not significantly impaired. A discussion of the ways various long-term productivity of the Forest is presented in the next few pages.

The soil resources are affected by most management activities. Activities such as timber harvest, road construction, and use of developed recreation sites, are cumulative and have long-term effects on the productivity of the soil. The effects can be seen through both soil erosion and soil compaction Harvest removals of nutrients also have direct impacts on long-term productivity, although our understanding of these processes is quite limited at present. Soil compaction is generally considered to be a long-term effect. However, on some types of clay soils, the process of wetting and drying (shrink/swell) tends to break up the compaction over several years.

Short-term management of the tree resource will have effects upon long-term productivity depending on the intensity of management selected Short-term management techniques that can increase long-term productivity include restocking of harvested areas within 5 years, the use of genetically superior trees, subsequent silvicultural treatments such as reforestation, precommercial thinning, and through fertilization in some stands. The Forest Plan establishes a sustained yield of resource outputs while maintaining productivity of resources The specific direction and mitigation measures included in the Forest-wide direction ensure that long-term productivity will not be impaired by the application of short-term management practices Each alternative was analyzed to assure that Forest direction could be met. An alternative was revised if some aspect did not meet these requirements Thus, long-term productivity is believed to be maintained in every alternative

Reductions in habitat capability for old-growth-dependent species due to timber harvesting are long-term effects that cannot be mitigated. Management Requirements for maintaining viable populations establish the least amount of mature and old-growth forest to be retained or managed This is necessary to avoid losing species dependent on mature and old-growth forest. The effectiveness of this approach in maintaining species viability is quite controversial at present

Reductions in deer and elk habitat capability due to human disturbances, such as road building and vegetative cover removal, can be long term but are difficult to quantify on a Forest-wide basis Management prescriptions that reduce open road densities have been assigned and are available The areas managed as elk winter range (eg , most local and collector roads), may be closed during the winter These measures will reduce wildlife harassment, partially mitigating the effects of traffic on existing roads and those created by the construction of new roads Permanent closures will be the most effective. Those with signs and no barriers are the most likely to be violated if enforcement is lax. Gates and barriers are sometimes removed or surmounted, and off-road vehicles can sometimes go around them In areas where violators are likely to be seen by other Forest visitors, peer pressure is often effective in enforcing closures.

A measure of long-term productivity for the fisheries resource is the effect on stream habitat capability Alternatives which call for more emphasis on timber harvest and road construction, have the greatest potential for long-term effects Long-term effects to

fish habitat on Forest Service-managed land are expected to be adequately mitigated by the proper implementation of the Forest-wide Standards.

Cultural resources represent a long-term use of the land In many cases, the resources have been in place for decades or even centuries However, these resources generally occupy a small area of land and thus have a negligible effect on the long-term productivity of the area they occupy.

Recreation uses, such as developed campgrounds, recreation residences, and Wilderness, all represent long-term commitments of the land. These commitments, in some cases, can mean a loss of long-term productivity of other resources Heavy, short-term recreation uses, such as large group outings or concentrated use in popular areas, may also result in a reduction of productivity. For example, campsites and trails can be compacted by heavy use which may result in soil and vegetation damage The short-term use of a campsite in a fragile Wilderness ecosystem can result in a long-term loss of vegetation Recreation use in critical fish habitat areas has the potential to affect the genetic makeup of fish populations by reducing the wild-type genes which may be necessary for the long-term maintenance of a fish species

Short-term vegetation Management Practices can have a long-term effect on the maintenance of scenery Timber harvest, with its associated road construction, will lead to greater visual diversity in the Forest stands, but also will contribute to the loss of the "natural appearing" setting. Natural appearing landscapes are preserved in Wildernesses and roadless areas

Mineral resources are not renewable, and deposits are fixed in size and grade Forest Service policy, as it relates to exploration and development of mineral resources, does not change by alternative Therefore, the short-term/long-term relationship does not vary by alternative However, management prescriptions which call for withdrawing lands from mineral entry have a short-term effect on the availability of minerals This can have a long-term effect if withdrawn indefinitely Examples of areas withdrawn include Wildernesses, Research Natural Areas, developed recreation sites, and some special interest areas and scenic travel routes. Leasing of Wilderness lands for mineral exploration and development would result in short-term degradation of Wilderness values However, if an assessment of an area's restoration capacity shows that Wilderness values would be significantly damaged over the long-term, the area would not be recommended for leasing or prospecting activities

Arterial and collector roads and some local roads and landings, are dedicated uses that take land out of production Therefore, these kinds of uses have long-term effects These effects vary because they are directly related to the amount of timber harvested Roads can have indirect negative effects on long-term productivity of fish and wildlife by increasing the amount of recreational fishing and hunting use Long-term productivity of timber can be increased due to roads allowing access for more intensive management activities Long-term effects of roads on the soil resource and on water quality can also be significant detrimental impacts

24 Irreversible and Irretrievable Commitments of Resources

Some irreversible and irretrievable commitments of resources would occur in all alternatives

To varying degrees, roadless and wilderness characteristics will be altered, land will be lost to timber production and some loss of wildlife habitat will occur. Additionally, mineral wealth will be removed from the Forest and some loss of cultural resource sites will occur

An "irreversible commitment of resources" results from a decision to use or modify resources that are renewable only over a long period of time, such as soil productivity, or

nonrenewable resources, such as cultural resources or minerals. An "irretrievable commitment of resources" refers to a resource that is lost because of land use designation and/or scheduling decision. In other words, opportunities are foregone for the period of time that resource cannot be used. The Forest Plan and the alternatives examined were long-term productivity for all resources Measures to protect natural resources that could be irreversibly affected by management practices were incorporated into Forest-wide Standards (Chapter IV of the Forest Plan)

The water resource on the Forest fluctuates in runoff or output in response to changes in climate. Water quality and timing of runoff is affected by management activities These effects are rarely irreversible with degradation being only temporary over time.

Soil productivity can be irreversibly lost or reduced by dedicated uses of the land. Examples of these uses would be arterial nd collector roads, administrative sites, and developed recreation sites. Soil erosion, as a result of management activities, is an irretrievable loss because once the soil particles are removed from the site and deposited into a stream or river, they are no longer available Accelerated erosion rates can reduce soil productivity and also reduce the water holding capacity of the soil

Unique biological and botanical interest areas, as identified in Chapter III, are either protected from management activities or not This could potentially mean an irreversible loss of the opportunity to classify a unique species However, while the area would not be classified, the rare or unique species would be protected through the Forest Plan Standards Geologic features would also be protected in this way from irretrievable loss.

Another irretrievable loss would be those timber stands occurring in designated Wildernesses or dedicated as old-growth wildlife habitat Insects, disease, and fire can also cause irretrievable losses.

Reductions in habitat capability for old-growth-dependent species due to timber harvesting involve an irreversible and irretrievable commitment of resources that cannot be mitigated Management Requirements for maintaining viable populations establish the least amount of mature and old-growth forest to be retained or managed. This is necessary to avoid losing species dependent on mature and old-growth forest. There are no known irreversible and irretrievable commitments of resources affecting fisheries involved in the implementation of the preferred alternative.

The protection of cultural resources also may affect timber production. However, this effect would be relatively small. Trees on and near cultural sites may not be harvested or harvested at less than maximum intensity Since the commitment to protect these cultural resources will continue in the foreseeable future, the timber not harvested on these sites represents an irreversible loss of that resource.

The development of roadless areas would mean an irreversible loss of the characteristics which qualify these areas for wildernesses or roadless areas Development could also mean an irreversible loss of natural scenery and, in some cases, old-growth habitat. On the other hand, not developing roadless areas may be an irretrievable loss of opportunities for vegetation management. This could result in a lower volume of timber supply from the Forest.

Removal of mineral or energy resources is an irretrievable commitment of resources. The removal and utilization of rock resources for road construction would be an example of a common use on the Forest Actual commitment of mineral resources will depend upon demand and mining industry initiative.

V

Public Comment on the Draft and Forest Service Response

V Public Comment on the Draft EIS and Forest Service Response

A Introduction

This chapter discusses efforts to involve and consult with the public during formulation of the Forest Plan and Final Environmental Impact Statement (FEIS) It also lists and responds to the comments received during the public comment period for the Proposed Forest Plan and Draft Environmental Impact Statement

The Forest Service conducted an active public involvement program throughout the forest planning process Federal, State, and local government agencies were informed and consulted. Individual Forest users and interest groups participated in meetings and sent in their comments

"Consultation With Others Between the Draft and Final EIS" is the first section in this chapter This section summarizes the public involvement efforts undertaken throughout the planning process, and the number, type, and general tone of the responses received during the comment period

"Comment Summaries and Forest Service Response" is the next section This section contains summaries of all the comments received during the comment period A Forest Service response to the concerns mentioned in the summaries will follow each issue summary.

"Copies of letters received from Federal Agencies, Elected Officials, and Indian Tribes" is a section containing reproductions of the letters and comments received during the public comment period, from Federal Agencies, Elected Officials, and Indian Tribes

"List of Agencies, Organizations, and Persons to Whom Copies of the Statement Have Been Sent" is the last section of this chapter It lists all of the people, organizations, and agencies to whom copies of this environmental impact statement and Forest Plan have been sent

B Consultation with Others Between the Draft and Final EIS

The Proposed Forest Plan and Draft Environmental Impact Statement were filed with the Environmental Protection Agency and made available to the public on August 14, 1987 A Notice of Availability was published in the *Federal Register* on that same date News releases were prepared for the media throughout Oregon

Approximately 1,800 copies of the Overview and 900 copies of other sets of the documents were distributed to the people and organizations on the mailing list Copies were also available for review in public and college libraries in Burns, Bend, Ontario, Eugene, Corvallis, and La Grande, and at Forest Service offices throughout Oregon The deadline for submission of written comments was November 14, 1987 This was later extended to December 14, 1987

Four public meetings were held during September, 1987, to present the Proposed Plan and to answer questions The public meetings were announced through the media and through posters placed throughout Grant and Harney counties These meetings were held in John Day, Burns, Prairie City, and Long Creek Approximately 100 people attended these meetings

1 Public Comments

The Malheur National Forest received input from 3,563 people, organizations, and agencies in the form of letters, questionnaires, petitions, coupons, and form letters Table V-1 displays the number of each type of response received These inputs will be generically

referred to as letters, except when greater detail is indicated, throughout the rest of this chapter.

Table V-2 displays a summary of who commented. Table V-3 shows where the letters came from geographically.

Accompanying some of these tables are Figures (V-1, V-2 V-3) to visually display the relationship, numbers, and percentages of each table component.

TABLE V-1: Public Response by Input Type

Input type	Total	Additional Comment[1/]	No Additional Comments[2/]	Not supporting That Alternative
Letters	686			
Coupons	71			
Petitions	4			
Form Letters	191			
Citizen's Multiple Use Questionnaire	1,324	1,185	6	133
Preferred-Plus Questionnaire	1,287	985	184	118
Total	3,563			

1/ Additional comments were written on the response form by the respondent.
2/ The respondent marked the boxes on the form but did not add any additional comments

FIGURE V-1 Public Response by Input Type

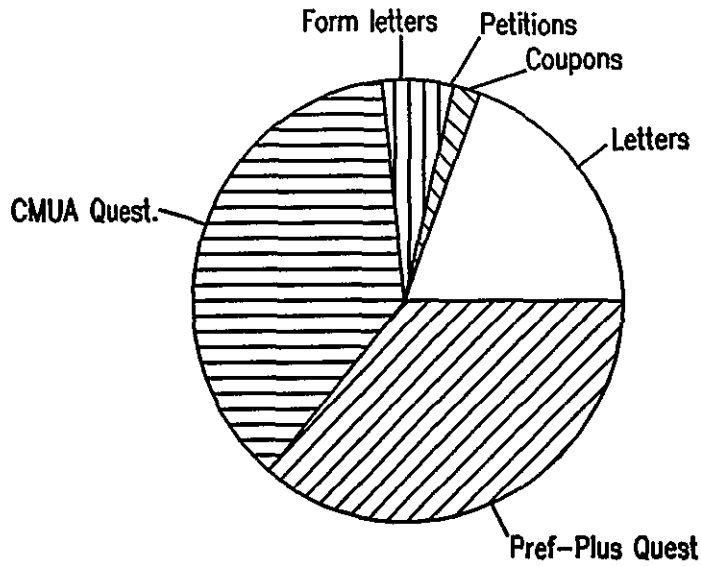


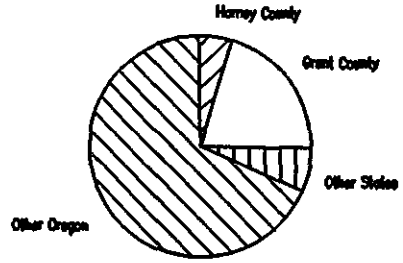
TABLE V-2:
Response by Respondent Type

Individuals	3,425
Local Agencies	8
Agencies from Other States	1
Federal Agencies	9
Local Elected Officials	6
Environmental Groups	13
Academic Groups	4
Professional Societies	2
Civic Groups	2
Business Groups	3
Commodity Interests	57
Service Interests	7
Mechanized-Recreation Interests	5
Nonmechanized-Recreation Interests	2
Hunting and Sports Interests	5
Tribal Governments	2
Other	2
Total	3,563

TABLE V-3:
Response by Respondent Location

Grant County	743
Harney County	165
Other Oregon	2,430
Other States	225
Total	3,563

FIGURE V-2:
Response by Respondent Location



The major conclusion that can be drawn from these tables is that the level of interest by individuals was high and that most of the respondents took the time to write down comments about their major concerns as opposed to checking a box on a form.

The major concerns of the respondents are summarized in the following tables Table VI-4 displays the number of comments about each alternative considered. Table VI-5 displays the number of comments about various subject areas. These displays give a general indication of the subjects and alternatives which were of most interest to the people reviewing the planning documents

TABLE V-4: Public Response by Alternative

Alternative	Number of Comments
A - No Action	7
B - Resource Planning Act	4
C - Maximum big pine, amenity emphasis	38
D - Moderate level amenity/commodity	4
E - Maximum small pine	10
F - Preferred	1,740
F - Departure	5
G - Maximum commodity with maximum roadless areas	4
H - Maximum big pine, commodity emphasis	9
NC - No Change	12
Preferred-Plus	1,438
Citizen's Multiple Use	1,716

FIGURE V-3: Response by Alternative

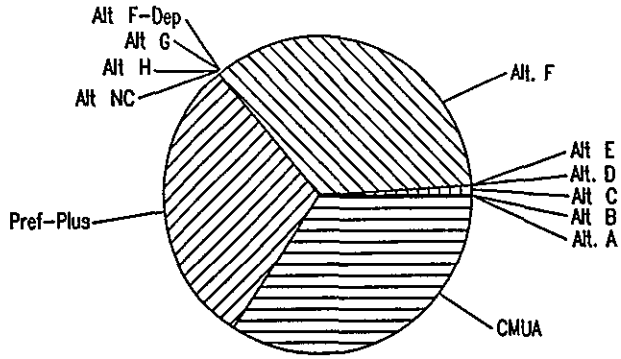


TABLE V-5: Public Response by Subject Category

Subject Category	Number of Comments
Timber	4,966
Range	3,581
Recreation	3,375
Wilderness	220
Roadless Areas	3,888
Wild & Scenic Rivers	82
Minimum Management Requirements	155
Wildlife	557
Old Growth	490
Big Game	3,540
Fish	1,761
Water	2,025
Riparian Areas	597
Visuals	180
Lands & Minerals	415
Protection	245
Insects & Disease	137
Roads	2,013
Air	16
Soils	231
Research Natural Areas	35
Economics	2,257
Social Factors	224
Indian Rights	22
Cultural Resources	24
Outside the Scope of Planning	
Log Exports	9
Sustained Yield Unit	47
Grazing Fees	66
Development in Wilderness	9
Grazing in Wilderness	5
Other Miscellaneous	40

TABLE V-6: Public Response by Selected Sub-Categories

Sub-Category	Number of Comments
Timber - general	77
Reforestation	104
Departure from long-term sustained yield	6
Below cost sales	60
Species mix	71
Land suitability	35
Harvest methods/logging systems	465
Timber stand improvement	47
Utilization standards	81
Uneven-age management	144
Yield tables	32
Conversion ratio	13
Inventories	8
Timber values	35
Firewood supply	31
Accessibility of firewood	7
Quality of firewood	3
Long-term sustained yield	277
Ponderosa pine management	198
Sale level of 203 MMBF	1,461
"Current" sale level	24
Sale level of 260 MMBF	929
Sale level of preferred alternative	237
Other sale level	521
Road management	84
Range - general	186
Range condition	61
Range productivity	120
Wild horses	14
Permit administration	136
AUM levels	2,940
Other (mostly noxious weed control)	124
Recreation - general	100
Road management for recreation (esp hunting)	1,318
"Hunting, fishing, and recreation"	1,356
Hunting	141
Fishing	77
Trails	138
Dispersed recreation	76
Off-road vehicle use	63
Handicapped/elderly access	32
Camping	20

Sub-Category	Number of Comments
Big Game - general	85
Road management for habitat	1,450
"Deer and elk"	1,380
Elk winter range	125
Cover	120
Elk habitat-general	114
Deer habitat	105
Big game numbers	92
Competition for forage	59
Elk summer range	22
Other	8
Economic considerations - general	407
"Jobs and county revenues"	1,337
Jobs	243
Receipts to counties	85
Diversity in economy	76
Forest Service budget	53
Personal income	18
Present Net Value	11
IMPLAN	2
Fish - general	178
"Salmon, steelhead, trout"	1,355
Anadromous fish	103
Resident fish	62
Habitat enhancement	40
Mitigation	14
Water - general	45
"Watersheds, fisheries, irrigation"	1,349
Watersheds - general	335
Water quality	143
Water timing/irrigation	89
Water quantity	40
Other	24
Roads - general	115
"Constructed roads"	1,369
Miles of planned roads	245
Road closure management	170
Miles of existing roads	55
Road maintenance	34
Road costs	25

2. Citizens Working Group

In March 1988, the Forest invited all those who commented on the Proposed Forest Plan and Draft EIS to participate as members of a "Citizens Working Group." The purpose of the working group was to bring together interested and affected publics, representing a variety of viewpoints regarding the management of the Malheur National Forest, to discuss the Forest Plan

The first meeting was held in April 1988 with over 50 people attending Objectives of the meeting included (1) build rapport among participants; (2) clarify understanding of public comments of the draft planning documents, (3) planning process update, and (4) identify a smaller group to meet for a two-day meeting in May.

A second "Citizens Working Group" meeting was held in May 1988 with a group of 21 who had been chosen by the larger group at the first meeting The objectives of this second meeting were to (1) continue to build rapport among participants; (2) review preliminary results of the analysis of issues; (3) review information about issues developed at the first meeting, (4) explore potential areas of agreement among participants, and (5) narrow the scope and clarify areas of continuing disagreement

Both "Citizens Working Group" meetings were instrumental in the Forest effort of interpreting the public's concerns. It was perceived by most of those involved that the objectives for both meetings were met In particular, the second meeting by virtue of being a smaller and more workable gathering, created a greater awareness of what the various publics were trying to tell the Forest

The format and atmosphere of the second meeting seemed to be the key to providing the maximum amount of organized interaction possible in the time available. Once the group agreed upon the meeting objectives, each of the five major issues were addressed equally as follows.

A write-up was provided for each participant that described what had been proposed in the Plan, what the public comments said, and summarized the small group comments from the first "Citizens Working Group" meeting A resource specialist for the issue at hand described the analysis that the Forest had done in response to public comment. The group then divided into three randomly chosen small groups to discuss the analysis information presented and to try and achieve the following goals put themselves in the Forest Supervisor's shoes, ("if you were him, what would you do?"), describe evaluation criteria ("We don't know what you should do, but whatever you do, it MUST ") Each small group was also charged with exploring for areas of agreement and narrowing the scope of differences.

The following paragraphs are summaries of what the small groups said about the key issues

Elk Habitat

There is public support for road closures in areas where elk habitat is of concern. Road management, including seasonal and permanent closures, is a key to managing big-game habitat. The road management policy should be area specific with clear objectives and be a key factor in project planning

Habitat effectiveness levels should determine project planning and implementation The affect of big-game herds on private lands should be seriously considered when managing habitat. The Forest should ensure that public lands are capable of supporting a healthy and vigorous population of wintering elk through proper timber management and forage enhancement. Timing and spatial distribution of activities on winter range should be considered in planning Harassment of game needs to be limited, but all activities do not necessarily need to be stopped Corridors through winter ranges need to be considered

Roads

The Forest should develop a comprehensive road management policy for seasonal and permanent road closures The Forest transportation network needs to be examined on a watershed basis, not a sale-by-sale basis, to ensure that long-terms needs are met Existing roads should be considered before new roads are built and both planned and

existing roads need to be reviewed for possibility of permanent closure. Roads no longer needed for management should be rehabilitated Roads should be designed and built to the lowest standard that meets the management objectives. All resource values need to be considered in the design and construction of roads

Riparian Areas

Riparian management is a national issue and needs to be looked at with a national perspective. There are many important values and resources to be considered when managing riparian areas Anadromous fish should not be the only concern

All groups agreed that it will be a challenge to implement riparian management standards. Generally, the option of no timber harvest in riparian areas was not favored; although, some did approve of this management practice. It was also a point of agreement that various options and alternate solutions be identified before decreasing grazing use in riparian area

The Forest needs a standardized approach to riparian management Baseline data (riparian inventory) is needed as soon as possible. There should be site-specific information and maps of unsatisfactory areas The Forest should look beyond the immediate riparian area and into total watershed needs There is a need for site-specific management which considers all impacts and values using an interdisciplinary approach, blanket solutions are not acceptable Managers should be flexible to meet site-specific needs, using percentages/numbers as guidelines

The Plan should clearly describe what kind of management will be applied There needs to be an aggressive monitoring program

Roadless Areas

A point of agreement was that there are many different values in each roadless area and there was support for the Forest reviewing specific attributes of each area. In the decision, the Forest needs to consider productivity of sites, soils, economics of timber harvest, and overall effects of management on the rest of the Forest, as well as site-specific attributes The Forest should also consider other management options that recognize mutual compatibility of resource management Everyone realized that no matter what management is chosen, there will be trade-offs

Timber

Uneven-aged management The options considered so far cause great concern about the loss in timber volume The Forest should consider other options to reduce fall down and look at what the Winema and Deschutes have done with uneven-aged management The biological factors of the site and impacts of management should determine the timber management system used

Timber yields Most agreed that there were major problems with the validity of yield tables. The Forest should analyze data before the plan is finalized and/or validate data during the first years of plan implementation

Management of understories· There was agreement that they should be managed with multiple use objectives and meeting site-specific concerns The estimate of the proportion of understories that are manageable should reflect data that has been collected on the ranger districts. Prescribed burning should be used as a tool. Pruning is not an economically viable option. It was agreed that the mix of species and size classes is important to the community. There needs to be more time to develop a market for fir.

Recreation (this was an optional lunch time discussion)

There was discussion about the potential of developing off-highway vehicle use areas that would be managed pro-actively to be competitive for available funds and attract organized users to the area Some mentioned the advantages to include economic boost to area, management and resource protection, and meets the desires of some users. Others voiced the disadvantages as being overly restrictive for some users, resource damage in some areas, overly promotes area and brings people related problems (vandalism, etc)

General Messages

There were some points that appeared to be raised in every issue discussion Due to the frequency of these points surfacing, it can be concluded that the groups agreed and felt strongly about the following points

a Site-specific emphasis came up in all areas

b Monitoring funding should be tied to project funding up-front If you can't monitor, don't do it

c Forest standards and "best management practices" need to be more objective and less subjective

d Need to address the impacts from surrounding Forests and communities on the local area (subregional analysis)

C Comment Summaries and Forest Service Response

The number of comments about a subject area is a general indication of the intensity of interest in that subject The following is a summary of people's concerns about the various subject areas Each comment summary is followed by the Forest Service response to those concerns

REQUESTS TO ANALYZE ADDITIONAL ALTERNATIVES

Comment Summary

During the public review and comment period, the Forest was requested to analyze three additional alternatives The first two requests were made by the Grant County Conservationists, for the "Grant County Conservationist Alternative" (GCC) and also an alternative called the "Citizen's Multiple Use Alternative" (CMUA) The latter alternative was developed by a coalition including the Grant County Conservationists, the Oregon Natural Resources Council, the Oregon Hunters Association, the Oregon Wildlife Federation, and other organizations A considerable number of form letters were received suggesting that we adopt the "Citizen's Multiple Use Alternative "

Also during the comment period, a coalition of timber industry representatives developed their own alternative, "Alternative Preferred-Plus - The Community Oriented Plan " Again, a considerable number of form letters were received suggesting that we adopt "Alternative Preferred-Plus" as our preferred alternative This alternative was also supported by such industry organizations as Associated Oregon Loggers, Northwest Forest Resource Council, the Northwest Forestry Association, and the Western Forest Industries Association

Forest Service Response

Under the National Environmental Protection Act regulations, Federal agencies are Response required to consider all reasonable alternatives when preparing Environmental Impact Statements If comments on the Draft EIS suggest that alternatives not analyzed in the Draft EIS should be considered, the agency must give them serious consideration.

Three alternatives were submitted for review Meetings throughout the spring and early summer of 1988 with advocates of the GCC, CMUA, and Preferred-Plus alternatives provided the information necessary to model these alternatives, using FORPLAN analysis to describe resource outputs. However, these alternatives were eliminated from detailed study (Final EIS, Chapter II, Section B). These were not developed in detail, either because they closely resembled other alternatives which were developed in detail, or because they were determined not to be fully implementable alternatives. In addition, these alternatives do not incorporate all technical corrections, nor are brought up to current Forest conditions A summary of the three alternatives is described below.

Grant County Conservationist Alternative (GCC)

This alternative was modeled with no set goal for allowable sale quantity All roadless areas were retained, with no scheduled harvests. Alternative C-Modified is a fully-developed alternative with similar resource outputs

a. Riparian zones were to have no scheduled timber harvests
b Foreground visual prescription was applied to a maximum of acres
c Old growth was set at 120,000 acres, excluding roadless or wilderness areas
d. Uneven-aged timber management was to be featured on a majority of acres

Citizens Multiple-Use Alternative (CMUA)

This alternative was similar to the GCC alternative, but with an allowable sale quantity target of 203 MMBF per year (roughly 35 MMCF per year), in an attempt to portray a historic level of timber offering for a 10 year time period (1977-86) Alternative C-Modified is a fully-developed alternative that comes very close to the theme of this alternative design in terms of land allocations

a. All roadless areas were retained as roadless, with no scheduled harvests
b Riparian zones were to have scheduled harvests, but very low ones
c Old growth set at 75,000 acres, excluding roadless and wilderness areas
d Uneven-aged timber management is featured on 30 percent of acres or more.

Preferred-Plus Alternative

The allowable sale quantity target of 260 MMBF per year (roughly 45 MMCF per year) was closely approximated within the FORPLAN run, as more acres were allocated to timber management than with the Proposed Forest Plan Alternative B-Modified comes very close to this proposal for both land allocation and resource outputs

a Roadless areas were scheduled for harvest, except for Vinegar Hill-Indian Rock
b Old growth outside of wilderness/roadless areas was set at about 45,000 acres
c Even-aged timber management was featured on most acres
d Uneven-aged management was retained in riparian/foreground visual zones

Summary of Trade-offs Between Additional Alternatives

Allocation of acres by Management Emphasis	Proposed Alternative Design			Detailed Alternative	
	Preferred-Plus	CMUA	GCC	B-Mod	C-Mod
Allowable Sale Quantity		(Decade 1)			
ASQ (MMCF/year)	45 3	34 1	23 8	44 0	25 5
ASQ (MMBF/year)	259 1	197 9	136.1	252.0	146.0
	(land allocations in thousand acres)				
Even-Aged Timber Management Prescriptions	867 944	571 981	344 321	866 977	568 304
Uneven-Aged Timber Management Prescriptions	N/A	158 364	267 400	89 806	202 083
Visual Foreground Prescription	64 247	65 776	136.828	57 335	133 990
Riparian Zone Timber Harvest Prescription	45 604	36 660	0	44 607	0
Roadless Area Retained	13 322	180 948	193 064	13.322	193 064
Total Old Growth Outside of Roadless/Wilderness	44 860	75 000	120.000	43.600	47 930

AMERICAN INDIAN RIGHTS

Comment Summary

The Confederated Tribes of the Umatilla and the Columbia River Inter-Tribal Fish Commission were the primary, though not the only, respondents on the treatment of American Indian Rights in the planning process They pointed out that the Forest has a stewardship responsibility to ensure that the treaty rights of the Tribes are protected While all treaty rights were of concern, the fishing rights were discussed the most Specific comments by these respondents about effects on fisheries are discussed under that issue, however, in terms of treaty rights, they noted that tribal members consider the inability to exercise their fishing rights to be a direct social impact They requested that the planning documents devote consideration to the Tribes' interests and that those documents should reflect coordination with efforts to increase the Columbia River anadromous fisheries. Another respondent noted that the impact of recent Indian fishing cases on allocation of fish stocks was discussed, but the extent that other outputs would be reduced to fulfill those court opinions was not discussed It was also noted that the planning documents did not identify where American Indian religious sites are located and how the Forest intends to protect these sites or mitigate impacts which interfere with or impair the religious freedom rights

Forest Service Response

Certain treaty rights apply to sections of Malheur National Forest lands in regard to hunting, fishing and gathering Furthermore, there is strong interest in the management of fisheries habitat on portions of streams tributary to the Columbia River

Treaty rights and privileges have been evaluated and are incorporated into the Final EIS (Chapters II and III) These same considerations will extend to project plans as well. The Forest has made a strong effort to coordinate the land management planning effort with tribal plans and programs and intends to continue with this effort in the future

The Forest is a primary rearing and spawning area for anadromous fish due to its location in the headwaters of the Columbia River system. As a result of treaty obligations, the Forest's responsibilities include management of salmon and steelhead habitat. Management responsibilities and the effects of management activities are discussed in the Final EIS (Chapters III and IV, and Appendix H)

In 1978, PL 95-341, the Joint Resolution on American Indian Religious Freedom was enacted. It was enacted to ensure that Federal lands are managed in a manner that does not impair the exercise of traditional American Indian religion, and access to sites and use and possession of sacred objects The law requires Federal agencies such as the Forest Service to review policies and procedures in consultation with native traditional religious leaders to determine appropriate changes necessary to protect and preserve American Indian religious rights and practices The Malheur National Forest has and will continue to coordinate with all appropriate tribes in planning. During environmental analysis we will consider American Indian traditional religious rights and values We will also notify tribal leaders or their designated representatives for comments To date the Forest has no inventory of spiritually significant areas We plan to conduct inventories in cooperation with appropriate Native American groups Special use permits can be provided for spiritual camps that provide exclusion of others to assure Indians their right to privacy. (FEIS, Appendix H)

BALD EAGLE WINTER ROOSTS

Comment Summary

There were some concerns expressed about the standards for Management Area 5, particularly regarding how activities would be restricted and during what time periods. The Forest was urged to prohibit motorized recreation in these areas by one respondent. Another respondent urged us to perpetuate the old-growth condition of the roost sites and provide for replacement sites when the stand becomes decadent We were also asked to overlap this allocation with a dedicated old-growth allocation.

Forest Service Response

The Forest management direction for Bald Eagle Winter Roosts, Management Area 5, contains standards restricting recreation, road use, and management activities when bald eagle roosts are occupied The Forest Plan (Chapter IV, Section F) includes a standard requiring maintenance of existing and potential roosting habitat for future use by bald eagles in Management Area 5 Old growth allocations were distributed throughout the Forest using a formula developed to meet the management requirements for pileated woodpecker and pine marten (FEIS, Appendix G) The primary roosting area for bald eagles is along the southern fringe of the Forest Several old growth allocations are in Management Area 5, but concentration of old-growth habitat along the southern fringe of the Forest would not meet management objectives for old-growth dependent species such as pileated woodpecker and pine marten

BIG GAME

Comment Summary

The public was generally dissatisfied with the habitat modeling process used by the Forest. Oregon Department of Fish and Wildlife, Oregon Natural Resources Council, and others expressed concern that the process provided inaccurate and misleading information, it did not follow the elk habitat effectiveness index, including procedures for estimating elk habitat capability in eastern Oregon Northwest Forestry Association expressed concern that public pressure to use this modeling process would unnecessarily constrain timber harvest They felt that the forage model used in the DEIS is comparable to the Habitat Effectiveness Index model

Considerable numbers of comments were also made in relation to cover and cover/forage ratios Many comments surfaced on winter range management. Some respondents felt that timber yields on winter range should be less than that of timber emphasis areas, that the plan should require specific winter range improvement practices, and that winter

range maintenance goals should be clarified and strengthened Others felt that normal timber yields would provide proper cover in many cases.

There was also concern expressed by Oregon Natural Resources Council and the general public over the lack of a specific road closure policy in summer and winter range. Numerous reasons were provided in support of a road closure policy, including increasing elk habitat effectiveness, providing elk escape areas, and providing for a quality non-motorized hunting experience Support for a specific road closure policy for elk habitat was expressed by the State of Oregon, much of the public, and was included in both the Preferred-Plus Alternative and Citizen's Multiple-Use Alternative Northwest Forestry Association stated that the adverse effects of open roads were of much greater concern than timber harvest itself

Oregon Natural Resources Council and others requested that we identify population goals for elk by specific state management units and specific winter ranges, the need to resolve conflicts between road management policies and State goals for harvest and solitude of wintering big game, the need to address the Challenge Cost-Share Program - Sikes Act, and the need to implement and monitor cover/forage ratios on an area basis smaller in size than TRI compartments (3,000 to 5,000 acres, possibly third order watersheds) The particular concern of this last comment is that structural contrast and age class diversity is lacking between adjacent managed forest stands (i e stands 4 5 feet tall) and adjacent recently harvested regeneration cuts, shelterwoods, and clearcuts The Northwest Forestry Association stated that timber management would further improve big-game habitat and access management would mitigate concerns about "quality" hunting opportunities They stated that the Plan should not change in its use of timber management as a tool to improve big-game habitat

Confederated Tribes of the Umatilla Indian Reservation stated that mule deer have not been protected adequately, and recommend that mule deer become an identified indicator species

Forest Service Response

The habitat modeling process has been changed in response to public comments and to achieve consistency with adjacent National Forests Habitat capability and population trends have been computed based on an elk winter range Habitat Effectiveness Index (HEI) Model devised by Thomas et al (1988), and the model is applied to both winter and summer ranges The model is based on preference of elk for types of habitat It consists of three variables size and spacing of cover, cover quality, and open road density Outputs include both total acres of cover produced and acres of cover of different quality levels (satisfactory, marginal and non-cover) The model assumes that forage needs would be met in all areas

Minimum Habitat Effectiveness Index (HEI) levels required by the Forest Plan (Chapter IV) vary with Management Area The objective will be HEI of 0 7 (40% total cover) in Wildlife Emphasis Management Areas, 0 5 (25% total cover) in winter range, and 0 4 (20% total cover) in summer range

Timber harvest will not be constrained in big-game winter range as long as a minimum HEI of 0 5 is maintained with 10% satisfactory cover and 25% total cover Winter range improvement practices will include burning, seeding and planting to improve forage

Forest-wide management standards (Forest Plan, Chapter IV, Section E) permit road or area closures to achieve wildlife habitat management objectives. Specific road closures will be addressed in the future by an Access Management Plan that will be updated annually The Forest will continue to request matching funds for fish and wildlife habitat improvement programs from the Challenge Cost-share Program

The Habitat Effectiveness Index Model, as identified in Alternative I, is based on sub-watershed units (3,000 to 15,000 acres). Big-game habitat will be managed for and monitored using these unit configurations

The Final EIS and Forest Plan deal with habitat capability rather than populations, and the Plan does not provide population goals for elk by specific State management units and specific winter ranges These management units and winter ranges include private land. Population levels vary for many reasons other than habitat quality (e g birth and death rates, reproductive rates, mortality due to hunting, disease, weather, stress, accidents, predation, etc.). Management of big-game habitat influences, but does not totally control, big game numbers

Mule deer are an important big-game species on the Malheur National Forest, but are not included as an indicator species. It is assumed that habitat requirements for elk are more restrictive, therefore, elk management will achieve mule deer management objectives. It is recognized that mule deer use different forage and somewhat different winter ranges, and do not need as much cover as elk. Yet, for the purposes of the Forest Plan, these differences in habitat preferences were assumed not to be significant on the Malheur National Forest.

BOARD FOOT/CUBIC FOOT RATIO

Comment Summary

We received eight responses on this issue, all from forest industry organizations or forest personnel These respondents questioned the use of a static conversion factor over time and the use of the same conversion factor in all alternatives In addition, we received much comment which doubted whether we could sustain projected future board foot volumes while managing for smaller-diameter trees. This reflects concern with our methodology for projecting future yields

Use of a constant conversion ratio over time may not provide an accurate reflection of future board foot volumes, since the average tree size harvested in the future under intensive management, in most alternatives, will be considerably smaller in diameter than the average tree harvested today. It also may not be consistent to use the same conversion ratio for alternatives which manage for smaller diameter mixed conifer species in the future as that used for alternatives which manage for large diameter ponderosa pine Other Forests in the Region have used different conversion ratios for existing and future stands The Ochoco NF, for example, used a variable conversion ratio over time In their Draft EIS, the Ochoco NF displayed a flat or non-declining cubic foot output over time for most alternatives, but a declining board foot output over time.

Forest Service Response

Cubic foot measurements of a tree are more accurate estimates of the total wood fiber volume contained in the tree The Forest program development and target attainment will be based on the cubic feet calculated for planned sale activity

The difference in conversion ratios between decades (and between alternatives) is due to changes in harvest tree diameters As tree harvest diameters decrease, the board foot per cubic foot conversion ratio will decrease accordingly. However, the cubic foot output will remain the same or increase over time

In response to public input concerning conversion ratio factors, the Forest has developed a way to calculate the board foot volume based on the actual harvest value and harvest tree size found in the FORPLAN model. Existing conversion ratios are based on the ratios found in the 1980 Forest inventory by different diameter classes. With this method in place, actual board foot values can be tracked over all decades when needed The board foot volume projections for all alternatives (first decade only), are based on this procedure. Board foot projections will not be made after the first decade.

CULTURAL RESOURCES

Comment Summary

Protection of cultural resource sites was a concern for several respondents. Some respondents felt that destruction of sites was an automatic result of timber management and urged that old-growth stands should be retained to protect these sites The survey, management, and mitigation of effects on cultural resource sites was a concern The US Department of Interior in particular was concerned with identification and management on a project by project basis They urged that the Forest Plan provide assurance that evaluation of the Forest's cultural resources would be conducted under a systematic survey by research goals extending beyond a project level and including testing to better understand the significance of the sites They also questioned why cultural resource investment and management were limited to Management Areas 1, 3, 4A, and 14 and not included in rangeland Historic sites were of interest to several respondents who urged that we interpret or at least mark these sites

Forest Service Response

Cultural resource surveys are conducted prior to implementation of any potentially disturbing project The sites identified during these surveys are evaluated by a professional archaeologist to determine whether they meet the criteria which qualify them for listing in the National Register of Historic Places Qualifying properties are said to be "significant" and are afforded appropriate management Properties not meeting the National Register criteria are not significant and are removed from further cultural resource management consideration

The Malheur National Forest operates its survey program on the systematic basis of a forest-wide inventory strategy This strategy considers the various types of sites known or suspected in the area, the probable location of these prehistoric and historic sites, and those factors which control our ability to locate them The strategy is designed to be applicable to the entire Malheur National Forest It is only implemented on a project specific basis Research issues for survey, evaluation, and data recovery are designed on a regional basis under the Inventory Strategy, the Lithic Scatter Programmatic Memorandum of Agreement, and other similar documents Questions relevant to regional research goals are taken from these regional documents and focused for the sites on the Malheur National Forest

The largest potential contributor to adverse impact on cultural resources is the timber management program As a result of the timber program, a survey is conducted on 80,000 to 100,000 acres per year. This survey is funded with timber support funds Sites discovered are either protected by avoidance, or their significant values are recovered through data collection or recordation to appropriate standards Range projects that have the potential to impact cultural resources are inventoried just as timber projects

All lands on the Forest will eventually be inventoried as time and resources become available. The Forest has a large inventory of documented sites that are currently being protected by avoidance The activity schedules in the Forest Plan (Appendix A) have been revised and expanded to include a large amount of site management work We recognize the need to be managing these sites and plan to aggressively move toward that end.

One valuable and effective aspect of site management is resource interpretation Interpretive projects are planned on the historic Sumpter Valley Railroad, Wickiup historic campground, Logan Valley, and the Middle Fork John Day area

DIVERSITY

Comment Summary

There was considerable concern that the approach used in discussing diversity is not adequate per CFR 219.26 There appears to be confusion or dissatisfaction with the lack of integration of diversity concepts, typified by a request by the Nature Conservancy to have a section called "natural diversity" in the environmental effects section of the Final EIS.

The Nature Conservancy and other respondents stated that intensive timber management and the shift, for a period of time, from ponderosa pine predominance to associated species will not provide for biological diversity and is contrary to the National Forest Management Act charge to "provide for steps to preserve the diversity of tree species similar to that existing .." It was suggested that judicious use of uneven-aged timber management contributes to vertical diversity

Several respondents, including Washington Native Plant Society, National Wildlife Federation, the State of Oregon, and others indicated that much more stringent standards are needed for native plant species, especially in riparian areas, and for protection of diversity as an objective focusing not only on forested types but also special habitats, juniper, grasslands, and hardwoods, especially aspen

Forest Service Response

In responding to the request to include a specific narrative on diversity within the Final EIS, the Forest's approach is to include a section on diversity of plant and animal communities (see Final EIS, Chapter III, Section B) Due to public desires, this section is based on discussions of diversity at the landscape ecology level. Some notable changes from the Draft to Final EIS are listed below. In order to maintain the natural vegetative diversity that exists across the Forest, thus providing a variety of landscape or habitat conditions across the Forest, the preferred alternative (Alternative I) will be.

1) featuring/emphasizing ponderosa pine on many of the Forest's mixed conifer acres and on all of our ponderosa pine acres

2) increasing uneven-aged management to approximately 225,000 acres of the managed forest lands This technique will feature multiaged canopies within fairly small parcels (approximately 2 acres) of forestland

3) providing snags and snag replacement trees at or above 40 percent potential population levels over the entire Forest (all land capable of producing snags)

4) providing old-growth replacement timber management strategies that will give an intermediate age class structure between intensively-managed forest and unmanaged (dedicated) old-growth habitat

5) closing roads not needed for Forest access, whereby providing for maintenance of higher snag levels, simply because capture of tree mortality through firewood harvest will be more difficult

6) maintaining higher levels of cover across the Forest for big-game habitat emphasis, thus providing the potential for greater vegetative diversity.

In general, timber harvest patterns across the Forest will result in changes to the existing diversity of vegetation, with both increases and decreases to natural diversity occurring Using ecological terms, there will be a general decrease in within-stand diversity, with an associated increase in between-stand diversity This will be a result of changing the structural composition of the Forest over time Harvests of large, old trees, thinnings and tree planting present a challenge in designing future Forest conditions related to vegetative diversity. As timber harvests, thinnings and plantings will be managed in

units ranging from less than two acres to more than 100 acres in size, the opportunity to increase the between-stand diversity becomes more pronounced Strategies for maintaining old growth, roadless areas, research natural areas, old-growth replacement stands, foreground visual zones, snags, snag replacements, and intensively-managed stands using uneven-aged and even-aged prescriptions in a intermingled pattern across the Forest will help to maintain a significant level of structural diversity.

Animal diversity, both in terms of edge and species richness, will change as a result of management activities and natural processes As habitat conditions are manipulated, the opportunity exists to both benefit and adversely impact certain ecosystems or portions of ecosystems Manipulations of common plant communities, each with distinct animal communities, will have the potential to affect changes in animal habitat conditions Increasing regeneration harvests in mature stands (clearcutting and shelterwood cuts) with an abundance of cover will increase the contrast edge Animal species and communities that respond favorably to edge will generally increase In areas with little cover, these harvest types will work to reduce optimal habitat conditions.

Increasing use of an uneven-aged management strategy that retains vertical diversity in managed timber stands would help to maintain within-stand diversity over the Forest and thus support species that thrive in these types of habitats However, it is the interaction of management activities on the Forest that is the key to understanding impacts and effects on diversity of habitat conditions Use of a geographically-specific modeling/analysis process will assist in monitoring habitat diversity and contrast on all areas across the Forest

Use of a Habitat Effectiveness Index model will incorporate diversity variables that are related to vegetative cover spacing and quality, and will be applied on a subwatershed basis Riparian area management standards have been revised and are more restrictive in forage utilization, thereby affording greater protection to native vegetative species Special habitat conditions, such as unusual vegetative types, research natural areas and protection of sensitive species will help maintain segments of the natural diversity found across the Forest

FISHERIES

Comment Summary

The Environmental Protection Agency, Fish and Wildlife Service, Trout Unlimited, Confederated Tribes of the Umatilla, Columbia River Inter-Tribal Fish Commission, Oregon Natural Resources Council, Oregon Environmental Council, Wilderness Society, Izaak Walton League, and others all commented that standards, monitoring plans, and information provided about the fisheries resource were inadequate, vague, unmeasurable and insufficient to protect the resource Reliance on best management practices (BMPs) was seen to be insufficient, and data is lacking to support the effectiveness of these measures on the Forest The Bonneville Power Administration's goal to double anadromous fish production was suggested as a measure of demand The reasons why the maximum anadromous fish benchmark took 50 years to reach that goal were questioned The objective of 90 percent fish habitat capability was recommended as a minimum objective for fishery management The State of Oregon and numerous response forms from individuals established the importance of recreational fishing and anadromous and resident fish production The Northwest Forestry Association noted that environmental groups were likely to question the Forest's conclusions and requested that the Forest fully document the scientific uncertainty of predicting effects on water quality and fisheries

Comments included requests for identification of areas where fish habitat has declined due to riparian degradation, objectives by drainage with monitoring recommendations and priorities, identification of streams to be protected from hydroelectric development as coordinated with the Northwest Power Planning Council, discussion of the impacts of management activities on fish habitat improvement projects of other agencies and landowners, requests for a special management area for anadromous fish, equal emphasis

on enhancement and protection of resident fish populations; and clarification of the relationship between the Forest and the Bonneville Power Administration projects relative to the projected increases in anadromous fish. It was requested that the Final EIS clearly describe the process and assumptions used to predict these increases. The Fish and Wildlife Service, Oregon Department of Fish and Wildlife, Oregon Natural Resources Council, and others requested special management consideration of the redband trout and the Malheur mottled sculpin Finally, it was noted that statements about the budget required to improve habitat were inappropriate; that the Forest had the discretion not to conduct activities that would degrade the habitat if it couldn't afford the protection or mitigation needed. Oregon Natural Resources Council stated that maintenance and improvement of fisheries habitat should come primarily through management not mitigation.

Forest Service Response

In response to public concerns, resident trout have been added as indicator species (Final EIS, Chapter III, Section D) Resident fish have also been added to the Monitoring Plan (Forest Plan, Chapter V)

The discussion of sensitive species has been substantially expanded (FEIS, Chapter III, Section D). In reviewing public comment and current data, a need for more facts was evident. Consequently, sensitive species have been added to the list of information needs (Forest Plan, Chapter II, Section E) Sensitive species have also been added to the Monitoring Plan (Forest Plan, Chapter V).

Standards for protecting water quality and fish habitat have been extensively revised to make them more complete and definitive (Forest Plan, Chapter IV, Sections E and F) This included revising the timber and road standards to provide additional protection to riparian areas. Anadromous and non-anadromous streams are identified separately, with specific management standards and monitoring plans developed for each. New timber harvest prescriptions for riparian areas were developed for Alternative I. Monitoring will now be done on a subwatershed basis, rather than on Forest-wide averages (Forest Plan, Chapter V) This will provide for more site-specific monitoring of fish habitat capability trends

Smolt habitat capability was recalculated using the coefficients from U S v. Oregon to be consistent with other forests in the region These estimates are based on rearing area, rather than on spawning, as was used for the Draft Environmental Impact Statement As a result, the outputs displayed here for commercial harvest and Wildlife and Fish User Days (WFUDs), which are the values with assigned economic values from RPA, are somewhat less than what was displayed in the Draft EIS. However, these numbers still reflect the economic value of the anadromous fish habitat on the Forest They do not reflect the fact that spawning occurs at higher densities on the Forest than downstream from the Forest boundary Another factor that is not accounted for in these calculations is the effect of expected improvement in water quality, especially temperature, on the habitat quality of downstream areas.

The Forest provided input to the Bonneville Power Administration (BPA) planning process concerning fish habitat and hydroelectric potential, along with other resource information, such as, wildlife, recreation, natural features, historic and archeological resources Bonneville Power Administration has now completed their analysis and issued their list of streams protected from hydroelectric development All streams on the Malheur National Forest are included in this list of protected streams

GEOGRAPHIC SPECIFICITY

Comment Summary

In the State of Oregon's response to the Malheur National Forest's Draft EIS and Proposed Land and Resource Management Plan, the Governor of Oregon stated that "many State agencies were hamstrung in making effective comments to you because of the lack of geographic detail in your analysis and discussion." Concern was expressed that resource effects, such as, sediment production, water flow, and habitat structure over time, could not be adequately assessed without more geographically specific information.

To alleviate this situation, the Governor requested that we "divide your forest into watersheds, or some other logical geographic breakdown, and embed that structure in your forest planning analysis and in the presentation of resource effects in your Final Environmental Statement." Concern about the lack of geographic specificity in reporting of resource outputs and effects, particularly in the areas of watershed management and cumulative effects, was also expressed by the Environmental Protection Agency, Oregon Trout, Oregon Natural Resources Council, and the Columbia River Inter-Tribal Fish Council

Forest Service Response

In order to be responsive to specific agency concerns, we have incorporated seven geographic identifiers (major watersheds on the Malheur National Forest), each with two range identifiers (summer vs winter), into the FORPLAN model structure

The watersheds that are now identified contain Forest acres within (1) Fox/Cottonwood Creeks, (2) the Middle Fork of the John Day River, (3) Upper John Day River; (4) South Fork of the John Day River, (5) Silvies River, (6) Malheur River, and (7) North Fork of the Malheur River To establish this geographic specificity, a minimum of elements within the existing model were necessarily traded off, in order to accommodate this approach (lack of room with the FORPLAN analysis model) To insure continuity with the "whole Forest" model (Draft EIS analytical basis), sensitivity testing was performed on the new geographic model The results have indicated that the Forest-wide model outputs and effects are virtually identical to the geographic (watershed) model outputs and effects The greater precision, in detail with the geographic model formulation, is the main benefit realized with this new approach.

Giving greater geographic specificity in response to State of Oregon concerns, as well as other public concerns, has provided outputs that will be more easily identified and tracked on the Forest This has allowed greater detail for cumulative effects analysis and specific watershed management This will be tied into the monitoring program for Forest activities such as timber harvests, elk habitat levels (cover production and forage outputs), thus bringing more clarity into the analysis process Subwatershed analysis is also more easily incorporated into this model formulation Subwatersheds are identified in the Forest Plan, Appendix N More information on this issue can be found in the Final Environmental Impact Statement (Appendix B, Section III).

LIVESTOCK GRAZING

Comment Summary

The majority of comments about livestock grazing addressed the level of animal unit months that the Forest should make available These comments were roughly evenly divided between those wanting grazing to be decreased or eliminated and those wanting it to be maintained or increased The Oregon Natural Resources Council and the Environmental Protection Agency (EPA) requested that suitability for grazing be determined as required by law, and that where it was concluded that impacts to riparian areas would be unavoidable, the area be determined unsuitable and livestock be excluded The EPA, Oregon Department of Fish and Wildlife, Oregon Environmental Council and others requested that an allotment map be provided as well as tabular information including allotment names, animal unit months permitted, season of use, trend and condition, graz-

ing system, current utilization rate, status of the allotment management plan, existing and planned improvement projects, and known or expected recovery rates.

Many respondents, including the Harney County Court, Associated Oregon Loggers, Northwest Forestry Association, and others, were concerned about the effects of planned riparian management on individual grazing permittees and community stability. Oregon Natural Resources Council and others requested more information about implementation of the riparian management strategy Associated Oregon Loggers commented that the reasons for changes in forage production were not well described between the alternatives.

Forest Service Response

The annual level of livestock use is affected by other resource management activities. Changes in timber management, fisheries habitat management and utilization levels of vegetation affects the capability for livestock grazing on the Forest These effects are further discussed in the Final EIS, Chapter III

The management changes that affect the annual level of livestock use on the Forest have been addressed in Alternative I (the Preferred Alternative), developed in response to public concerns about livestock use In this alternative, livestock use capability in riparian areas will be reduced by approximately 12 percent and will be reduced by 5 percent Forest-wide from current use levels

Suitable rangelands are areas which produce, or have inherent capability to produce, 50 pounds or more of palatable forage per acre; can be grazed on a sustained-yield basis when allowable use levels are applied without damage to vegetation and soil resources, and are or can be made accessible for use. Suitability is independent of past range use effects Range with a very low forage rating is suitable if vegetation can be improved through management Some areas may be closed temporarily to grazing or other steps may be taken to improve the otherwise suitable area

A grazing allotment map is available upon request (Supervisor's Office, John Day, OR) and a table displaying the activity schedule for grazing allotments can be found in the Forest Plan (Appendix A, Table A-10)

Upon implementation of the Forest Plan, the Animal Unit Month (AUM) capability level for riparian areas will drop 12 percent due to changes in various resource management activities This will cause slight adverse impact upon Forest permittees However, we do not anticipate that the 5 percent Forest-wide reduction in livestock use capability from recent historical levels will produce a measurable effect on the community In reviewing public comments and recent analyses, the changes are necessary to accomplish coordinated uses and multiple resource management to which the USDA Forest Service is charged

The Forest-wide and Management Area Standards (Forest Plan, Chapter IV, Sections E and F) have been extensively revised and made more specific to provide precise management direction for resource managers. The Forest monitoring plan (Forest Plan, Chapter V) has also been reworked and monitoring worksheets added to provide adequate evaluation and implementation direction

INSECTS AND DISEASE

Comment Summary

The past effects of western spruce budworm and the potential for future infestations were the primary concerns of those who commented on insects and disease A major concern was that the Plan's volume projections do not account for the mortality and growth loss caused by the most recent epidemic Respondents noted that the large increase in mixed conifer stands in future decades would increase the potential for another epidemic infestation. Others, such as the Associated Oregon Loggers, felt that the benefits to forest health as a result of managing for ponderosa pine were not adequately considered.

Some respondents commented that the budworm was killing the fir understory as have fires of past years and that the Forest Plan's reliance on managing these understories was questionable They were not reassured by relying on future intensive management and full stocking level control as a way to manage severe future outbreaks and suggested that plans to prevent or reduce damage from pests, including wilderness outbreaks, be discussed. Some respondents recommended that insect outbreaks in the wilderness be allowed to run their natural course Other respondents, including the Environmental Protection Agency, requested that the criteria for epidemics which "severely" threaten adjacent land be spelled out The Washington Native Plant Society further recommended that non-chemical means of control be specified for research natural areas and wildernesses

Forest Service Response

The major comments on insects and disease activities and their effects are all interrelated and a change in the forest management approach in one area will most likely have an effect on the others

In response to comments about the recent western spruce budworm epidemic, the Forest has reviewed the manageability of its existing understories This review has indicated that there has been a significant change in the number of acres that are found to be managed both on a Forest-wide basis, of which approximately 60 percent is manageable, and on a major watershed basis, which may vary from roughly 90 percent to 20 percent depending on the species mix and watershed location The analysis also has revealed that understories were most likely not manageable if they had a high percentage of white fir and/or Douglas-fir, and were found in watersheds that occupied the northern portion of the Forest This is where the recent epidemic has occurred for the longest time period and has had the greatest effect on host species, (i e , white fir and Douglas-fir) The Forest has now made changes in the analytical approaches in order to reflect these findings A special study is now being conducted to determine the effects of the epidemic on the growth of trees and stands This study will not be completed for one to two more years and its results will be incorporated as they become available

The Preferred Alternative will emphasize more ponderosa pine using both even-aged and uneven-aged management systems This change, over time, should cause a lessening of both insect and disease agents across the forest due to the lower susceptibility of this tree species to these agents

The overall effect of these two major changes, combined with intense timber management practices, will be to produce healthier stands of trees over time Even with these changes to lessen the risk and loss to these pest agents, there will still be periodic outbreaks of spruce budworm and tussock moths (Final EIS, Chapter II) However, as these changes in management take effect, outbreaks should become less severe and further apart in time

Actual on-the-ground controls and actions will vary among management areas, and will be based on the objectives for the management area and sound integrated pest management principles Control activities that could be utilized include no action, control through natural predators, or the use of chemical or biological control agents

Insect and disease outbreaks in general forest areas will be open to all control activities with the addition of the option to replace existing trees with species that are more disease resistant In areas such as wilderness and research natural areas, control through natural predators (i e , birds, mammals, or microbial agents) is favored These options are also preferable in semiprimitive roaded and unroaded areas; however, the use of chemical controls could be made available if management objectives can be met

An environmental analysis will precede the initiation of control activities This analysis will be used to determine the control activity used and the course of action, and to ensure compatibility with the management area standards and guidelines Future insect

outbreaks will be managed through the interdisciplinary process using Forest standards, Region 6 Vegetative Management EIS and land management goals for each individual management area.

LANDS AND MINERALS

Comment Summary

The Bonneville Power Administration recommended that the Forest Plan designate existing and proposed utility and transportation corridors and also address the impacts of the alternatives, if there are impacts, on rights-of-way and corridors. They recommended that the documents reference the 1986 Western Regional Corridor Study. They further recommended that management area descriptions state whether utility or transportation corridors should be avoided or excluded from the area The State of Oregon Division of Lands, identified specific parcels that may be affected by changes in Forest management and are available for sale or exchange.

The Bonneville Power Administration, the Fish and Wildlife Service, and the State of Oregon Department of Environmental Quality commented that the Plan should better address renewable energy resources such as wind, hydroelectric, geothermal, and biomass. They requested that the type and potential of the resource, impacts of the alternatives and conflicts with the potential development of those resources is identified. It was suggested that the Forest incorporate the 1982 "Geothermal Resources of Oregon" map which shows the entire area as favorable for discovery of this resource.

Trout Unlimited and other individual respondents suggested more directive standards for mineral activity such as not allowing mining in or near streams during spawning months or prohibiting instream degradation of any kind. The Environmental Protection Agency suggested that monitoring of reclaimed area be included as a standard to ensure accomplishment of objectives The State of Oregon Division of Lands identified specific standards to address compliance with State laws

Several comments addressed access for mineral development Some commented that access should not be restricted The Fish and Wildlife Service recommended that standards stipulate that access or new roads would be restricted to existing ways in the scenic area and that valid existing mineral rights would have to be tolerated in the Strawberry Mountain and Monument Rock Wildernesses. That agency, as well as the State Department of Geology and Minerals Industries, also recommended an expanded and revised discussion of the Forest's mineral potential to include a discussion of present activity, the percentages of area in various categories of restriction, discussion of projected demand and historical production and value, a list of current mineral withdrawals, and information about industrial and construction minerals. They also recommended that the Forest initiate mineral investigations as part of the activity schedules.

Forest Service Response

The impacts by alternative on existing and proposed utility and transportation corridors are not addressed. Standards providing management direction for these corridors were made more specific in Chapter IV, Management Direction, of the Forest Plan These standards indicate that existing corridors will be used to the extent feasible, and an interagency environmental analysis will be conducted when this is not possible In addition, standards for specific management areas indicate whether corridors would be allowed, avoided or excluded

A land ownership adjustment schedule was added to Appendix M of the Forest Plan. This schedule establishes direction for ownership adjustments that will best accommodate the objectives of the Forest.

The potential of a variety of energy resources have been addressed by the Area Mining Engineer, who used the *Bibliography of the Geology and Mineral Resources of Oregon*, State of Oregon Department of Geology and Mineral Industries, as a base document for

research Little information is available on the potential of wind energy on the Malheur National Forest Therefore, it is not discussed in this planning effort The potential for hydroelectric energy on the Forest is low (Final EIS, Chapter III). The effects of each alternative on the potential yield and value of minerals and energy resources are discussed in Chapter IV and Appendix F of the Final EIS

Forest standards (Forest Plan, Chapter IV, Sections E and F) have been made more specific regarding mining operations in streams. Specifically, miners will be notified of applicable laws with which they must comply, and operating plans will emphasize protection of and/or mitigation of impacts In addition, reclamation of operating sites has been added as a monitoring and evaluation item to ensure compliance with established standards (Forest Plan, Chapter V) Under the mining laws, claimants are entitled access to their mining claims Forest Standards have been revised to emphasize this point

The Final EIS has been revised to better describe mineral potential and values, current activity and restricted areas (Chapters II, III, IV, and Appendix F) Additions to the Forest Plan (Chapter IV) now respond to expected future trends with respect to energy and non-energy mineral production. Mineral investigations have not been added to the activity schedules It is expected that most investigations will be performed by industry users in the course of mineral exploration and development

MANAGEMENT INDICATOR SPECIES

Comment Summary

Concern was expressed about the lack of indicator species for resident fish habitat and riparian habitat There was also an expressed desire for additional base line information and evaluation of effects on indicator species populations by alternative There was concern about the lack of discussion about the estimated effects on indicator species due to changes in vegetation type, age class, etc The Forest was urged to improve the limited data made available and discuss any scientific uncertainty Various additions to the indicator species listed were recommended The redband and bull trout and Malheur mottled sculpin were consistently mentioned as resident fish indicator species Upland sandpiper and sandhill crane were recommended for meadow indicator species Downy woodpecker and ruffed grouse were the primary species mentioned for riparian habitat, although, there were other candidates as well Wolverine was also recommended more than once as a large predatory mammal that is sensitive to changes in its habitat

Forest Service Response

Habitat modification may result in population changes of species that are associated with that habitat, and the response of certain species, known as management indicator species may indicate the effects of the habitat change on other species with similar habitat needs There is some uncertainty about the general application of this concept, as it is not well tested In comparison to describing and managing the hundreds of species individually, an approach of using one species to represent several others is an attractive one and has been adopted as a forest planning and monitoring strategy

Following the release of the Proposed Forest Plan and Draft EIS, there was a noted increase in awareness of public concerns about management indicator species The Forest re-examined this issue Concurrently, there was a Regional effort to bring additional consistency to management indicator species The Forest elected not to evaluate effects of alternatives or to discuss vegetative type changes on management indicator species. Instead, the focus of this effort was on expanding the list of management indicator species to cover most of the habitat types where management activities could have an adverse effect on wildlife species.

Consideration was given to adding management indicator species for resident trout and riparian habitat Resident fish have been added to the list of management indicator species. Indicators for non-anadromous streams now include, bull trout, cutthroat trout, and rainbow/redband trout. Rainbow and redband are considered together because both

occur on the Forest and until the taxonomic uncertainty about redband trout is resolved, it is safer to use both. The Malheur mottled sculpin was not included as management indicator species. Its distribution and habitat assessment have been identified as needing additional data (Forest Plan, Chapter II) The Forest does not have reliable indicators for riparian habitat; however, separate management areas (Management Areas 3A and 3B) have been established for anadromous and non-anadromous streams, ensuring the maintenance and improvement of this important habitat

Not all plant communities were represented by management indicator species, only the communities where management activities were most likely to cause adverse impacts Two major plant communities not represented are meadows and juniper/sagebrush habitats. Instead of management indicator species for these communities, we addressed the habitat needs in Forest Management Standards for several featured species using these specialized habitats, the sandhill crane, upland sandpiper, sage grouse, and antelope.

Rather than representing all plant communities under the management indicator species system, only the most critical habitats were included, old growth and dead and defective tree habitats Groups or species guilds were included to represent these habitats (e.g , three old-growth species and 11 cavity excavators for dead and defective habitat) Also, the Forest added Cooper's and sharp-shinned hawks as management indicator species to monitor habitat changes in early to mid-successional forest ecosystems, because of the uncertainty of impacts of large precommercial thinning operations on species utilizing these habitats

MANAGEMENT REQUIREMENTS

Comment Summary

Those who commented on this topic generally expressed support for the concept of management requirements which would represent the minimum needed to meet biological needs of certain wildlife species Some respondents thought that we should have a management requirement for three-toed woodpeckers Others felt that our minimum requirements were not stringent enough, given the level of uncertainty. Still others felt that we should have had a range of minimums displayed for comment There was a comment that we could do more overlapping of land allocations to meet the requirements, while another comment stated that we had no justification for overlapping areas for pine marten and pileated woodpecker

Forest Service Response

Management requirements are the minimum requirements which must be met to accomplish the goals and objectives of the National Forest System as outlined in 36 CFR 219 of the National Forest Management Act regulations Fish and wildlife habitat will be managed to maintain viable populations of existing native and desired nonnative vertebrate species Habitat for these species will be provided to support at least a viable population of reproductive individuals, and will be well distributed so that those individuals can interact

Habitat for old-growth dependent species was dedicated using minimum territory sizes for pileated woodpecker and pine marten (which are the management indicator species for old-growth habitat), and a distribution requirement that they be located within 10,000 to 12,000 acre blocks for pileated woodpecker and 4,000 to 5,000 acre blocks for the pine marten, and that old-growth stands be interconnected where possible The most suitable old growth stand or unit was selected within each of these areas, and the same potential old growth units received consideration under each alternative Both pileated woodpecker and pine marten use mixed conifer old-growth habitat and hence there was an overlap in old growth allocations for these two indicator species There was not a complete overlap because pine marten occur only in mixed conifer and higher elevation forests, while pileated woodpecker are found also in ponderosa pine communities

Management requirements were not established for three-toed woodpeckers because the

timber management strategy for lodgepole pine habitat will provide a significant excess of old growth Forest-wide Management designation of these areas is therefore not needed at present. Furthermore, large acreages of old-growth lodgepole pine have been killed by mountain pine beetles, which precludes designation in many areas at present It will be an estimated 40 years before about 26,000 acres of lodgepole pine forest becomes suitable habitat for northern three-toed woodpecker, and future Forest Plan revisions will include consideration of that species The Forest Plan (Chapter IV, Section E) contains a management standard to identify any existing and potential old-growth lodgepole pine stands as per Regional Management Requirements for three-toed woodpeckers

The Forest Plan (Chapter IV, Sections E and F) directs that old growth allocations be sufficient to maintain populations of dependent species at 30 percent above minimum viable levels This accounts for stands that have less than 100 percent occupancy rates, and for risk associated with managing at minimum viable population levels Management direction for old growth areas (Management Area 13) is provided in Chapter IV of the Forest Plan and a detailed discussion of management requirements can be found in Appendix G of the Final EIS

MONITORING

Comment Summary

Comments on monitoring requirements were generally limited to a few large organizations who completed an in-depth review of the Proposed Forest Plan These organizations included the State of Oregon, Environmental Protection Agency, Columbia River Inter-Tribal Fish Commission, and the Confederated Tribes of the Umatilla

Respondents generally felt that monitoring requirements were inadequate, being too general and not sufficiently comprehensive Specific concerns included

a Monitoring for some key resource areas is nonexistent or inadequate,

b Monitoring questions are too general to ensure that the Forest Plan is being properly implemented Respondents suggested that monitoring items be specific and measurable, with terminology defined The State of Oregon Department of Forestry recommended specific monitoring items and processes

c Responsibility for completion of particular monitoring activities is not specified,

d Frequency of monitoring, sampling rates, and sampling procedures and methodology are not described,

e The size of area to be used as the standard for monitoring is too large to ensure that the resource of concern is being adequately addressed,

f Threshold levels and variability standards are not established Too much emphasis is placed on the evaluation of monitoring results to determine the course of action to be taken if projected outputs and effects are not met,

g Concern about links between monitoring and the budget exists Respondents expressed concern that if funding is not adequate to implement the Plan, the monitoring budget will be reduced The Governor of Oregon recommended that "plans be structured so that output levels will be proportionately reduced if monitoring resources are not forthcoming as promised" Respondents also requested that the links between particular resource outputs and effects and budgets be specified, with specific information provided concerning how outputs and effects would be affected if actual budget levels were less than projected levels

Forest Service Response

In response to public concern about the monitoring plan, changes have been made to provide land managers with a definitive monitoring process. A discussion of the monitoring plan and individual resource monitoring items can be found in the Forest Plan (Chapter V).

The monitoring plan has been revised. The language used to display monitoring questions in developing the monitoring plans is more specific. This ensures that the monitoring items are more measurable. We have included both threshold levels and variability standards in each of the monitoring items

In an attempt to incorporate established procedures for monitoring frequency, sampling rates, procedures and methodology, we have included the specific approach to be used Often this is based on well-established research/field practices, documented in professional and technical literature.

Establishing a reasonably sized monitoring area is certainly a critical part of the process. We know that too large an area will "wash out" specific indicators of change, while a sample on too small an area will result in excess costs or inconclusive results With this in mind, we have geared our investigations towards sampling designs that capture resource trends, within established error tolerance, at low costs of implementation.

The link between monitoring and the budget has been tightened to include specified actions in project implementation if monitoring budgets change in any significant way. For each monitoring item, if funds are inadequate to effectively monitor the Forest Plan goals, objectives, standards, and resulting environmental effects, the specific situation will be analyzed A resulting course of action will be taken, which will be reflected in regulation of proposed output levels, or in revised implementation schedules.

MUNICIPAL WATERSHEDS

Comment Summary

The town of Canyon City recommended that the Byram Gulch and Long Creek watersheds be considered individually and Byram Gulch be removed from scheduled timber harvests, thereby prohibiting logging in that watershed

Prairie Wood Products said that the Forest Plan did not discuss impacts on other watersheds (i e. not municipal) which provide water supplies for some municipalities (i.e. John Day) They recommended that we discuss the impacts on those watersheds.

In their response to the Forest Plan, the city council of Prairie City requested that the Dixie Creek drainage be considered as a municipal watershed. After their response was received, the Long Creek District Ranger and the Forest hydrologist met with the mayor of Prairie City to clarify the city's request Under current Forest Service manual direction, Dixie Creek does not meet certain qualifications for municipal watersheds on Forest Service lands

Forest Service Response

A municipal watershed provides water for human consumption that is utilized by a community or 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 Where Forest Service management could have a significant effect upon the quality of water is at the intake point. (This definition can include such facilities as campgrounds, organization camps, resorts, residential areas, etc)

The intake point for the supply does not have to be within the Forest boundary However, if the intake is some distance from the Forest and there are potential pollution sources that outweigh any problems from National Forest land, then such a situation would not justify classification as a municipal watershed. The definition does not include communities served by a well or confined ground water unaffected by Forest activities.

All municipal supply watersheds have been identified and management direction for each is prescribed in specific management areas (Forest Plan, Chapter IV, Section F) A separate management area has been established for each municipal watershed. Byram Gulch (Management Area 17) is a primary water source for Canyon City, OR A secondary water source for the town of Long Creek, OR, is an unnamed tributary of Long Creek (Management Area 18)

In response to municipal water supply concerns, the Byram Gulch watershed (Management Area 17) has no scheduled timber harvest, cattle grazing is prohibited, and the area is withdrawn from mineral entry Timber harvest is permitted within the Long Creek watershed (Management Area 18), however, timber harvest activity and road building will be designed to minimize excavation and protect streams and drainage channels

All other watersheds on the Forest are an important source of water for on-site values and downstream uses, however, watersheds other than the two recognized as municipal watersheds are managed by the Forest through applicable management area and Forest-wide standards Water quality and water yield changes are potentially affected by timber management. Although timber harvest can increase annual water yield, these increases are typically an insignificant part of total runoff and are generally unmeasurable Water quality in all alternatives will protect beneficial uses for all decades of the Plan, through implementation of Forest standards and best management practices (BMPs) More information regarding water quality can be found in the Final EIS (Chapter IV, Section C)

The Dixie Creek drainage does not qualify as a municipal watershed and will therefore be managed under the applicable management area Dixie Creek drainage is to be managed as a wildlife emphasis area with no scheduled timber harvest

OLD GROWTH MANAGEMENT

Comment Summary

Five topics were the focus of comments the definition and value of old growth; the amount of old growth retained, the effects of the Proposed Plan, the implementation of the Proposed Plan, and the lack of a map denoting old growth

Concern was expressed that not enough old growth would be retained in perpetuity on the Forest This concern was expressed by both local and nonlocal residents, Columbia River Inter-Tribal Fish Commission, The Wilderness Society, Washington Native Plant Society, Oregon Natural Resources Council, and in the Citizen's Multiple Use Alternative. These respondents felt that most, if not all, existing old growth should be retained in perpetuity The Citizen's Multiple Use Alternative calls for retention of at least half the existing old growth Columbia River Inter-Tribal Fish Commission called for retaining 10 percent of each timber type in old growth, Washington Native Plant Society recommended from 5 to 15 percent of each timber type. These groups also expressed concern that the amount of old growth retained throughout the general forest would be insufficient and dispersal distances too great to maintain viable systems and species

Concern was also expressed that too much old growth was being retained, and that only the minimum management requirement of old growth should be provided This concern was expressed by some local residents, local and other timber industry representatives, including Northwest Forestry Association, the Oregon State Department of Forestry, and in the Preferred-Plus Alternative. Northwest Forestry Association and others commented that the decision to retain 30 percent more acreage than needed for viable populations of wildlife species was not needed and at least requested more scientific rationale and discussion in the documents considering the effects on the timber allowable sale quantity (ASQ).

There were several comments that old-growth stands could not be maintained in perpetuity and that some replacement stands should be identified, or at a minimum, a

replacement stand procedure should be developed. There were also concerns voiced by the Oregon Department of Fish and Wildlife, the Oregon State Department of Forestry, and others about the quality of timber stands being identified as old growth, the definition of old growth itself, and the lack of old-growth maps in the Plan documents. The National Wildlife Federation and the Washington Native Plant Society recommended that the Plan distinguish between mature timber stands and old-growth timber stands and also between naturally evolved old growth and "managed" old growth The Columbia River Inter-Tribal Fish Commission requested that a list of the criteria for determining old growth be displayed in the Plan These groups, as well as the Wilderness Society and the Sierra Club, commented that the Plan discussion of the numerous values and importance of old growth were not adequately discussed in the draft planning documents They noted that old growth is the resource that is least available from other landowners and most difficult to replace, as rationale for increasing the amount of old growth maintained. The Washington Native Plant Society also requested that we address old-growth juniper stands and old-growth native grass communities

The analysis of the effects of the alternatives, especially the Proposed Plan, was criticized. The Washington Native Plant Society requested that the documents include a list of all species associated with old growth and a thorough evaluation of the effects on those species of reductions in existing old growth They called for a moratorium on the harvest of old-growth ponderosa pine and a discussion of the anticipated amount of old growth retained by timber type, as did the National Wildlife Federation The Environmental Protection Agency and the Columbia River Inter-Tribal Fish Commission requested more discussion of the effects on anadromous fish due to harvest of old growth adjacent to anadromous fish-bearing streams The Environmental Protection Agency also requested more information be displayed about the elevation of the old-growth stands retained The Columbia River Inter-Tribal Fish Commission disagreed with the assessment that a reduction to 20 percent of the existing old growth would be a "limited" effect and requested justification of that statement. The Fish and Wildlife Service commented that the Forest's assumption of 100 percent occupancy of old-growth units is unrealistic and requested analysis of effects using a more realistic assumption The Northwest Forestry Association stated that the scientific uncertainty and literature reviewed were not satisfactorily disclosed in the Draft EIS

In conjunction with the stated concerns about effects, several of these reviewers were dismayed that maps of existing and proposed old growth by timber type were not provided to assist them in assessing the extent of effects for themselves.

The Washington Native Plant Society supported the old-growth management area designation and made numerous recommendations for additional standards The Columbia River Inter-Tribal Fish Commission commented on the number of exceptions which would allow harvest or management of old-growth stands and recommended that the Forest designate replacement stands to ensure that adequate amounts of old growth would be retained Western Wood Products Association and others recommended that old-growth allocations be overlapped as much as possible with other compatible allocations such as Bald Eagle Winter Roost sites and riparian areas

Forest Service Response

A wildlife and fish management goal is to manage habitats to ensure the existence of viable populations of all resident species This goal is extracted from the National Forest Management Act of 1976 (NFMA) which defined a viable population as "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence and is well distributed in the planning area" NFMA also directs national forests to "provide for diversity of plant and animal communities" Attention has focused on old-growth forest communities and dependent species because they are the most threatened of existing communities on the Forest Without dedicating old growth (habitat), complete harvest of old-growth stands in general forest lands could occur within approximately 30 years

Old-growth stands generally represent successional stages for an area Forestry terms such as "mature" refer to tree growth and economic management considerations (Smith 1962), and mature is usually a mid-successional stage Old-growth forests have often been described by foresters as "overmature "

Information on vertebrate species-habitat relationships is presented by Thomas et al. (1979) At least 25 bird and 10 mammal species use large trees, cavities, or cracks in the bark that are characteristic of mature and old-growth forests

Pileated woodpecker and pine marten were selected as indicator species of old-growth forest Suitable habitat for these two species were identified using spacing, size and habitat suitability criteria. Pine marten sites were located every 4,000 to 5,000 acres and pileated woodpecker sites every 12,000 to 13,000 acres. Whenever possible, sites were placed within wilderness, other no-harvest areas, and in areas of reduced harvest levels, wherever these met habitat quality and distribution requirements Both pileated woodpecker and pine marten use mixed conifer old-growth habitat and hence there was an overlap in old-growth allocations for these two indicator species There was not a complete overlap, however, because pine marten occur only in mixed conifer and higher elevation forests, while pileated woodpecker are found also in ponderosa pine communities

Management requirements were not established for three-toed woodpeckers because the timber management strategy for lodgepole pine habitat will provide a significant excess of old growth Forest-wide Furthermore, large acreages of old-growth lodgepole pine have been killed by mountain pine beetles, which precludes current designation in many areas It will be an estimated 40 years before about 26,000 acres of lodgepole pine forest becomes suitable habitat for three-toed woodpecker, and future Forest Plan revisions will include consideration of that species Also, the Forest Plan (Section E) incorporates a management standard to identify any existing and potential old-growth lodgepole pine stands to meet management requirements for three-toed woodpeckers

The same potential old-growth units received consideration under each alternative Acres of old growth (Final EIS, Chapter IV, Figure IV-5), and percentage of old growth retained above management requirement level (0 to 50 percent), varied by alternative because of differences among alternatives in management emphases

Under the allocations of the Forest Plan (Alternative I) the Forest will maintain populations of dependent species at 30 percent above minimum viable levels This is in order to account for stands that have less than 100 percent occupancy rates, for risk associated with managing at minimum viable population levels (such as epidemic insect and disease risks), and potential losses from fire and windstorms There is certainly a lack of scientific data to support management requirements for old-growth species, and also a lack of current field data to verify how much of dedicated old growth is presently "suitable" versus "capable " The 30 percent figure is based on professional judgement In addition to wildlife habitat, old growth can provide diversity to the forest ecosystem and visual or aesthetic values across the Forest

The Management Unit Plans (currently being implemented) use the three-tier system with 240-year rotations for old-growth management (Final EIS, Appendix G) The 1987 Draft Forest Plan proposed to change management strategy to establishing dedicated sites where the required amount of naturally evolved old-growth forest is withdrawn from timber production Location of the stand does not change over time Based on public and agency comments, the Forest Plan retains the dedicated stands and adds replacement old-growth forest stands that are one-half the size of the dedicated old-growth units Replacement stands are to be located within one-quarter mile of dedicated stands, and will be managed under an extended rotation Management direction for old-growth areas (Management Area 13) is provided in Chapter IV of the Forest Plan Old growth will be retained on approximately 121,040 acres (8 percent of the total Malheur

National Forest), including about 47,690 acres dedicated within old-growth management units that are distributed across the general forest, and 4,040 acres in bald eagle winter roost areas.

Non-forest communities have been altered by livestock grazing for over one hundred years and present vertebrate species have adapted to a grazing disclimax The Shaketable Research Natural Area (RNA proposal) includes lower elevation sagebrush-grass with some juniper, and the proposed Dixie Butte RNA includes subalpine sagebrush-grass These areas contain old-growth plant conditions for the above mentioned plant communities

RECREATION

Comment Summary

The public commented that not enough priority was given to recreation in the Proposed Forest Plan. Fishing, camping, horseback riding, and other outdoor activities are important to the users of this Forest They told us that they want the Forest to provide a high-quality recreational experience. Some respondents were critical of our assumptions about recreation values and future demands They maintained that there had not been an adequate prediction of the potential increase in employment in the tourism and recreation business, that recreational activities were undervalued, as compared to other resources, and that an aging population would be demanding more developed sites than that what was predicted Some commented that they agreed with the proposal to change 14 developed campgrounds to dispersed camping areas, while others maintained that the campgrounds needed improvement and the Forest could use at least two more developed recreation sites Several respondents cited the strong leadership role that the Forest should play in strengthening the economic base of Grant and Harney counties

Off Road Vehicle Use/ Motorized Recreation.

There was concern about motorized recreation on the Forest. Many respondents did not like the amount of motorized recreation that the Forest proposed to provide The concerns were especially strong regarding semiprimitive motorized recreation. Some respondents noted that the Proposed Forest Plan fell short in meeting demand for semiprimitive recreation by the fifth decade Others said that off-road vehicle use should not be allowed in "roadless areas," that there was adequate opportunity for such use elsewhere on the Forest. Still others said that off-road vehicle use should be banned from the Forest Commentors maintained the need to address the topic of off-road vehicle use more explicitly, the need to designate specific use-areas, and that there should be more clarity used to identify the impacts on soil, water, vegetation, cultural resources, and other impacts

Winter Recreation.

The public responded that too little emphasis was placed on winter recreation and that the Forest had a role to play in helping the counties expand the recreational season of use into winter. There were suggestions for designated winter sports areas, requests for snowmobiling corridors through big-game winter ranges, and generally a desire for more specific information about how the Forest intends to plan for and manage increasing winter recreation use

Hunting·

Hunting is an extremely important use of the Forest for many of the respondents The effect of timber management activities on hunting opportunities was a major concern Some respondents stated that the Forest should maintain roadless areas to protect big-game habitat, escapement, and a quality hunting experience. Others said that the Forest should not limit their opportunity to hunt by keeping areas roadless. Some respondents did not like to hunt in areas that had received timber management treatments Others thought that more areas should be managed for timber production and other resources and provide a quality hunting experience with seasonal road closures

Forest Service Response

In preparing the Proposed Forest Plan, the Forest completed an analysis of the current level of recreation activity on the Forest and made projections of future use. Estimated recreation use figures from our Recreation Information Management (RIM) records were used, as well as hunting use statistics prepared by Oregon Department of Fish and Wildlife These current use figures were then expanded by the projections of growth in recreation demand outlined in the State Comprehensive Outdoor Recreation Plan (SCORP)

The information used for projecting recreation demand was the most current and accurate available The Forest did not have the means to conduct separate analysis to develop more refined information than that already available

Concern was expressed that the Forest did not adequately predict the potential increase in employment in the tourism and recreation business Projections were made on the basis of statewide trends in population growth and dynamics This does not account for site specific changes that could affect local economic conditions.

Changes made between the Proposed and final Forest Plans are believed to be more responsive to recreation trends and expressed user desires Additional developed recreation facilities have been proposed, including a new campground in the Austin area that would provide recreation vehicle (RV) hookups and showers This facility would be designed to accommodate both the bicyclists along a national bikeway and the contemporary camper looking for full facility campgrounds (Forest Plan, Appendix A, Table A-1).

In the dispersed recreation area, the Forest proposes the addition of 200 miles of groomed snowmobile trails and as much as 75 miles of designated off-highway vehicle (OHV) trails

The Malheur National Forest has great potential for providing a wide range of recreation opportunities It is the intention of the managers of this Forest to work with our customers, the Forest users, to develop partnerships that will capitalize on this potential In so doing, visitors will have memorable experiences and the local economies will benefit from the influx of recreationists

Off Road Vehicle Use/Motorized Recreation

The intent, in the Forest Plan, is to provide for a wide spectrum of recreation opportunities on the Malheur National Forest This spectrum was determined by current use and anticipated demands Motorized recreation is believed to be one legitimate use within this spectrum of opportunities

There are recreationists who are looking for recreation opportunities in a semiprimitive environment with and without motorized vehicles Conflicts often arise between the motorized and nonmotorized recreationist, particularly in a semiprimitive setting With this knowledge, separate areas to accommodate the difference in user preferences are established

According to Forest projections, sufficient lands have been allocated to meet a 50-year demand for recreation opportunities in a semiprimitive nonmotorized setting. The same is not true for the semiprimitive motorized needs There will be sufficient space to accommodate the demand for motorized recreation in other settings, such that concern over resource conflict is not anticipated

The trend is to move away from indiscriminate use of off-road vehicles, and to develop designated trail networks These trails may be specifically designed for off-highway vehicles and/or they may utilize local roads that are closed to larger vehicles. The Forest will be developing these designated networks to meet user demands The exact location of all of these facilities is not known at this time, they will occur in areas designated

for motorized use At the time individual trail networks are developed, environmental analysis will be completed to assess the impacts to various resources, and designs will be implemented that minimize these impacts

Winter Recreation

An increase in dispersed winter sports activities on the Forest is anticipated In the budget proposal for recreation, funding was built in to increase staffing in recreation management so as to be responsive to and work with user groups such as the snowmobile clubs and nordic skiers

Specific dispersed winter sports areas or trails have not been identified, as these are still developing These facilities will be located where they are most compatible with other resources. Provisions were made in the Forest Plan to add 200 miles of snowmobile trails and 50 miles of nordic ski trails to the existing trail network

Hunting:

The Forest Plan has been revised to provide additional areas where roads will not be developed and areas where roads will be closed to motorized use. Lands that will remain in an undeveloped state and closed to motorized access were increased from the Proposed Forest Plan to the final Forest Plan Additional acres were added where the roads will be closed following project needs Most of these acres are in areas that will be allocated to wildlife emphasis strategies

There will also be an increased emphasis, in the Forest Plan, on closing local roads to meet big-game habitat requirements

Additional seasonal closure areas were not identified in the plan, this does not mean that the option for additional seasonal closures is foregone If specific proposals are brought up in the future, the Forest is willing to consider the additions based on public support and administrative impacts.

RESIDUE/FIRE MANAGEMENT

Comment Summary

Concern was expressed by many local residents, one State agency, and grazing permittees that too much slash is being left following timber harvest activities. These individuals feel these slash levels are unsightly, hinder livestock grazing, hinder big-game passage, cause recreationists to abandon areas, contribute to insect and disease epidemics, provide a fire hazard, and/or cause other resource problems One comment was received concerning the lack of guidance in the Proposed Forest Plan for the habitat requirements of non-game wildlife species dependent on down, woody debris Several respondents questioned the lack of recognition of the relationship between slash and long-term site productivity

Many respondents supported an increased use of prescribed burning as a management tool, not only for slash reduction, but to reintroduce the natural role of fire in the ecosystem. There were a few comments, both in favor of and opposed to, allowing fire to play a natural role in wilderness There were some concerns expressed about the effect of burning on air quality

Forest Service Response

There is a fine balance between the amount of residue needed for wildlife and site productivity, and excess residue needing modification or removal for fire protection, insect/disease control, and animal movement. The Forest fuels standard is to reduce the fuel loading, at the lowest possible cost, to a level that will minimize the potential of catastrophic wildfire. The system for determining the amount of residue needing removal for fire protection will be guided by the National Fuels Appraisal process.

The Knutson-Vanderberg Act under the Sale Area Improvement Plan, deals with the removal of unwanted residue for resource objectives such as range improvement, wildlife habitat improvement, and site productivity enhancement

As identified in the Forest Plan, utilization will be a high priority in residue management There will also be an increased use of prescribed fire to eliminate unwanted residue. This should increase big game and cattle movement, and stimulate forage production. Prescribed fire may also be used as an effective tool in reducing insect and disease problems

The effect of all this should be a cleaner, more aesthetically pleasing Forest Developed after and tiered to the Forest Plan, will be an additional plan which will give specific directions on how fire and fuels will be managed on the Forest This has been referred to in the Forest Plan as the Fire Management Action Plan

RIPARIAN

Comment Summary

Most of the public comments on riparian zone management can be grouped into three categories (1) comments about the analysis, data, documents, and process, (2) comments about alternatives and management strategies, primarily Alternative F (the Preferred Alternative identified in the Draft EIS), and (3) comments about the "amenity" values of riparian zones

The Environmental Protection Agency, Fish and Wildlife Service, Confederated Tribes of the Umatilla Reservation, and various interest groups (Trout Unlimited, Oregon Natural Resources Council, etc) were very critical of the data used, the analysis performed and processes followed, the adequacy of the documents, and the lack of geographic specificity in the Forest modeling process They stated that standards were too general and the monitoring plan was insufficient to protect riparian resources

There was criticism of the riparian zone classification into satisfactory and unsatisfactory The inventory process was not seen to be well-documented Additional information about the total number of miles inventoried, and the criteria used, etc was requested by Trout Unlimited, the Columbia River Inter-Tribal Fish Commission, Oregon Natural Resources Council, the Oregon Department of Fish and Wildlife, and others Specific comments cited a riparian habitat evaluation procedure developed under the auspices of the Oregon/Washington Interagency Wildlife Committee ("Managing Riparian Zones for Fish and Wildlife in Eastern Oregon and Eastern Washington") which Regional Forester Worthington approved, this Forest did not use the Interagency Committee's procedure

Most comments about the proposed management strategy for riparian zones consisted of expressions of dislike and there was considerable opposition to the practice of clearcutting lodgepole pine by Trout Unlimited, Columbia River Inter-Tribal Fish Commission, Oregon Environmental Council, and individual respondents Some reasons stated for disliking the Forest proposal included expected decreases in water quality and increased sedimentation, decreased late season water flows, reduced visual quality in riparian zones, reduced fish populations, conflicts with big game and other wildlife, too much commodity production (grazing, timber harvest), and too little protection of amenity values Others objected to the lack of information about how riparian management proposals would be implemented

Many respondents said that riparian zones should be managed to emphasize the production of fish/wildlife, visual quality, and high quality water Trout Unlimited, Oregon Environmental Council, Columbia River Inter-Tribal Fish Commission, the Fish and Wildlife Service and others felt that riparian areas should be mapped, including identification of satisfactory and unsatisfactory stream reaches They requested that the desired future condition of riparian areas be described in terms of key vegetative species, condition and trend, woody debris objectives, streambank stability, overall condition of the watershed including uplands, and potential for fish habitat Water quality alone

was not seen as a sufficient indicator of riparian quality. These respondents generally supported maintenance or enhancement of the Forest riparian zones for "riparian" values. Various respondents said that livestock use, timber harvest, and/or roads should be curtailed or eliminated, especially in unsatisfactory riparian areas. Others, including the Harney County Court, supported these uses in riparian areas accompanied by the best management techniques available to protect the resources.

The Northwest Forestry Association noted that various environmental groups would be likely to attack the Forest's conclusions and requested a more complete display of the scientific uncertainty in linking timber management activities to water quality They stated that proper management, including sound sale design and mitigation measures, would produce high quality water and healthy fisheries. They also suggested a relaxation of standards on intermittent streams when water was not present The Western Wood Products Association also requested further documentation or explanation concerning potential effects of timber management on sediment production, increased water temperature and increased water quantity. They felt that the sediment index model was not clearly explained and that direct ties between effects and planned activities were not described They stated that the proposed management would not be likely to have a significant effect on water yield or quality. They further stated that road location was significant and should be controlled.

Forest Service Response

The management of riparian areas is not only one of the most controversial and sensitive issues, it is also one of the most intricately woven and complex resources to work with when establishing management practices Although they occupy only 4% of the Forest's land base, riparian areas are the most productive and biologically diverse areas on the Forest These areas provide important fish and wildlife habitat and often contain very productive timber stands and productive, lush forage in grazing allotments Their gentle topography makes riparian areas attractive for road location and, in the semiarid west, the combination of water and riparian vegetation attracts recreationists Because of the variety and sometimes conflicting nature of these concentrated uses, riparian areas have the greatest potential for resource-use conflict on the Forest

Public comment and continued concern for these valuable assets brought about many changes in management plans for riparian areas Specifically, Management Area 3 (Riparian) has been further subdivided into two new management areas These are, respectively, Management Area 3A (Non-Anadromous Riparian Areas) and Management Area 3B (Anadromous Riparian Areas) The scope of planning, designing, and implementing riparian habitat improvement activities differ between management areas The time frames for upgrading riparian areas into a desired future condition are 30 years for non-anadromous and 15 years for anadromous One other difference is to make land ownership adjustments which emphasize obtaining or maintaining federal ownership adjacent to anadromous fish habitat The descriptions and standards for each of these management areas can be found in the Forest Plan (Chapter IV, Section F)

Additionally, Forest-wide and management area standards have been rewritten to make them more specific and measurable (Forest Plan, Chapter IV, Sections E and F). Opportunities for improving standards pertinent to riparian area enhancement were significant in the Range, Roads, and Timber sections.

Changes in range standards include more restrictive forage utilization standards in riparian zones and suitable range lands (uplands).

Priority consideration has been given to those rangelands in unsatisfactory condition. Activity schedules displaying those allotments in unsatisfactory condition and the year all Allotment Management Plans (AMPs) will be updated can be found in the Forest Plan (Appendix A, Table A-10)

Changes in the road management standards have also been numerous. The most notable changes pertinent to riparian area management include

a Avoid locating roads in riparian areas while providing adequate local road access for management activities Minimize the density of open roads in this management by obliterating, revegetating, or closing unnecessary roads or any roads causing significant resource damage

b Design and maintain roads to protect fisheries values and riparian area habitat.

c. Provide seasonal closures during spring runoff when necessary to reduce sedimentation

Also, a review of the existing road system will be done and roads that no longer contribute to integrated land management objectives will be obliterated. Other road standards modifications will also have a beneficial effect on riparian area management (Forest Plan, Chapter IV, Sections E and F)

Increased emphasis on timber management standards (Forest Plan, Chapter IV, Management Areas 3a and 3b) will also play a significant role in riparian area improvements.

The net effect of all changes in riparian area management is to maintain shade, provide for streambank stability, protect water quality (especially in highly-sensitive areas), provide for a future supply of large woody debris, maintain a filter strip to prevent sediment from reaching the streamcourse, provide for visual quality, emphasize the production of fish and wildlife, and most importantly to ensure that management activities are subordinate to riparian-dependent resources

The monitoring plan has been expanded and revised to include more specific monitoring items and provide for a more definitive link to the implementation process (Forest Plan, Chapter V)

A riparian inventory will be completed for the entire Forest based on the process described in "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" (1979). This inventory procedure will be used to evaluate the present condition of riparian habitat, its potential for improvement, and provide a basis for establishment of riparian area habitat management objectives for all riparian dependent resources.

The 235 miles of "unsatisfactory" riparian areas as referred to in the Draft EIS have now been included in a revised and more complete Activity Schedule (Forest Plan, Appendix A, Table A-7) These 235 miles were derived from the Watershed Improvement Need (WIN) Inventory Watershed problems were identified (e g , unstable stream banks, gullies, etc.) which resulted in a classification of "unsatisfactory." Only a few miles of stream known to lack shade were included This inventory did not include wildlife and fisheries information (shrubs, shade, and fish habitat). These items will be addressed in the riparian area inventory scheduled for completion by 2000 The WIN projects are identified on a Forest-wide map which is available for review in the Supervisor's office, John Day, Oregon.

It was never intended that the previously identified 235 miles were the only problem areas on the forest and that a complete riparian area inventory had been applied The riparian inventory that will be implemented on the Forest will accomplish the following:

a. Identify and prioritize riparian areas where high riparian resource value potential exists.

b Evaluate riparian areas using parameters such as percent stream surface shaded, percent stream bank stability, percent streambed sedimentation, and percent grass, shrub, and tree cover

c Determine the site potential of each stream reach for vegetative response, the time frame required to attain the desired response, and the management prescriptions under which the objectives can be attained.

The new inventory will not include subjective terms such as satisfactory and unsatisfactory. However, these terms will still be used in describing grazing allotments. Allotments with riparian areas in unsatisfactory condition denotes either "basic resource damage or other resource damage" The following criteria apply to "basic resource damage"

a Maximum summer water temperatures are elevated above State standards or other approved criteria on class I or II streams and this is largely due to the loss of shade-producing vegetation in the allotment

b. Less than 80 percent of the total miles of class I, II, and III streams are in a stable condition where this is largely due to the loss of stabilizing streambank vegetation

c Gully development of sufficient size to lower the seasonally saturated zone and change in the plant community type is occurring

d. Soil condition rating on 25 percent or more of key areas is rated poor or very poor

Adverse impacts on resources other than the basic soil and water resources is "other resource damage" An allotment meets this classification when ten percent or more of its area has damage to vegetation that is in excess of planned use

Grazing allotments with riparian areas in unsatisfactory condition can also be identified when on suitable range, forage condition is less than fair with a stable trend

RESEARCH NATURAL AREAS (RNA)

Comment Summary

The Washington Native Plant Society (WNPS), an organization of botanists, made some of the most substantive comments on research natural areas They recommended that the Cedar Grove Botanical Area be managed as a research natural area (RNA) instead of a special interest area The Washington Native Plant Society also commented on our inventory and evaluation process for RNAs, specifically questioning if our inventory complied with Regional direction to evaluate potential sites for unfilled categories of plant associations They were strongly opposed to any livestock grazing in RNAs and, recommended revision of our RNA management standards, as did individual respondents They also maintained that the Forest failed to present a monitoring and surveillance plan to ensure the continued viability of our RNAs They requested that the Forest include a timetable for completion of survey and establishment reports and made specific recommendations for standards to be included in this management area

One individual recommended that project activities be deferred in any potential RNAs that was not proposed for designation under the Forest Plan, unless it was deemed unsuitable or unnecessary by the area ecologist The Nature Conservancy also requested that project activities be deferred or modified to protect the natural plant communities for further evaluation

Another citizen was dissatisfied that the proposed RNAs did not include any timbered sites outside of wilderness The point was that RNAs in a variety of timber sites could provide some controls for scientific study in the future The Washington Native Plant

Society commented that the Forest's assessment of cumulative effects on RNAs was inadequate and mitigation measures should be described.

The Nature Conservancy proposed a boundary adjustment to the McClellan RNA to better protect a rare plant The group also noted the potential of several other areas for research natural area status (Stink Creek, Shaketable, Dixie Butte, Utley Butte, Greenhorn Mountains, and Antelope Valley) There was generally endorsement of the three areas proposed for designation in the Proposed Forest Plan, including endorsement by the State of Oregon Division of Lands

Forest Service Response

Research is an important element of land use planning There must be a basis for determining the effects that human activities will have on the land To provide a basis for comparison, tracts of land on which natural features are preserved in as nearly an undisturbed state as possible, are set aside These areas are called research natural areas (RNAs) and are maintained for scientific and educational purposes These tracts mimic those lands that are presently allocated for extensive human activity The Pacific Northwest Regional Research Committee reviews the needs for RNAs and identifies candidate areas throughout the region

The Draft EIS identified one existing research natural area (Canyon Creek), and two proposed research natural areas (Baldy Mountain and McClellan Mountain) Since that time, several proposals have been made and four proposed RNAs have been brought forward into the Forest Plan These areas, in addition to the existing Canyon Creek RNA, are Dixie Butte, Baldy Mountain, Dugout Creek and Shaketable Mountain Cedar Grove Botanical Area was not considered as a RNA due to its limited size and primary value as a special interest area (botanical) Cedar Grove was set aside because of the unusual occurrence of Alaska yellow cedar trees, that can be viewed by Forest visitors On the other hand, RNAs should be areas that are typically representative of common vegetative communities, yet are presently being heavily impacted by human activities outside of the RNA Forest visitors are discouraged from impacting the RNAs

The Malheur National Forest inventory and evaluation process for RNAs is in compliance with Regional direction and coordinates closely with the Pacific Northwest Regional Research Committee which identifies and fills the needs for research natural areas The Malheur National Forest does not have a timbered research natural area outside of wilderness boundaries The regional need for timbered RNAs has been sufficiently met by the Wallowa-Whitman and Umatilla National Forests

The guiding principle in research natural area management is preservation Uncontrolled livestock grazing is not allowed Stock may be used expressly to simulate a natural large ruminant population Grazing is prescribed as a manipulative treatment for maintenance of a natural feature Physical improvements are generally not allowed, except those considered essential to research and educational purposes Some boundary fences in grazing allotments may be required The establishment report for each RNA will dictate a grazing management strategy

In response to public comment and recent evaluation, there has been a strong effort to revise and expand the monitoring plan A monitoring item for RNAs has been included (Forest Plan, Chapter V)

The areas now included in the research natural area program and the dates for completion of survey and establishment report follow

Area Name	Proposed District	Establishment Acres	Reports
Dixie Butte	Long Creek	105	1992
Baldy Mountain	Prairie City	2,850	1990
Dugout Creek	Prairie City	270	1990
Shaketable	Bear Valley	375	1994

Research natural areas will not contribute to the allowable sale quantity, grazing potential, or recreational opportunities on the Malheur National Forest. The establishment reports prepared for and approved by the Chief of the Forest Service will, by specific area, establish conditions to be retained and the monitoring required to assure that objectives are met Due to the preservation concept inherent in the management of these areas, adverse environmental cumulative effects are thought to be minimal or nonexistent. Establishment of these areas call for the removal of all disturbing activities.

ROADLESS AREAS

Comment Summary

The public was very concerned about the amount and kind of information which was made available for their review relative to roadless area management. The display of information in the Proposed Forest Plan was seen to be inadequate and biased. The State of Oregon comments were directed to the rationale for selecting particular areas for semiprimitive recreation or for development activities. They stressed that the Forest should evaluate the areas against criteria for recreation, not wilderness. The State also was concerned about an apparent lack of coordination with adjacent Forest designations and questioned the economic values of semiprimitive recreation, as did the Wilderness Society Comments noted that the presentation of the issue unnecessarily increased polarization of this issue. There appeared to be support from Associated Oregon Loggers, and other commodity interests, for development of management schemes for these areas that allow some type of timber management while retaining the natural character of the area This was often mentioned in conjunction with emphasis on managing for some other resource, such as wildlife There were several respondents who urged the Forest not to create de facto wilderness areas

Concerns about roadless area management included provision of quality hunting, winter range, and escape areas for deer and elk; maintenance of semiprimitive motorized recreation opportunities; maintenance of old-growth habitat, maintenance of key watershed values such as anadromous fishery habitat, downstream irrigation, and domestic water use, maintenance of snowmobile access; the cost of development versus the value of the timber; effects of management on the local economy; and desires to "resolve the wilderness issue."

The long-term supply of semiprimitive recreation opportunity and the potential future demand for such opportunities was a concern of the State of Oregon, timber industry associations, and other respondents Some respondents felt the demand was underestimated, while others felt it was overestimated.

Public comments also addressed the allocation of roadless areas. Comments indicated that the Proposed Forest Plan called for development of too many or too few roadless areas. Changes in allocation were also suggested for specific areas, as well as for all roadless areas as a package Oregon Natural Resources Council, the Oregon Department of Fish and Wildlife, and other respondents requested that all roadless areas be retained and/or managed as semiprimitive. Oregon Natural Resource Council recommended specific boundary changes to many areas

Associated Oregon Loggers, Northwest Forestry Association, Northwest Forest Resource Council, Western Forest Industries, and many other respondents requested that all road-

less areas be developed within the first decade. There were also numerous comments addressing a range of allocations between these recommendations

Forest Service Response

The disposition and future management of the currently inventoried roadless areas on the Malheur National Forest is a major issue and has generated a considerable amount of public comment As a result of the public concerns, Forest personnel developed a new process to review each roadless area, making an assessment of their attributes and opportunities Attributes and opportunities in recreation, wildlife, vegetation management, cultural resources, compatibility with adjacent non-Forest Service land management objectives, and unique natural features were examined An economic analysis was also conducted on each area to assess the economic values of managing timber on these lands. The Forest used the RPA economic values, assigned by the USDA, for non-commodity outputs in semiprimitive areas (Final EIS, Appendix B, Section IV). This data was developed with the public comments for each roadless area and used to make management proposals

As a result of this analysis the area assigned to semiprimitive management was increased from a total of 66,962 acres in the Proposed Forest Plan (Alternative F) to 79,854 acres in the Forest Plan preferred alternative (Alternative I) Areas have been assigned to differing management strategies, ranging from wildlife emphasis to semiprimitive nonmotorized recreation Timber harvest activities are allowed in wildlife emphasis areas, however, the harvest intensities will be dependent on the management objectives of the area All roadless areas within allocations that have scheduled harvest will be entered in the first decade A table displaying the management area acres by alternative can be found in Chapter II of the final Environmental Impact Statement (Table II-4)

Some comments were received that referred to the Wilderness issue being resolved by the 1984 Oregon Wilderness Bill and that we were creating de facto wilderness by allocating lands to a semiprimitive setting The allocation of lands for semiprimitive recreation opportunities is not related to Wilderness legislation The primary forms of recreation on this Forest occur in dispersed area settings as opposed to activities needing developed facilities It is believed that demands for a variety of dispersed recreation settings will continue into the future The allocations made for semiprimitive and wildlife emphasis settings are in response to the current and anticipated demands for recreation opportunities that these management strategies will provide

The existing wildernesses on this Forest will contribute to meeting that demand for primitive and semiprimitive settings, but they cannot be depended upon to provide for all of the demand Wilderness, by legislative definition (1984 Oregon Wilderness Act), is an area where change occurs by natural process unaltered by human activities Recreation use of wilderness is an acceptable use as long as it does not accelerate the rate of natural change Forest Service management of wilderness is based under a nondegradation policy If recreation use is causing degradation of the wilderness, that use will be reduced to a level where degradation no longer occurs. The tolerance for evidence of human activities in semiprimitive and wildlife emphasis areas outside of wilderness is greater, thus providing a greater capacity for recreation use

ROAD MANAGEMENT

Comment Summary

The Oregon Department of Fish and Wildlife, Oregon Natural Resources Council, and the public expressed concern about the lack of a specific road use policy for the Forest as a whole, and for some resources in particular General concerns included a belief that road densities were too high, that local roads should be closed and put back into resource production immediately following timber harvest, and that in many cases road construction and maintenance standards were too high.

The greatest concern is the proposed roads policy in relation with big-game habitat and

hunting. Specific desires expressed include permanently or seasonally closing roads to enhance big-game summer and winter range. Included with this concern was increasing elk habitat effectiveness, providing elk escapement areas, and providing for a quality hunting experience (Non-Motorized).

Support for a specific road closure policy for elk habitat was expressed by the State of Oregon, Oregon Natural Resources Council, and much of the public, and was included by both timber industry and environmental organizations, as seen in the Preferred-Plus and the Citizen's Multiple Use alternatives.

Concern was expressed by Oregon Natural Resources Council and other commentors about the cumulative effects of road building on other resources such as water quality, late season flows, and sedimentation.

Forest Service Response

Management of the Forest road system is of particular concern to all individuals using the Malheur National Forest for livelihood or recreation. A transportation system offers access to recreation sites, hunting areas, campgrounds, mining claims, and timber sales However, road building may have a significant impact on all other resources within the Forest and must be planned, and managed, with all resource values considered

After reviewing public comments received and evaluating the present road system, the management direction for road building has been revised. This direction is considerably more extensive and specific

Roads will be planned, designed, and constructed to the minimum level necessary to meet integrated land management objectives (i e , the needs of all the resources). Forest-wide and management area standards (Forest Plan, Chapter IV, sections E and F) will provide direction on how this will be accomplished and how the transportation system will be managed.

The Forest Management Standards specify that nonclassified lands will be managed to meet stated Elk Habitat Effectiveness Index values In order to meet this specification, selected roads will be

a. physically closed with barriers, or

b opened to use by permit only, or

c opened to use for Forest Service administration only, or

d opened seasonally only, or

e obliterated.

A travel management plan will be developed, published, and used to document travel management restriction Project plans for projects requiring the use of roads will document project travel management restrictions Travel on roads will be monitored to establish compliance with restrictions and ensure that travel management objectives are being met.

Area or project level transportation planning will incorporate an interdisciplinary analysis of effects on soils (compaction, loss, puddling, or productivity), water quality (temperature and turbidity), water run-off (when, where, and how fast), and riparian areas (barriers created at crossings, loss of shading, sedimentation, and how best to avoid or mitigate) The cumulative effects on these resources of adding more roads will also be analyzed

Additionally, Alternative I (the preferred alternative) identifies 618 miles of new road construction by timber purchasers for the first decade This amount is fairly low, as compared to other alternatives This represents a reduction of 250 miles over the decade from what was identified in Alternative F (the preferred alternative in the Draft Environmental Impact Statement) Estimates of road reconstruction by timber purchasers did not change enough to be significant

SNAG MANAGEMENT

Comment Summary

Concern was expressed by Oregon Natural Resources Council, the Oregon Department of Fish and Wildlife and others, that the snag levels proposed in the Forest Plan were not sufficient to support viable populations of cavity dependent species. Some respondents also felt that large diameter snags would be gone within a short period of time and replacement trees were not being provided for to meet future needs Concern was also expressed that large acreages with only 20 percent snag levels would not meet distribution requirements Some Forest personnel also were concerned that the geographic areas being used to manage for and evaluate snag levels were too large

The State of Oregon recommended that the Forest manage for 60 percent of potential populations on general forest lands and 100 percent on all other forest lands. The Oregon Natural Resources Council called for 80 percent of potential on general forest lands and 100 percent on all other areas The Washington Native Plant Society called for a Forest-wide prohibition on snag cutting for fuelwood They expressed particular concern about the paucity of snags in the ponderosa pine forest community Oregon Department of Fish and Wildlife, Oregon Natural Resources Council and other respondents were concerned about the effect of the Forest firewood policy on the supply of standing snags

Forest Service Response

The National Forest Management Act requires that fish and wildlife habitat be managed to maintain viable populations of existing native species Habitat for these species will be provided to support at least a viable population of reproductive individuals, and be well distributed so that these individuals can interact Management of snag habitat capable of supporting at least 40 percent of the potential population of primary cavity nesters will maintain viable populations of these birds and secondary cavity nesters This will be the standard requirement for general forest areas (Forest Plan, Chapter IV, Section F)

Snag habitat must be provided within land areas no larger than normal harvest unit size (40 acres) These densities will be maintained through the full rotation on these areas by providing for green replacement trees that will become snags of adequate size when existing snags fall Snags will be retained in patches where possible, and patches should be no closer than 750 feet because of territories of cavity nesters (Forest Plan, Chapter IV, Section E)

In addition, snag habitat will be managed to support 60 percent of potential populations of dependent species in riparian areas, and natural population levels in old-growth areas, semiprimitive areas, wilderness areas, bald eagle winter roost areas, and unsuitable timber lands Forest management direction (Forest Plan, Chapter IV, Section E) also requires that fuelwood cutting is managed to ensure that wildlife tree management levels and objectives are met

SOCIOECONOMIC

Comment Summary

Nearly one-third of all the responses to the Proposed Forest Plan indicated that jobs and county revenues should be maintained Many of these respondents used the Citizens Multiple Use Alternative form to relate this concern

The production of ponderosa pine on the Forest was identified as a very important facet of the local economic picture by the Harney County Court, and by various timber com-

panies, industry and environmental organizations, and governmental agencies such as the Associated Oregon Loggers, Northwest Forestry Association, Northwest Forest Resource Council, the Sierra Club, Oregon Natural Resources Council, the State of Oregon, and others. Continued production of ponderosa pine from the Forest is beneficial for community stability because of the unique market position that ponderosa pine maintains. Opinions vary on the type of strategy that should be employed for ponderosa pine production from the Forest. Some respondents said that the Forest should reduce our harvest levels, which would result in sustained production of large diameter ponderosa pine, while others maintained that we should not reduce the harvest levels of ponderosa pine because of current market values

Resource outputs from the Malheur National Forest are very important to local counties. Grant and Harney Counties are currently considered to be the Forest zone of influence; Baker, Union, and Wallowa Counties have been proposed as possible additions to our zone of influence by various timber companies, ranchers, and others (particularly because of possible changes in demand for Forest timber as the Forest Plans in northwest Oregon are implemented)

The Forest resources are critical to the survival of local economies Respondents perceived the role of the Malheur National Forest differently, depending on their perspective. Some respondents see the Forest's role primarily as providing a sustained yield of commodity outputs which sustain existing industries and occupations Others see the Malheur National Forest as the drawing card for recreation-oriented growth and diversification of the local economies. They see the value of second-growth timber as questionable, feeling that it should not be counted on to support local economies in the future Others see the potential to maintain existing industries and still increase tourism and recreation

Oregon Natural Resources Council, and other respondents were concerned that below-cost sales may result in less mitigation, short-cutting, cost-cutting, and other concerns which could result in damage to Forest resources The respondents were concerned that emphasizing the production of mixed conifer species may result in more below-cost sales because of the lower valued material being harvested

Concern was expressed by several respondents about the proposed Forest budget, and what actions will be taken if the Forest budget is not adequate for the Plan implementation. The State of Oregon requested that the Forest specifically address the likelihood of funding for various programs and the impact of a less-than-fully funded budget.

The State of Oregon; various timber industry organizations such as the Western Forest Industries Association, Columbia River Inter-Tribal Fish Commission, Oregon Natural Resources Council, and others expressed comments and concerns about our demand analyses for timber, recreation, fisheries, wildlife, etc Associated Oregon Loggers and the Northwest Forest Resource Council questioned the economic assumptions used for future projections of timber values

Many respondents expressed concern for what the Malheur National Forest will be like for future generations. Their concerns range from the provision of timber-related employment opportunities to recreational opportunities (hunting, fishing, sightseeing, etc.) for future generations.

Community stability was a concern of many respondents, although opinions varied on how to promote community stability Some respondents believe that a sustained yield of ponderosa pine equates to community stability, while others think that diversification of the local economies (i e , increased recreation-oriented opportunities, etc.) should be the emphasis. Some respondents opposed any Forest Service consideration of community stability as a factor in decision-making They stated that this was not the responsibility of the Forest Service.

Forest Service Response

The Forest has been an important source of employment and revenue for local residents for many years, many of the residents in Grant and Harney Counties are dependent upon products from the Forest (e g., forage, timber) for the maintenance of their lifestyles In making resource management decisions, probable effects upon the local economies were considered (Final EIS, Chapter IV, Section C).

Modifications to Forest-wide standards have been made to provide more emphasis on the production of ponderosa pine from the Forest (Forest Plan, Chapter IV, Section E) Ponderosa pine volume harvested under this Forest Plan will be less than recent harvest levels In future planning periods, the volume of old-growth ponderosa pine available for harvest is anticipated to further decline simply due to the historical heavy emphasis on ponderosa pine harvest The importance of ponderosa pine to the local economy is addressed in the Final Environmental Impact Statement (Chapter III, Section C), Ponderosa pine volume by alternative is displayed as an indicator of response for resolution of the timber management issue (Final EIS, Chapter I, Section K and Chapter II, Table II-12)

The Forest zone of influence was determined to be Grant and Harney Counties in 1981, using criteria still considered valid Although changes in historical timber sale purchase patterns in the last 1-2 years have occurred, conditions over the last decade are indicative enough to project a zone of influence for the next 10-15 years When considering effects on local economies, discussions have been brought forward on the importance of the Forest to adjacent counties (Final EIS, Chapter III, Section C) A review of the Forest's zone of influence will be done during the next planning cycle

The importance of the Forest to the local communities is realized, including the supply of raw materials for commodity production industries and the availability of recreational opportunities to all types of recreationists (i e , local and nonlocal) In the resource management decisions for the Forest Plan, there is necessarily a concerted effort to balance commodity production with the maintenance of amenity-oriented experiences (i.e , wildlife and fish emphasis, dispersed recreation experiences, etc) Management of the Malheur National Forest is intended to provide raw materials to support commodity production industries that are the current base for the local economies, while maintaining the character of the Forest in a manner that will appeal to dispersed recreationists (Final EIS, Chapter IV, for a complete analysis of the effects of Alternative I (the Preferred Alternative).

The Forest has reviewed the economic assumptions on second-growth timber The basic assumptions have not been changed, key assumptions include 1) markets will be available for smaller diameter logs from the Forest, and 2) prices paid for stumpage will vary by diameter of the logs offered (i e , existing price-diameter relationships will be effective in discounting the relative value of smaller diameter material - see Final EIS, Appendix B).

Forest-wide standards will be followed during all phases of project planning, design, and implementation. These standards do not permit "less mitigation, short-cutting, cost-cutting, etc ," which might result in damage to Forest resources (Forest Plan, Chapter IV, Section E). Additionally, revisions to strengthen the monitoring plan (Forest Plan, Chapter V) are provided, with additional measures to ensure that project activities do not result in resource damage Also, greater emphasis will be placed on the production of ponderosa pine from areas of the Forest that have historically produced ponderosa pine (Forest Plan, Chapter IV, Section E) This is a long-term strategy and the results will not necessarily be realized for many decades

The chapter (in the Forest Plan) that discusses implementation (Chapter V) and the Forest Budget has been revised These revisions include more specific discussions of "key output-budget" relationships which are especially sensitive to the Forest budget, and the impacts to the Forest if these programs are not fully funded The monitoring

plan has also been revised (Forest Plan, Chapter V) to increase monitoring activities for the actual Forest budget relationship to the planned Forest budget (including program monitoring) A discussion of funding potentials for various programs is not considered appropriate at this point, considering the role that Congress plays in determining program appropriations and emphases for the Forest Service.

The Forest has reviewed the comments and suggestions on demand analyses, and has incorporated some suggestions on clarification. The analyses in the Draft Environmental Impact Statement are believed adequate for use in the Final Environmental Impact Statement and Forest Plan; new analyses for these resources in future planning efforts will be undertaken

Concerns about the future condition of the Forest and the relationship to existing lifestyles have been considered in making resource management objectives. The Forest Plan will chart a course of action that is intended to provide for sustained outputs of products and opportunities from the Forest (Forest Plan, Chapter IV, Section C)

Community stability concerns have been considered in establishing resource management objectives They are intended to show consideration to all opinions and management philosophies of the respondents. In making recommendations for resource management, the Forest looked for a balance in resource programs and outputs, ones which would maintain or enhance the local communities that are nearby or dependent upon the Forest

SOILS

Comment Summary

Comments on soils addressed the Forest standards, monitoring, and information presented. Protection of the soil resource was important to all who commented on this topic The Environmental Protection Agency, Trout Unlimited, and others commented that the standards for soil protection were too general to assure adequate protection of the resource Many commentors expressed the opinion that clearcuts, especially on steep ground, would increase erosion, road construction and grazing were also considered to increase erosion Grant County Stockgrowers and other individual commentors suggested that more grass seeding be planned following timber activity to reduce erosion

The Environmental Protection Agency (EPA) and Western Wood Products Association noted that the discussion of sediment yield should be expanded to clarify the assumptions and methods used to derive the index used to compare alternatives Environmental Protection Agency and the Oregon Department of Fish and Wildlife recommended that information include a summary of the extent and location or mapping of high-hazard lands, a summary of management concerns and the risks of sedimentation caused by various activities They requested more emphasis on monitoring as a screening tool to determine allowable levels of activities and cumulative effects within a drainage basin

Forest Service Response

Soil productivity protection is a major consideration in all project level analysis The Forest-wide standards (Forest Plan, Chapter IV, Section E) have been revised to make them more specific and measurable These standards will be closely followed during project planning The environmental analysis process used in project planning will identify measures to be taken to mitigate adverse soil loss or impacts and identify several viable alternatives per project Activities that would significantly reduce soil productivity are not considered

Erosion is a major Forest concern since it is considered a permanent loss of site productivity. The National Forest Management Act (NFMA) requires that plans be developed in accordance with the Multiple Use Sustained Yield Act of 1960. The NFMA further requires regulations to be developed to ensure that there will not be "substantial and permanent impairment of the productivity of the land " Standards have been developed to maintain soil productivity and minimize erosion

Measures to reduce erosion are required in every timber sale contract Clearcutting on steep slopes, road construction, and grazing practices are all managed to minimize erosion Measures used to mitigate soil loss include water diversion structures (such as waterbars) and grass seeding (Final EIS, Chapter IV, Section C)

Seeding is a mitigation practice that is provided for in most timber sale contracts There are two types of seeding, erosion seeding and forage seeding (Final EIS, Chapter IV, Section 3) While erosion seeding is limited to areas of high erosion hazard, forage seeding can be applied anywhere there is a potential to grow forage for livestock production. As a minimum, erosion seeding is to be applied on 1) all disturbed soil within 100-200 feet of a class I, II, III, or IV stream or where eroded material could reach a stream, and 2) compacted skid trails with slopes greater than 20 percent In most cases, grass seeding on these sites, in conjunction with the normal waterbarring, provides sufficient protection against erosion It is common practice to forage seed all the disturbed soil that is not erosion seeded The only timber harvest units that are not seeded are regeneration units where tree seedlings are being established.

Sediment yields were developed by adjusting computations from the Modified Universal Soil Loss Equation (MUSLE) for Forest conditions and erosion factors The index values are used to compare planning alternatives The discussion of sediment yield in the Final Environmental Impact Statement (Appendix B, Section F) has been expanded to better describe the methods used to derive the sediment index

Soil mapping units and their management interpretation (i e , erosion hazard, compaction hazard, etc) are published in the Soil Resource Inventory and are available upon request at the Supervisor's office, Malheur National Forest, John Day, Oregon Management concerns and soil hazards are identified for each project in the environmental analysis process

Intensive soil monitoring is an integral part of the soil management program on the Malheur National Forest Significant changes in management practices have been made as a result of soil monitoring Discussions in the Final Environmental Impact Statement have been expanded to emphasize the importance of monitoring, (Chapters III and IV) The monitoring plan for the Forest has been revised and is now more specific and complete There is a monitoring worksheet for soil productivity included in the monitoring plan (Forest Plan, Appendix J)

SPECIAL INTEREST AREAS

Comment Summary

The Washington Native Plant Society (WNPS), an organization of botanists, made some of the most substantive comments on special interest areas The Washington Native Plant Society supported our proposed designations of the three areas as special interest areas, however, they did not agree with continuance of permitted grazing in these areas, especially the Cedar Grove Botanical Area They recommended that Cedar Grove be designated a research natural area, with livestock use excluded Also, they agreed with management strategies for mineral withdrawal and recreation use and they recommended that the Forest not expand the developed recreation facilities at Magone Lake

The Oregon Natural Resources Council (ONRC) recommended the Ice Cave on the Burns Ranger District should receive "total protection including no logging on the short trail " They also recommended that other small special interest areas be inventoried and protected in a undeveloped allocation. In addition, they suggested that "small pretty areas" should be recognized and protected under the "Special Interest Area" heading of their response

The State of Oregon (Division of Lands) supported special interest area recommendations, Alternative I (preferred) will maintain recommendations similar to that of the Oregon Natural Heritage Advisory Council (NHAC)

Two additional areas have been recommended for special interest management on Prairie City Ranger District. These areas include a "perched-water table" spruce bog, and a portion of the Sumpter Valley Railroad The historical railroad district was also identified by the Fish and Wildlife Service as a potential special interest area

Forest Service Response

Cedar Grove was not recommended as a research natural area since it was not needed to fill specific research needs. Cedar Grove covers about 100 acres, considerably less than the 300-acre size suggested for research natural areas. Rationale for not recommending this area as a research natural area is that it is a public interest area and the emphasis is to continue to encourage people to visit this unique botanical site. As a research natural area, Forest management would require restrictions on use, not encouraging recreational visits

Special interest areas are set aside for their uniqueness (historical, geological, botanical, zoological, paleontological, etc) Public enjoyment of these areas is encouraged. On the other hand, research natural areas are tracts of typical lands set aside for research purposes (Final EIS, Chapter II, Section B, Management Areas by alternative)

During the summer of 1989, the Forest began reconstructing the campground and day use facilities at Magone Lake This project has been designed to upgrade the facilities in the complex and to control the traffic within the site to minimize impacts This is not a site expansion project, most of the construction activity will occur within the limits of the existing site

The Forest has not designated any specific "small pretty areas" to protect via the Forest Plan standards Provisions have been made to identify these areas and record them so management allowances can be made to maintain their integrity

The Forest will develop a management plan for the Sumpter Valley Railroad The management plan will provide direction for preserving segments of the old grade. The Malheur National Forest, in cooperation with the Wallowa-Whitman National Forest, will be developing interpretive sites along the railroad A portion of the railroad (16 acres) along Oregon State Highway 26 from the Forest boundary to Dixie Summit will be managed as a special interest area

The 32-acre perched water table spruce bog, known as Fergy's Bog, will be managed as a special interest area on the Prairie City Ranger District.

FOREST STANDARDS

Comment Summary

Comments from the general public, other agencies, and in-service reviews centered on the general nature of the Forest standards Major comments from the State of Oregon, environmental organizations, and in-service reviews stated the standards were too vague, too general, and read like goal and objective statements or "motherhood" statements, rather than true, measurable standards One State agency expressed confusion regarding how the Forest-wide standards applied to individual management areas.

Respondents generally felt that for standards to be meaningful, they should be strengthened to provide clear on-the-ground direction There was also strong support from one in-service group and some State agencies for standards to be measurable and linked to the monitoring plan. They felt this would provide information on how well the standard was being followed and if it was meeting the management objectives for a given management area

Forest Service Response

Since publication of the Draft Environmental Impact Statement and Proposed Forest Plan, there has been an extensive interdisciplinary effort undertaken to revise the Forest

Plan Standards (Forest Plan, Chapter IV, Section E). These revisions include clarifications to make the standards more measurable, specific, and implementable Revising the monitoring plan (Forest Plan, Chapter V) will allow the scrutiny necessary to more closely evaluate how Forest Plan Standards are being applied

As stated in each section of specific Management Area Standards (Forest Plan, Chapter IV, Section F), Forest-wide management direction is applicable to each management area unless superseded by specific management area direction (i e., standards).

THREATENED, ENDANGERED, SENSITIVE SPECIES

Comment Summary

Commentators urged the Forest to make several additions or improvements to the planning documents to better address their concerns about this topic These suggestions include

a Specific standards for protecting and preserving the diversity of native plant communities on the Forest;

b conduct Forest-wide inventories for sensitive plant species (preferably conducted by field botanists), not just during project analysis, as a limited inventory does not give a complete picture of the status of the plant;

c list all species of concern on the Forest in the planning documents, reference was made to discrepancies between the State of Oregon listings and the species that were identified;

d include specific standards and a comprehensive monitoring program to assure protection of sensitive plant species such as *Luina serpentina*,

e include "information needs" concerning native plants in that section of the Forest Plan,

f provide detailed information about the effects of the Forest Plan on native species, specifically the effects of noxious weed introductions and the role of livestock

Forest Service Response

Timber harvest, livestock grazing, and recreation use will affect native species and plant communities Timber harvest will maintain relatively common forest communities in early and mid-successional stages, except in special management areas such as old growth or riparian Trampling by forest visitors in heavy use areas and road construction may impact plant communities The Forest has developed standards for protecting and preserving sensitive plant communities Livestock grazing may select in favor of more palatable understory plant species Plant communities within research natural areas (RNAs) are to be maintained in a natural state There are four research natural areas and a special use area (botanical) on the Forest They are described in the Final Environmental Impact Statement, (Chapter III, Section B) and management direction is provided in the Forest Plan (Chapter IV, Section F) Additional potential RNAs will be evaluated in the next Forest Plan revision

Threatened, endangered and sensitive plant and animal species are listed in Chapter III, Section D of the Final Environmental Impact Statement This list was extracted from a Region-wide list. Forest Management Direction in Chapter IV (section E) of the Forest Plan states that Forest-wide surveys will be conducted for sensitive plants This will be done by contract or by adding botanical expertise to the Forest staff Inventories will be done during the proper season for detecting species presence and estimating abundance. Additional data on sensitive plants has been added to the "information needs" section of the Forest Plan (Chapter II, Section E).

No management activity will be undertaken that will adversely affect a sensitive species population If necessary, critical habitats will be excluded from timber harvest activity, livestock grazing, or recreation use Collection of sensitive plants will be prohibited except by special permit (Forest Plan, Chapter IV, Section E). In addition, the Forest has included the need for data on threatened, endangered, and sensitive species on the information needs list in the Forest Plan (Chapter II, Section E).

Livestock transport seeds of noxious and exotic plants onto the Forest from adjacent lands during the growing season Seeds of these species also enter the Forest in road mulch, and in hay used for horses and bedding by hunters The Forest Service (Region 6) has entered into a memorandum of understanding with the Oregon State Department of Agricultural for the control and eradication of noxious weeds Present control methods include hand or mechanical treatment and biological control with insect predators

TIMBER MANAGEMENT

Comment Summary

Comments about timber management centered on the transition from a wild to an intensively managed forest There is strong public sentiment to maintain the present character of the Forest, with large diameter ponderosa pine as the predominant species on the Forest Support for maintenance of the existing Forest character, uneven-aged management, maintenance of ponderosa pine species, and associated issues was expressed by the Grant and Harney County Courts, environmental organizations such as the Nature Conservancy, Wilderness Society, and Sierra Club (Blue Mountain Group), and by timber industry organizations such as Associated Oregon Loggers, Northwest Forest Resource Council, Western Forest Industry Association, and Northwest Forestry Association The means of implementing and defining uneven-aged management and maintenance of ponderosa pine differed among these groups

These concerns were also a major portion of the State of Oregon's comments The State called for analysis of "uneven-aged (sic) management . to allow sustained production of clear-boled, insect resistant ponderosa pine with diameters of approximately 20 inches in rotation ages close to 100 years" Many respondents expressed a dislike of even-aged management in general, and clearcutting in particular, expressing the belief that uneven-aged management better protects all resources

The level of timber harvest was a concern of nearly everyone who commented on timber management Some respondents expressed concern about the 55 million board feet increase over the 10-year average sale program of 203 million board feet (1977-1986) Harvest levels at or below this 10-year average sale level were recommended by a coalition of environmental organizations as expressed in their Citizen's Multiple Use Alternative Other respondents said that proposed timber harvest levels were too low, and that all the available land base (particularly existing non-Wilderness roadless areas) should be available for timber harvest to provide local employment and payments to counties. Support for maintained or increased harvest levels (245 million board feet or higher annual allowable sale quantity) was proposed by the forest products industry and others who support the timber industry developed "Preferred-Plus Alternative"

Grant and Harney County Courts, Associated Oregon Loggers, Northwest Forestry Association, other timber industry respondents and various individuals, suggested that an increased salvage program is needed Grant County Court supported a departure from sustained yield to salvage insect infested and diseased trees The Bonneville Power Administration commented that the Plan did not adequately address the potential for utilization of biomass as an energy resource

Several respondents expressed concern about the assumptions used to develop the timber management parts of the planning model Others did not address specific technical aspects but expressed their concern in terms of support for long-term sustained yield.

Comments from individuals, other agencies such as the Environmental Protection Agency, the State of Oregon, and environmental organizations stated that the standards for timber management were too vague and were not measurable. It was suggested that standards also be more clearly linked to the monitoring plans

Forest Service Response

Timber, as a renewable resource, is of strong concern to all those with an interest in the Malheur National Forest Timber cutting plays a big role in the management of the Forest, because this activity has the potential to impact every other resource on the Forest After reviewing public comment and recent analysis, many changes have been made which affect the amount of timber sold annually, the types of harvests allowed, and where and when timber is cut

Uneven-aged management is felt by many who responded, to be the best management choice for preserving Forest character, maintaining sustained production of ponderosa pine, and providing the best possible protection of all resources Uneven-aged management will now be applied to the Malheur National Forest in the following ways

a Riparian Areas - All timber working groups in these areas (Management Areas 3A, 3B) will be managed emphasizing uneven-aged systems (Forest Plan, Chapter IV, Section F)

The entry schedule for uneven-aged management has been lengthened in the riparian areas On average, timber harvest treatment activity will occur on the same acres once every 40 years

When harvest does occur, the heaviest stands of vegetation will be left next to the stream where stream surface shading, wildlife, and fishery needs are critical More trees will be designated to be retained for wildlife and fisheries needs (i e , large woody debris, snag replacement trees)

b Visual Corridors - Uneven-aged management will be used in these areas (Management Area 14) to meet visual quality objectives for retention, partial retention and modification These objectives have been further defined, with ranges of tree sizes described to meet the desired condition (Forest Plan, Chapter IV, Section F)

c General Timber Harvest - Uneven-aged management in the General Forest (Management Area 1), Winter Range (Management Area 4A), and Wildlife Emphasis areas (with scheduled harvest, ie , Management Areas 20A and 20B) will provide, on average, two trees 20 or 24 inches in diameter at breast height (DBH) and five replacement trees 16-18, or 18-24 inches in DBH per acre, depending on the uneven-aged management strategy employed These intensive management strategies will be applied on the ground in two acre (or less) groups and on as much as 25 percent of the acres suitable for timber management Actual application will be determined after a site-specific evaluation to determine the best management prescription, based on biological and social objectives for an area (Forest Plan, Chapter IV, Section F)

As a result of applying uneven-aged management, there will be an increase, over time, in ponderosa pine to be grown and harvested from those acres receiving the silvicultural treatment. The ponderosa pine species more readily lends itself to easily-maintained uneven-aged management silvicultural treatments (Final EIS, Appendix E) than the other commercially important timber species found on the forest. Ponderosa pine has a greater potential to naturally produce an uneven-aged stand, is less susceptible to major insect and disease agents, and has a greater tolerance for fire and cutting activity damage Thus ponderosa pine will become more prevalent in those stands receiving the uneven-aged treatment

In Alternative I (the Preferred Alternative), there will also be an increase in the amount of ponderosa pine grown and harvested Forest-wide over time. However, the increase will be gradual, and the harvesting strategy will result in more ponderosa pine being harvested throughout all decades as compared to the Proposed Forest Plan (Alternative F) There will still be a decrease in ponderosa pine by the fifth decade, but less than in the Proposed Forest Plan (1987). There will also be a subsequent increase in ponderosa pine volume in future years, reaching 50 to 60 percent of harvestable volume in eighty to one hundred years

Favoring the ponderosa pine species will also result in the increased use of clearcutting the mixed conifer working group sites to achieve the desired species mix. This is due to the fact that ponderosa pine does not reproduce well under other species To keep clearcutting to a minimum, natural regeneration will be the desired or favored method of regeneration wherever possible, once a site-specific evaluation is made (Forest Plan, Chapter IV, Sections E and F). While it is necessary to minimize the adverse impacts of clearcutting, if they are determined to be the optimal harvest method, clearcuts will be distributed over time more evenly, rather than passed on to future generations for resolution.

After review of the Forest stand conditions, technical changes were made to the application of timber prescriptions inside the FORPLAN computer model have been made These FORPLAN model changes include. a refinement of the number of acres that are found to have a manageable understory (based on a review by watersheds, it was found that roughly 60 percent of these type stands could be managed Forest-wide, this average varying greatly from watershed to watershed), commercial thinnings were allowed to be scheduled for management, and uneven-aged management treatments are available to areas based on species composition and stand health.

Alternative I (the Preferred Alternative) also proposes several land allocation changes that will effect allowable sale quantity. After further review, based on knowledge of individual areas, public comments, and overall resource objectives, eight roadless areas, in total or part, will be kept roadless for recreation needs Two of these areas, Aldrich Mountain and Glacier Mountain, were enlarged to better meet management objectives. Four roadless areas are now assigned to Wildlife Emphasis Without Scheduled Harvest. Two roadless areas are now assigned to Wildlife Emphasis With Scheduled Timber Harvest Snags and snag replacement strategies will ensure that cavity nester habitat is retained at higher levels across the Forest. Alternative I also maintains 25,000 acres on an extended rotation as old-growth replacement stands

All of these changes will have an effect on the character of the Forest The objective is, where possible, to maintain the present appearance of the Malheur National Forest by providing more large diameter trees, emphasizing ponderosa pine, and retaining roadless areas, snags, old growth, old-growth replacement, and riparian areas The character of the Forest will be changed However, the overall objective is to maintain the natural beauty, while providing for commodity production and employment opportunities

The proposed allowable sale quantity (ASQ) will be reduced in both cubic foot and board foot measure from changes made in Alternative I (Preferred Alternative) Under Alternative I there will be a reduction of 6 MMCF per year and 34 MMBF per year in ASQ, in the first decade, as compared to Alternative F (Final EIS - Draft Preferred Alternative) This will result in an annual allowable sale quantity of 200 MMBF for the first decade

TRAILS

Comment Summary

There is widespread support from individuals, the State of Oregon, Oregon Natural Resources Council, and other organized groups for maintaining a high-quality hiking trail system across the Forest, especially in conjunction with backcountry areas. There is

concern about conflicts between motorized and nonmotorized use, with expressed desires to reconsider the uses allowed in specific areas (e.g., Malheur River, North Fork Malheur River) There is a high level of concern about a general nationwide trend to fewer trails on National Forest System lands and about the loss of existing trails on the Malheur National Forest due to logging and road building under the Proposed Forest Plan There were requests for more specific information regarding trail management under the Plan and opportunities to designate significant trails with historical value and interest

Forest Service Response

In response to the public comments, the Forest will make additions and changes to the Forest trail system in the Forest Plan The Forest proposes to construct 200 miles of snowmobile trails across the Forest, in addition to 10 miles of horse/hiker trail in the McClellan Semi-Primitive area Additional trails will be constructed as site-specific plans for managing semiprimitive and roaded natural areas are developed. Portions of the local road system and old railroad grades will be considered for designation for all-terrain vehicle/off-highway vehicle (ATV/OHV), horse/hiker, and nordic skiing use

Much of the existing trail system was developed many years ago when they were used strictly as a means of getting from one place to another The Forest will be assessing the relocation of portions of trails to enhance the recreation opportunities that the trails offer and also to reduce environmental damage and trail maintenance due to poor locations All of the trails that are currently maintained on the Malheur National Forest trail system will be retained

Many of the trails do not have acceptable trailhead facilities or access roads Several trailheads are listed in the capital investment program for the next 10 years The Forest will continue to work toward providing acceptable access and appropriate parking facilities for the trail system

The North Fork Malheur River trail was changed from a motorized trail to a nonmotorized trail in the Forest Plan, and on the Malheur River trail motorized use will be limited to two-wheeled vehicles

A detailed capital investment program for trail construction/reconstruction was developed and is displayed in the Forest Plan (Appendix A, Table A-2)

VISUAL RESOURCE MANAGEMENT

Comment Summary

There was a great deal of public comment about the proposed change in the visual character of the Forest under the Proposed Forest Plan Various respondents felt that we may be choosing the wrong corridors, be allocating too high or too low a standard, or underestimating the effect upon timber volume outputs Some suggested that we explore in detail the use of uneven-aged management or a "roaded natural dispersed recreation" type of management in place of some corridors Several respondents were supportive of increased slash cleanup to improve the appearance of the Forest

Oregon Natural Resources Council recommended more visual corridors, preservation of visual quality along trails and at trailheads, and refinement of the visual management strategy to leave more large trees per acre than proposed The Harney County Court supported maintenance of the existing old-growth ponderosa pine character along major Forest travel routes. The Columbia River Inter-Tribal Fish Commission and the Monument Soil and Water Conservation District stated that planning for scenic quality should do more than erect a facade along roadways. The Northwest Forestry Association and others who supported a Preferred-Plus Alternative, felt that areas managed for visual quality objectives of retention and partial retention, should be far more limited than in the Proposed Plan and the effects of such management should be more fully disclosed. They also urged more use of uneven-aged management to ameliorate visual impacts of timber management

Forest Service Response

There are some significant differences between Alternative F (the Preferred Alternative in the Draft EIS) and Alternative I (the Preferred Alternative in the Final EIS) in how the Forest will appear. In Alternative I, approximately 30 percent of the suitable forested lands will be managed under uneven-aged management prescriptions. These include areas managed under riparian zone prescriptions and the foregrounds of corridor viewsheds. There was very little change in the amount of area allocated to visual corridors (Management Area 14). The most significant change is the addition of ponderosa pine stands that are available to be managed under uneven-aged prescriptions.

In addition to the acres in uneven-aged management there will be 81,320 acres of wilderness, approximately 132,000 acres in semiprimitive nonmotorized, semiprimitive motorized, and wildlife emphasis allocations, and about 73,000 acres of dedicated and replacement stands of old growth

The combination of all of these allocations will create a mosaic of different intensities of vegetative management on the Forest. Certainly, there will be areas in the Forest where intensive timber management will dominate the character of the Forest, but the overall character of the Forest will change less dramatically than that presented in the Proposed Forest Plan

The National Forest visual resource management system was designed to maintain those areas in a visually pleasing condition that are most often seen by the visually sensitive public. All areas of the Forest are not under the same scrutiny by the visually sensitive public Therefore, areas were identified where the public is most sensitive to the scenic qualities of the Forest. These are primarily road and trail corridors and heavily used recreation sites. The area that can be seen or potentially seen, based on landform, will be managed to maintain a natural appearing to moderately altered character. Areas outside these visually sensitive areas will be managed with emphasis on resources other than the visual resource This does not mean that all acres outside corridor viewsheds will be heavily altered in appearance

In the foreground distance zone of the corridor viewsheds, the emphasis will help to create fairly open stands of large diameter trees, where possible, on 20-40 percent of the forested land at all times

WATER RESOURCES

Comment Summary

The Northwest Power Planning Council, Columbia River Inter-Tribal Fish Commission, Wilderness Society, Oregon Environmental Council, Fish and Wildlife Service, Environmental Protection Agency, State of Oregon Department of Environmental Quality, Oregon Natural Resources Council, Trout Unlimited, and the Monument Soil and Water Conservation District, as well as others, commented that the standards, monitoring plan, and information provided about watershed management and protection of water quality were too general and insufficient to protect this resource Reliance on "best management practices" (BMPs) without data to assess their effectiveness was not considered adequate mitigation or protection Cumulative effects of roading, grazing, and timber management individually and collectively were of serious concern to these respondents. For example, the 10-year timber sale program indicated numerous sales on tributaries to the Middle Fork of the John Day River within the next seven years, but the cumulative effect of these sales on this major river were not disclosed

The Northwest Forestry Association noted that various environmental groups were likely to attack the Forest's conclusions about water quality and quantity, and therefore requested further description of the scientific uncertainty involved in tying Forest management practices to effects on water They stated that they did not perceive a measurable risk of adverse impacts on water quality and felt that proper watershed management including sound timber sale design and mitigation measures would provide high qual-

ity water The Western Wood Products Association asked for documentation of the generalized statements that timber management increases turbidity and sediment water temperature and increased streamflow. They felt that the sediment index model was not adequately described and that timber management in riparian zones could have a positive effect on low flow volumes

The State of Oregon Water Resources Commission requested that the Final Plan reference their water use programs for the John Day and Malheur Basins commentors requested that information be provided to identify which streams were not currently meeting state water quality standards They also requested reasons for this situation, and the measures planned to correct the situation Identification of woody debris objectives for various stream types was requested as well as a description of the connection between those goals and snag potential requirements The State Water Resources Commission and other commentors said that the planning documents did not adequately address the impacts of the alternatives on runoff and streamflows during low-flow periods They stated that timber management activities would have significant impact on streamflow and peak runoff periods There are also numerous opportunities to affect both streamflow and peak runoff periods through watershed management activities and riparian management designed to improve water retention capability and raise water tables

Forest Service Response

Unlike other eastern Oregon Forests, the Malheur National Forest has numerous rivers and streams It is hard to walk for any length of time in the Forest without seeing several water channels of some type However, the amount and timing of running water in those channels fluctuates drastically due to the uncertainty of weather in this arid land A great deal of land falls within the zone of influence for all of these streams and with so much land influenced, virtually every resource activity will in some way affect the water resource

In response to public input and recent evaluation, the standards, monitoring plan, and management strategies have been rewritten to make them more specific and measurable (Forest Plan, Chapter IV, Section E and Section F and Final EIS, Chapter V, responses to riparian and fisheries public comments) Additional management standards have been included in Management Areas 3A and 3B (non-anadromous and anadromous riparian areas) The standards which specifically relate to and strive to improve water quality include·

a Protect instream flow on National Forest System Lands through critical analysis (via NEPA) of proposed water uses, diversion, and transmission applications and renewal of permits

b Achieve instream flow protection by.
(1) Filing protests with States where applications are made that adversely affect National Forest resources
(2) Asserting claims for this water under Federal or State laws where applicable
(3) Inserting protection measures into special-use permits
(4) Reaching formal agreements over use

The Forest also recognizes the purchase of water rights and impoundments as other means for reducing water quality impacts

In addition to improved standards, a riparian inventory will be performed on the entire Forest based on the process described in "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" 1979 This inventory procedure will evaluate the present condition of riparian habitat, its potential for improvement, and provide a basis for establishment of riparian area habitat management objectives for all riparian dependent resources.

The riparian inventory that will be implemented on the Forest will accomplish the following

a Identify and prioritize riparian areas where high riparian resource value potential exists

b Evaluate riparian areas using parameters such as percent stream surface shaded, percent stream bank stability, percent streambed sedimentation, and percent grass, shrub, and tree cover

c Determine the site potential of each reach for vegetative response, the time frame required to attain the desired response, and the management prescriptions under which the objectives can be attained.

The 235 miles of "unsatisfactory" riparian areas as referred to in the Draft Environmental Impact Statement is now included in the Forest Plan (Appendix A, Activity Schedules) These are backlog watershed improvement needs (WIN) projects. On an average 3 3 miles or 100 acres per year of backlog watershed improvement needs (WIN) projects will be completed These WIN projects have been prioritized on each ranger district Projects will be accomplished throughout the entire Forest by working through the district priorities from high to low These WIN projects have been identified on a Forest-wide map which is available for review in the Supervisor's office.

Cumulative effects is also of special concern when dealing with the water resource A Forest-wide analysis of cumulative effects is not sensitive enough to determine if individual watersheds will be adversely effected There have been a number of small watershed studies, typically 100 acres in size or less, where change in streamflow have been measured, (i e , before versus 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 watershed, where only one to two percent of the area is harvested annually This is due to vegetation re-growth in harvested areas.

In watersheds where project scoping identifies an issue or concern regarding the cumulative effects of activities on water quality or stream channels, a cumulative effects assessment will be made This will be undertaken in order to determine the effects of management activities on small subwatersheds throughout the Forest An issue that occasionally arises is one which addresses the effects of timing on water runoff within certain subwatersheds To facilitate an analysis, the Forest has been further divided into logical subwatersheds A harvest effects model will be applied which converts a range of harvest activities to a common factor and applies a recovery rate to simulate hydrologic or watershed recovery over time An interdisciplinary team composed of soils, watershed, fishery, and timber management specialists will perform an evaluation which will consider such factors as geology, soils, stream condition class, fisheries value (including potential), roads, timber type and grazing effects Timber harvest is the driving factor for cataloging watershed impacts Harvest activities alter the vegetation on a watershed bringing about changes in interception, snow accumulation and snow melt, soil moisture, infiltration, exposing mineral soil to erosion, potentially affecting water quality, quantity and timing

There are a number of other management practices either currently, ongoing or planned which individually help to retain water on the Forest for maintenance of summer low flow conditions Various methods are used to increase the infiltration rate so that the water percolates into the lower horizons of the soil profile or supplies water to the groundwater zone. For instance, leaving more slash on the ground is beneficial for the soil productivity, reduces the potential amount of soil compaction from tractor piling slash, and provides a roughness to the ground surface which may act as sediment traps/filters, and increase

the infiltration rate into the soil Soil monitoring is also done to ensure that excessive amounts of soil are not compacted, displaced, or puddled Other management practices used include grass seeding and watershed and fisheries improvement projects

Overall, the practices and changes in management strategies which protect or enhance not only the riparian areas, but the uplands as well, are looked at as a cumulative effort of maintaining streamflows throughout the year A healthy riparian area is one which can absorb water during the spring and make it available for streamflow during the summer. This is one benefit of improved livestock grazing and changes made in harvesting of timber in the riparian area

Upon review, the Forest has concluded that the the Forest Plan is consistent with the objectives and strategies of the John Day Basin Plan (i e , the Water Resource Commission Recommendations, section B2 which refers specifically to the Malheur National Forest) The John Day Basin Plan states that forest managers "should minimize impacts on stream systems by taking the following actions· 1) Block and revegetate Forest roads where appropriate, 2) Use existing road networks to the maximum extent possible in future harvesting, 3) Locate future roads outside riparian zones whenever possible, 4.) Design future roads for temporary use and to minimize effects of concentrated surface runoff, 5) Leave the maximum amount of harvest residues on site, consistent with other management practices, 6) Continue and expand efforts to improve livestock distribution and grazing management and develop watering facilities away from streams, 7) Continue and expand riparian protection and restoration efforts "

Management direction which appropriately responds to the above mentioned objectives can be found in the Forest Plan Most specifically, the Forest-wide standards (Chapter IV, Section E, Forest Roads and Trails) and Management Area Standards (Chapter IV, Section F, Management Areas 3A and 3B)

The Clean Water Act of 1972, Section 319, as amended in 1987, requires the State of Oregon to assess the current status of non-point source problems The State will determine those waters that will not meet the goals of the Act, to determine those non-point source activities that are contributing pollution, and to develop a process of determining best management practices to reduce such pollution to the "maximum extent practicable " The forest reviewed and updated the assessment of non-point water pollution problems in Grant and Harney County through interaction with the following agencies, Soil Conservation Service, Agricultural Stabilization Conservation Service, Grant County Extension Agent, Prineville and Burns District of the Bureau of Land Management, Oregon Department of Fish and Wildlife, and Grant Soil and Water Conservation District

The Forest Service has a long history of applied management practices utilizing a great deal of experience throughout all levels of the organization The research branch is continually focusing on research which is applicable to the person doing the job on the Ranger District Their mission is to perform research which answers questions generated in the field A large amount of water quality data has been collected and analyzed, and the findings have been used to address water quality and quantity issues This research has demonstrated that timber management activities can be performed with a minimum amount of adverse impact to water dependent resources, given proper application

The main goal of best management practices (BMPs) monitoring is to provide the resource manager with information regarding the effects of management activities on the water resource Best management practices are defined as. "Methods, measures or practices selected by an agency to meet its nonpoint source needs BMPs include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures Best management practices can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters." There are generally three accepted types of BMP monitoring (1) Implementation, (2) Effectiveness, and (3) Validation For additional information on best man-

agement practices, see Final Environmental Impact Statement, Appendix I and also the Forest Plan, Chapter IV, Section E.

WILD & SCENIC RIVERS

Comment Summary

Public response to the Draft Environmental Impact Statement and Proposed Forest Plan contained 70 responses commenting on the subject of wild and scenic rivers All called for consideration of Forest rivers for wild and scenic river status Many were critical of the plan for not adequately addressing the issue, feeling the Forest had not met the intent of the Wild and Scenic River Act by failing to review Forest rivers for eligibility. Some respondents "formally requested" that the Forest review rivers for eligibility.

Of the 46 respondents who listed specific rivers for possible inclusion in the wild and scenic river system, all but eight listed only the John Day, Malheur, and Silvies rivers. Other rivers receiving some mention included the South and Middle Forks of the John Day, North Fork Malheur River, Little Malheur River, Murderers Creek, Deer Creek (tributary to South Fork John Day), Myrtle Creek, Bear Creek, East Fork Canyon Creek, Crooked Creek, Pine Creek, and Calamity Creek.

Forest Service Response

During the comment period following the release of the Proposed Forest Plan, the Forest received several recommendations of waterways to be evaluated for eligibility under the Wild and Scenic Rivers Act. The Forest convened an interdisciplinary team to conduct an eligibility review of all major waterways, and any other waterways, that the public commented on. As a result of this review, two rivers were found to have outstandingly remarkable characteristics which meet the criteria for eligibility for the wild and scenic rivers system

In the 1988 Omnibus Oregon Wild and Scenic Rivers Act the North Fork Malheur and Malheur Rivers were designated as additions to the Wild and Scenic Rivers System The North Fork Malheur River has 25 5 miles designated as "scenic" from the headwaters to the Forest boundary The Malheur River has 13 7 miles designated, with the section from Bosonberg to Malheur Ford as Scenic and Malheur Ford to the Forest boundary as wild.

WILDERNESS

Comment Summary

The contribution of the Malheur National Forest toward meeting the national demand for wilderness in the long-term was a concern of several respondents, including the Columbia River Inter-Tribal Fish Commission, the Confederated Tribes of the Umatilla Indian Reservation and the Washington Native Plant Society The latter two groups expressed support for the recommendation of Pine Creek area for wilderness designation to meet that demand in the future and because of the unique attributes of that area.

Management of existing wilderness was a concern of several respondents. The Environmental Protection Agency commented that Goal #9 in the Proposed Forest Plan regarding wilderness was confusing and not easily definable. The Washington Native Plant Society raised several questions about vague language regarding insect and disease treatment in wilderness and supported the natural role of insects and diseases in wilderness. Other respondents urged us to consider alternatives which would declassify portions of existing wilderness and manage them for uses such as timber production The Wall Creek drainage of the Strawberry Mountains as well as Monument Rock Wilderness were specifically mentioned

It was suggested that the roads at Indian Springs campground and McNaughton Springs campground should be closed to reduce the volume of recreation use in the Lakes Basin Other respondents, such as the Columbia River Inter-Tribal Fish Commission, stated that the Forest would not need to regulate use if more roadless area was retained on

the Forest Still other respondents felt that little or no roadless areas would need to be retained if the Forest promoted more intensive use of the existing wildernesses

Forest Service Response

Wilderness is legislated by the Congress of the United States, therefore, it is not the prerogative of the National Forest to classify or declassify wilderness Those interested in classifying or declassifying wilderness, should contact the appropriate Congressional Delegation

The Pine Creek roadless area, designated a further study area, was evaluated for wilderness designation The area is not unique, in terms of its natural features, relative to other similar drainages on the Malheur National Forest It was proposed for wilderness designation only in Alternative C of the Draft Environmental Impact Statement, and the proposal received little public support It is brought forward into Alternative C-Modified of the Final Environmental Impact Statement However, under Alternative I (Preferred), it is not being proposed for wilderness in the Forest Plan

Comments were received that referred to the interrelationship between roadless areas and wilderness Reference was made that more roadless areas would reduce pressure on wilderness Conversely, other proposals were made to reduce roadless areas and promote more intensive use of wilderness Wilderness, by legislative definition, is an area where change occurs by natural process unaltered by man's activities Recreation use of wilderness is an acceptable use as long as it does not accelerate the rate of natural change In managing wilderness, the Forest will encourage the dispersion of recreation use throughout the wilderness, but this will not be promoting the intensive recreation use of wilderness The Forest will manage wilderness under a policy of non-degradation If recreation use is causing degradation of the wilderness, that use will be reduced to levels where degradation no longer occurs This could involve restricting motorized access to wilderness from the outside by closing roads to motorized use some distance before reaching the boundary The intent is to promote the spontaneous use of wilderness as free from regimentation as possible, therefore going to a permit system is viewed as a last resort for regulating use. The Forest will initiate educational programs to provide people with information about how to visit and enjoy wilderness without leaving a trace of their visit

Semiprimitive areas outside of wilderness do not have legislative restrictions, therefore the tolerance for evidence of man's activities is greater These areas expand the capability of the Forest to provide recreation opportunities in an unaltered setting This provides flexibility in managing wilderness by giving people options other than just wilderness to seek a setting that provides solitude far from the sight and sounds of human activity

Wilderness will be managed for natural processes to occur unaltered by man's activities There may be some exceptions where man may have to intervene in this process One such case could occur in the event of a major insect epidemic Insects play a natural role in the process of ecological change and their role will be untampered with in wilderness until such time where the continued expansion of the epidemic threatens to move out of wilderness onto lands with other ownerships and/or resource objectives If this occurs, steps may be taken to treat the insects to protect investments outside wilderness (Forest Plan, Chapter IV, Section F)

A second example of man's intervention could be planned ignitions They would be used to reduce unnatural buildup of fuels as a result of artificial fire suppression activities Such ignitions would be necessary to reduce the risk and occurrence of unnaturally intense wildfire within or escaping from the wilderness due to heavy buildup of fuels, which under natural conditions would have been consumed over time in several less intense fires The exact role of fire in wilderness will be defined in the Wilderness Fire Management Plan

D. Organizations, and People to Whom Copies of This Statement Have Been Sent

The following pages contain a listing of those who have requested copies of the Forest Plan, Final Environmental Impact Statement, Appendices, Maps, Overview and Record of Decision. Prior to the printing of these documents, those on the Forest Planning process mailing list were notified of the impending availability of these documents. They were given the option of receiving all/or a combination of the final documents



List of Recipients

The Malheur National Final Forest Planning Documents were distributed to the following agencies, organizations, and individuals Prior to the release of these documents for public review and comment, those on the Forest Planning process mailing list were notified of the impending availability of the documents It was their option to receive the Forest Plan, the FEIS, a FEIS Summary, the Appendixes, or a combination of these documents.

A. Elected Officials

U.S. Senator Mark Hatfield
U S Senator Bob Packwood
U S. Senator Dan Evans
U S Representative Bob Smith

B. Federal Agencies

Bureau of Indian Affairs
Bureau of Mines, Western Field
Federal Highway Administration, Environmental Program Manager
Fish and Wildlife Service
Office of Hydropower Licensing
U.S Dept of the Air Force
U D Department of the Army, Corp of Engineers
U S Department of Energy, Bonneville Power Administratio
USDA Forest Service
- Region 1, Missoula, MT
- Region 2, Lakewood, CO
- Region 3, Albuquerque, NM
- Region 4, Ogden, UT
- Region 5, San Francisco, CA
- Region 6, Portland, OR
- Region 8, Atlanta, GA
- Region 9, Milwaukee, WI
- Region 10, Juneau, AK
- Colville National Forest, Colville, WA
- Deschutes National Forest, Bend, OR
- Fremont National Forest, Lakeview, OR
- Gifford Pinchot National Forest, Vancouver, WA
- Mt Baker-Snoqualmie National Forest, Seattle, WA
- Mt. Hood National Forest, Gresham, OR
- Ochoco National Forest, Prineville, OR
- Okanogan National Forest, Okanogan, WA
- Olympic National Forest, Olympia, WA
- Rogue River National Forest, Medford, WA
- Siskiyou National Forest, Grants Pass, OR
- Siuslaw National Forest, Corvallis, OR
- Umatilla National Forest, Pendleton, OR
- Umpqua National Forest, Roseburg, OR
- Wallowa-Whitman National Forest, Baker, OR
- Wenatchee National Forest, Wenatchee, WA
- Willamette National Forest, Eugene, OR
- Winema National Forest, Klamath Falls, OR
- Pacific Northwest Experiment Station, Corvallis, OR
- Rocky Mountain Experiment Station, Fort Collins, CO

U S Dept of the Interior
U.S Dept of Transportation, Northwest Mountain Region
U S Environmental Protection Agency

C State Agencies and Officials	Rep Ray French Office of the Governor, Gov Neil Goldschmidt, Oregon Employment Division, Research and Statistics Oregon Environmental Council State Dept of Forestry, Resource Planning, Eugene D Timms, State Senate
D Local Agencies and Officials	County Court for Harney County Deschutes County Board of Commmissioners ECOAC Grant County Economic Dev. Committee Grant Administrative District Grant County Planning Commission Grant County Commissioner, Robert Holland Grant County Court Grant SWCD John Day Basin Council Mt. Vernon School District #6 Monument Soil & Water Conservation District *Prairie City Council* Union County Court
E. Indian Tribes	Burns Paiute Tribes Confederated Tribes of the Warm Springs Reservation Confederated Tribes of the Umatilla Reservation
F. Libraries, Colleges, and Universities	Central Oregon Community College, Librarian, Bend, OR Humboldt State University, Lee H. Bowker University of Oregon, Lands Coordinator, Survival Center Linda Hall Library, Documents Section Ohio State University, John G Lyon Oregon State University, Carl E Bond Oregon State University, Forestry Sciences Laboratory Oregon State University Library, Documents Section Treasure Valley Community College Library, Westfornet-South, Berkeley, CA Westfornet-North, Seattle, WA
G. Organizations and Associations	American Rivers, Inc. Associated Oregon Loggers, Inc Blue Mt Group, Sierra Club Central Coast Hunters Assn Columbia R. Inter-Tribal Fish Commission Grant County Bird Club Grant County Stockgrowers Assn *Harney County Chamber of Commerce* Harney County Stockgrowers Assn LaGrande-Union County Chamber of Commerce Lane County Audubon Society Morgrass Grazing Assoc. National Wildlife Federation Northwest Forestry Association NW Power Planning Council

Oregon Natural Resource Council
Oregon Rivers Council
Oregon State Snowmobile Association
Oregon Trout, Inc
Oregon Water Resources Congress
Oregon Wildlife Federation
Sierra Club, Legal Defense Fund, Inc
The Wilderness Society
Trout Unlimited of Oregon
Washington Native Plant Society
Western Forest Industry Assn
Western Wood Products Assn

H Businesses

American Moulding & Millwork
B & W International, Inc
Don Baack and Associates
Bishop-Roney Lumber Company
Black and Co
Blue Mountain Eagle
Bo-K Explorations
Boise Cascade Corp
Burns Clinic
Burns Times-Herald
The Campbell Group
Cascade Earth Sciences, Ltd
Chuetsu Pulp Ind Co
Continental Wood Products, Inc
Ellingson Lumber Co
Equitable Life & Casualty Ins
A Fillinger, Inc
Higgins Insurance
JAL Construction, Inc
John Day Lumber Co
Main Street Family Physicians
Management Advisory Services
Malheur Lumber Co
McPhillips Manufacturing Co
Metropolitan Lumber Company
O'Toole Cattle Co
OJI Paper Co , Ltd
Powne - Heller
Prairie Wood Products
Puget Sound Plywood, Inc
Rayner & Rinn Scott, Inc
Lebanon Animal Hospital
Simpson Timber Company
Snow Mountain Pine Company
Tallgrass Ranch
Teeny Nymph Company
Timber and Wood Products Group
Tom Giesen Consultant, Inc
Tree Timber Products Ltd
V-Dash Cattle Co
Wellons, Inc

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Mrs O L. Allison
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Vel Asher
Sally R. Ashley
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Phil Barney
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William D Cramer
Don Cross
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Kent D Cutting
Kathleen M. Danks
E L Davidson
Allen J Davis
Donald R. Davis
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Edly J Day
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Nathan Decker
Ruth & Harold Deery
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Craig Gorham
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Barry Greer
Jan Greer
Gary Gregg
Ralph Giuffre
Robert E Griffith
Wendell Gronso
Steven Gurnsey
Candice Guth
James B Haas
Floyd Habbe
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William Hammer
Al Hammill
Rod Harder
Roy Hathaway
Charles Hebard
Nelson Heckman
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Jon Huber
Joe Hughes
Sam Humbert
Ralph Hunter
Roy Hurst
Hal Hushbeck
Gregory C. Jacobsen
Louisa Jensen
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N. D. Johnson
Steve Johnson
Glen Johnston
Brian Jokela
Steve Jolley
David E Jolma
Donald C. Jones
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Laurie Jordan
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E E. Kazda
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Guy Keilman
Rocky Keith
Maureen K. Kelly
Alan Kelso
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Gary Kish
Edward J Klimko
Lloyd Knapp
D. R Knoll
John O. Koenig
Robert H Kono
Fred E Koontz
Frank L Krebs Jr.
Kurt S Kremers
Scott La Franchi
Jim Labbe
David Larson
Rosamond Laughter
Louise F. Lear
Arlie Leasy
Stanley J. Lenox, Ella Mae Lenox
John Leonard
R M Lesley
David M Liberty
Tim Lindenmeyer
Robert B Lindsay
Robert C. Lindsay, Joyce F Lindsay,
Dan Little
James Lowrie
Laine Ludwig
Linda Lynch
Mark R Malco
Dan Martin
Jerry Martin
Neil G. Martin
L M Mathisen
Rollie Mattson
Ken Maurer
Mark Mayo
Jim Mc Cann
Larry McCalden
Donald C.J. McElligott
Bernice McGee
Laurie Watson McGillivray
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Daniel McKenzie
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Thomas A McNeel
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Don Meacham
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Charles R. Montogomery
Howard J Moore
Linda J. Moore
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Paul Morgan
Robin Morgan
Steve Mullin
Alan & Jeanne Munhall
Shirley Muse
Alfred E Musgrove III
Jim Myron
Charles & Inez Nale
Richard Neafie
Bryan Nelson
Susan K. Nelson
Frazier Nichol
Gary A Nichols
Kay Nothaft
Barbara Jo Novitski
Jan O'Rorke
David Olp
R. M Orum
George & Rhonda Ostertag
Mike Overbay
Bob Owen
George W. Pace
Tom Partin
Sandra K Pattin
Gail Pearce
W. G Pearcy
Phil Peick
Suzanne Pepin
Ted & Pearl Perry
Harry A Peterson
Robert W Phillips
John L Phipps
Rance Pilley
Joanne Piper
Don Porter
Robert Portwood
Carl Powell
Larry Powell
Kevin Proctor
Gary Pryse
Mito Puderbaugh
Ed Pugh
George Purdy
Maureen Quinn
Charles Raines
Alta Ralls
Gretchen Randolph
Carl Rapp
Ron J. Rathbone
Dr Alfred G. Ratz

Leroy E Record
Roger A Redfern
Andrew P Reid
Louis Reinoehl
Lee T Rhoads
Cliff Rich
Tom Rickard
Leonard E Rider
Richard W Rieber
Elana Ripnitz
Jeffrey Ritter
Charles Roberts
Jim Robertson
Mr & Mrs. Rodney Robertson
Stan Rodgers
Louie Rogerson
George Lee Rondema
Dan Rooper
Michael Ross
Larry Roumpf
Louis V Round
Gerald Russell
Ken Rutherford
Gerald Sagert
Margaret Sagert
Mary Salabery
Roger Sanders
Don Sands
E Lee Sansum
Jerry L Schaeffer
Lila Schlavin
Lyle Schlavin
George Schlegel
Ralph Schoof
Kirk Schroeder
Duane Schwebke
Kenneth Scott
Lorraine Scott
Arthur D Scripture Jr
Ronald Seadschlag
Thom Seal
Darwin Secord
Marc K Sellers
Sandra G Shapiro
Melvin Shaw
Skeet Shepherd
Dan Sherburne
Robin Schrock Shissler
Dale Simon
Liz Sinclaire
James Sitz
Paul Smoland
Eugene R Spangler
Paul Spencer
Helen St Clair
Roy Stafford
Jess R Stalcup
Wendell Stalker
Thad C Standford, M D
Ray Stanley
Daniel Stein
Ross Stenkemp
E H. Stewart
Henry Stewart
J R Stiller
Brenda & Carl Stinnett
A C Stipe
Carl Stout
Karl G Stout
Loren Stout
Marilyn Stout
Lance H Stover
Richard B Stover
Rose Strickland
Donald O Strode
Marc Strong
Bruce Stuwe
Tim Sudbrock
John B Sutherland
Larry Svart
John R Swanson
Bernice Tannenbaum
Bruce W Taylor
Robert E Templeton
A Douglas Tennant
Paul Terdal
Evelyn L Terry
Frank Thompson
Joseph W Thompson
John V Toman
Raymond Torretta
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David Turner
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Charles P Van Epps
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Lyle Vickers
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Patrick Voigt
Diana Wales
George Walker Sr
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Alan P Wells
Ernest Wells
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Robert G. Wilson
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Arnold Wittrock

Arthur Woelk
Mr. M A. Wolf
Kenneth Wonderly
Katherina M. Woodward
Ralph Woodfin
James D. Wooton
Eric L Wright
Gino Zalundrdo

E Copies of Letters Received from Federal Agencies, Elected Officials, and Indian Tribes

The following pages contain reproductions of the letters and comments received, during the public comment period, from Federal agencies, elected officials, and Indian tribes



NEIL GOLDSCHMIDT
GOVERNOR



OFFICE OF THE GOVERNOR
STATE CAPITOL
SALEM OREGON 97310 1347

December 14, 1987

Chuck Graham
Acting Forest Supervisor
Malheur National Forest
139 NE Dayton Street
John Day, OR 97845

Dear Mr. Graham

Active participation in federal forest planning is a high priority for all Oregonians It is essential that the hopes, needs and ideas of Oregonians be incorporated into these important resource plans In that context, this letter provides the State of Oregon's comments on the Malheur National Forest Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (LRMP)

It is imperative to the State of Oregon that all federal land management plans be environmentally sound and provide stable, predictable supplies of commodities and amenities The state depends upon the Malheur National Forest for resources critical to Oregon's economy and environment These lands provide a significant share of the employment in Grant and Harney counties and of the revenues accruing to these counties In addition, the Forest contains critical watersheds and big game habitats, anadromous fish streams such as the John Day River and its tributaries, wilderness areas and recreation sites, and is the home of a multitude of wildlife species

The State's objectives for the management of the Malheur National Forest are twofold 1) that these lands be managed in an environmentally sound manner so that future generations have the same opportunities we do to enjoy the bounty the lands can provide, and 2) that these lands produce the flow of economic benefits that they have traditionally provided Our comments here focus on evaluating your resource management planning from these perspectives

All affected State agencies have reviewed the DEIS and LRMP In addition, we held a public meeting in John Day to hear, from the public, what issues relative to the proposed Plan were of special interest This letter and the detailed agency attachments highlight the State of Oregon's questions, concerns, and recommendations on these documents Please consider them in development of your Final Environmental Statement

Before sending this letter and the detailed agency comments to you, we made them available for public review. We received numerous letters advocating that the State take positions on different issues and also many substantive letters suggesting improvements.

Three comments we received deserve special mention: 1) Distress over our inadequate attention to the anadromous fishery in the John Day River drainage. We have made numerous additions to this letter to overcome that problem 2) Worry that our request for the Forest to take a longer look at unevenaged management and growing bigger ponderosa pine trees, if implemented, could cause a significant decline in the harvest level. We are only requesting information here so we can assess the trade-offs. We are not recommending any particular policy 3) Concern that our criticism of the elk habitat model could cause the Forest to switch to a model that assumes less compatibility with timber production. The Malheur has selected, without explanation, a habitat capability model different from the type chosen on surrounding forests and one that takes a simpler view of the determinants of elk habitat than recommended by the State Department of Fish and Wildlife. Since the Forest is somewhat out-of-step, we feel it should either justify its approach or use a more conventional one.

Also, your Forest graciously sent us corrections to our comments. We have considered them, the three points made above, and the many other suggestions we received on improving our comments when we produced the letter that follows.

THE STATE RESPONSE

We realize the tremendous effort that went into construction of the DEIS and LRMP and we appreciate your staff's help to us as we reviewed these documents over the last few months. The State of Oregon, however, cannot support any of the alternatives in the DEIS because they appear grounded on analytical assumptions that seem questionable and they do not fully provide the information that we believe is needed to make a reasoned decision.

With your help, we plan to construct our own State alternative for your Forest. We had hoped to do this during the comment period, but our difficulties with the analytical models that you employed and the data gaps that exist preclude our construction of that alternative now We still plan to construct a State alternative in the future and view this letter as a vehicle to help you understand our difficulties with your analysis and the additional data about your Forest that we need

The rest of this letter highlights the analytical problems and information needs uncovered by our State agencies In outlining the problems that they uncovered, we want to emphasize that we wish to work with you in a cooperative manner to resolve the difficulties described here Both the Federal Plans Coordinator and the agency contacts mentioned on the attached listing are willing to discuss these comments further and meet with you to explain our suggestions for clarification and improvement and to clear up any misunderstandings that we may have of your planning documents

We have organized our comments on your DEIS and LRMP into six major sections: A) development of alternatives, B) estimation of resource effects, C) estimation of economic effects, D) standards and guidelines for plan implementation, E) monitoring of plan activities and effects, and F) other considerations

A. Development of Alternatives

We are concerned that the Malheur's development of alternatives may have been unduly restrictive and may have overemphasized the conflicts between commodities, amenities and environmental protection We feel that a wider range of choice and choices that increase the compatibility of different land uses could be examined for four major outputs produced on the Forest 1) timber, 2) livestock forage, 3) minerals, and 4) anadromous fish

1. Timber Production

Wood processing based on timber harvested from the Malheur National Forest provides the overwhelming majority of manufacturing employment in Grant and Harney counties and a major portion of these counties' budgets A resource management plan that maintains this flow of economic benefits from timber production is a high priority for the State's involvement in planning for your Forest

The Malheur's alternatives are predicated on the widespread use of evenaged silvicultural techniques for timber production across the Forest. These techniques will result in a fundamental change in the vegetative composition of the Forest and its visual character over the next few decades People throughout Central Oregon have requested that the national forests there consider unevenaged management more seriously and *comprehensively than has occurred in the issuance of DEIS's As a result, two nearby* national forests, the Deschutes and Ochoco, have undertaken a substantial reconsideration of the potential for unevenaged management on their forests We request that the Malheur undertake the same reevaluation.

Embedded in the preferred alternative is the Malheur's decision to emphasize the management of climax species, such as the true firs, over early successional species on the mixed conifer sites that make up much of the Forest On sites where ponderosa pine currently exists as a natural, and often dominant, component of these stands, this decision has significant social, economic, and environmental impacts that have not been fully addressed in the DEIS Many State agency comments including the Oregon State Forestry Department (OSFD), the Economic Development Department (EDD), and the State Economist express distress over the possibility of losing ponderosa pine as a predominant species on the Malheur.

Ponderosa pine gives local primary and secondary manufacturers their competitive edge in the wood products industry In addition, maintaining ponderosa pine should reduce losses to defoliating insects and root and bole diseases, and is a prized home for many wildlife species.

The Malheur should more closely examine opportunities to maintain the high quality ponderosa pine component of its timber sale program throughout the planning horizon High quality pine does not necessarily mean old growth pine Intensive forest management methods and emerging technology in such areas as pruning, and the unevenaged management mentioned above, should be considered to allow sustained production of clear-boled, insect resistant ponderosa pine with diameters approaching 20 inches in rotation ages close to 100 years. Such production potentially could provide a continuing forest industry in forest setting that would maintain the unique character of the Malheur National Forest.

Maintenance of the visual appearance of the Forest along major travel routes is an important objective for the Forest Plan, but it is equally important that this objective be systematically varied between alternatives so that the benefits and costs of its attainment are revealed Because the Malheur retains a similar level and method of visual protection across most alternatives, the choices seem unduly restrictive. We suggest you consider varying the visual objectives more substantially between alternatives, and develop at least one alternative that does not contain discretionary visual objectives Please see the comments of *OSFD and the Division of Parks and Recreation for more details*

2. Livestock Forage

As detailed in the DEIS and LRMP, the economic viability of the ranches surrounding the Malheur is, in most cases, contingent on availability of forage from the Forest The nearby cow/calf ranching operations have for generations utilized these public lands as summer pasture, with home ranch properties devoted to irrigated hay production during the summer months for winter feed A change in forage availability from the Malheur could have a significant effect on local ranches and stability of local communities

For these reasons, our Department of Agriculture views with some concern the proposed reduction in permitted animal unit months contained in the draft Forest Plan While the reductions proposed are not large, they could serve to stifle future growth in the ranching *industry, a major contributor to the local economy*

The supposition that permitted grazing must be reduced over the life of the plan to facilitate restoration of substandard riparian areas needs more justification We support restoration of riparian areas as a high priority of the Forest Plan, and we understand that specific riparian areas may require reduced grazing or exclusion of livestock for a period of time to promote recovery of these important resources The Department of Agriculture believes that these practices, in addition to changes in grazing management, can improve riparian area conditions while simultaneously providing increases in forage. Also, the Department believes that development of watering facilities away from streams, placing salt and minerals away from riparian areas, and fencing to provide seasonal exclusion can also help improve riparian conditions

3. Minerals

The Malheur National Forest is currently the site of active exploration of a wide variety of valuable minerals In addition the Department of Geology and Mineral Industries (DOGAMI) has ongoing studies in the area of bentonite, limestone, talc, and zeolite whose production could impact the Forest Given the potential importance of minerals from the Forest, the DEIS and LRMP appear to lack the comprehensive inventory and analysis needed to support decisions about these resources While the metallic mineral coverage in Appendix F is excellent, it is not well integrated into the DEIS and LRMP and these documents also lack inventory data on industrial and construction minerals In addition, only one of the 10 alternatives in the DEIS (alternative B) lists how the alternatives would affect mineral production, and a discussion of potential revenue from future mineral production seems almost wholly lacking. We request that the Forest consider minerals as an integral part of each alternative and highlight their potential outputs, revenues, and costs more fully in the DEIS and LRMP. Please see the comments of DOGAMI for more details

4. The John Day Fishery

The John Day River system may contain the most important anadromous fishery in Eastern Oregon It supports one of the few remaining runs of wild spring chinook salmon in the Columbia Basin and also substantial summer steelhead runs. Because of the relatively small number of obstacles that the fish encounter on their way to and from the Pacific, the river system will always be a major source of Columbia Basin salmon and steelhead.

In addition, the Northwest Power Planning Council is undertaking extensive efforts to rebuild the runs of Columbia basin tributaries, emphasizing the preservation and restoration of natural spawning runs. In keeping with that goal, many thousands of dollars from the Bonneville Power Administration are being spent on your Forest to construct hundreds of instream structures for fish habitat improvement All of these factors support special recognition of the John Day anadromous fishery

Maintenance and enhancement of the John Day fishery must be a central focus of the Malheur Forest Plan To do this, all facets of management should be systematically examined Included in this discussion should be management choices for protection of riparian areas during logging and livestock grazing (as discussed above), alternative road building schemes, and different types and levels of instream investment. In all cases, this discussion should cover the predicted outputs and associated benefits and costs In this analysis, special attention should be paid to documenting stream temperature and sedimentation effects of activities and to practices that will reduce both temperature and sediment.

B. Resource Effects

Many types of information needed to understand the amenities produced and to estimate the environmental impacts incurred in your proposed Forest Plan, and the alternatives to it, are not presented in the DEIS or are based on models that our State agencies feel make questionable assumptions We have highlighted here some of the major difficulties and information needs that our State agencies found in review of your Plan More detailed discussions can be found in agency comments, especially those of the Oregon Department of Fish and Wildlife (ODFW), the Water Resources Department, and Department of Environmental Quality (DEQ) We have divided our discussion into five parts· 1) fish and wildlife, 2) stream flow; 3) water and air quality; 4) dispersed and developed recreation; and 5) summary

1. Fish and Wildlife

We have further broken our fish and wildlife discussion into six sections. a) elk habitat prediction, b) road management; c) dead and down material; d) old growth; e) riparian zones, and f) rangelands.

a. Elk Habitat Prediction

One of Oregon's premier elk herds roams the far reaches of the Malheur National Forest The DEIS indicates that elk numbers can increase in most alternatives ODFW feels the foundation for that conclusion is weak and the assumptions behind this analysis are questionable. Elk habitat in your analysis is based on the ability of the Forest to produce forage, but forage is only one attribute of the habitat effectiveness models that are in wide use in eastern Oregon Other attributes include cover and effective road density Until those other attributes are included, or an explanation is given why they should be excluded, your estimates of habitat effectiveness will lack credibility.

b. Road Management

Beyond considering roads in your estimate of effective elk habitat, it is important the you spell out more completely your road management and closure policy and that you embed an objective of a much lower effective road density in some of your alternatives. Doing so can help maintain effective elk habitat at minimal cost to timber production and have numerous other benefits We request that you consider the proposed road management policy of the Wallowa-Whitman National Forest and the attached comments of ODFW and OSFD as a start

c. Dead and Down Material

Dead and down woody material is becoming increasingly recognized as an important component of the forest ecosystem Yet we believe the Plan lacks the information needed to understand the current level of dead and down material and also does not present evidence that the proposed level will maintain viable populations of cavity nesters Please see ODFW's comments for more detail on this problem

d. Old Growth

Old growth is an important component of forest habitat for many species. Yet we cannot find, in the DEIS and LRMP, a distribution map of the existing old growth on the Forest, a detailed discussion of the old growth groves that will be maintained under each alternative, or a table showing the amount of old growth that will be grown over time. Providing such information to the State would be of major help to it in development of its alternative.

e. Riparian Zones

Riparian area management is a critical concern in semi-arid Eastern Oregon, with these areas being so important to water flow management, fisheries, and species diversity. Land management activities in riparian areas, unless done carefully, can compact soils, thus affecting water flow rates, and raise water temperatures. A full understanding of the affected resources is essential to ensure that riparian zones are not degraded through land management activities Their importance is underscored by the many State agencies which expressed concerns over possible degradation of these areas.

We could find little quantitative information in the DEIS and LRMP, however, on riparian zones and evaluation of their condition. We request that you give us a map of riparian zones by condition class, or at least a compilation of this information by subbasin, more information of the allowable livestock use rate in these zones, and a description of the technique used to rate streamside zone condition

f. Rangelands

The Malheur National Forest needs to provide more information on the current status of its rangelands, including their condition and the improvements envisioned Without this key baseline information, it is difficult to understand the impact on fish and wildlife in the alternatives relative to the conditions that now exist

2. Stream Flow

The Malheur National Forest is drained by three major basins the State has defined for water management 1) John Day River, 2) Malheur River, and 3) Malheur Lake Basins In all three basins, irrigation, fisheries, and recreation are the major uses of surface water As mentioned above, the John Day drainage is of special concern as an increasingly important spawning and rearing area for salmon and steelhead In addition, the towns of John Day and Long Creek derive water supplies from the Forest watersheds and small amounts of water are used for livestock watering, industry, and mining

The Water Resources Commission (WRC) has adopted water use programs for both the John Day and Malheur Basins We request that you reference these important programs and evaluate your alternatives against them

WRC's recently adopted basin program for the John Day contains specific recommendations for the Forest Service that are detailed in Water Resources' comments One of the major objectives discussed there is to achieve better seasonal distribution of runoff in the John Day drainage to reduce high stream flows and increase low stream flows, especially through the protection and improvement of riparian areas We hope you will give serious consideration to attaining this important objective

In addition, we request that you provide projected stream flow and timber harvest activity information by watershed for each alternative. Please see the comments of the Water Resources Department for more details

3. Air and Water Quality

Regarding air quality, the Department of Environmental Quality's (DEQ) main concerns relate to impacts from prescribed burning on the Forest and from burning of the Forest's fuelwood by the public within urban areas

Regarding water quality, DEQ's main concern is that the Forest Plan be consistent with Oregon's adopted Statewide Water Quality Management Plan for forest practices as required by the Clean Water Act The DEIS and LRMP do recognize goals of meeting water quality standards and protecting beneficial uses of water However, these documents lack information needed to assess adequately the water quality effects of proposed activities on the Forest, including sediment production and management controls in specific watersheds In addition, findings need to be made regarding the relationship between baseline water quality conditions and the effects of proposed Forest activities

DEQ is especially concerned about the potential cumulative impact of grazing, logging, and roadbuilding on sediment entering Forest streams, especially the John Day drainage We request that the Forest present a detailed assessment of these effects in the Final Environmental Statement

See DEQ's comments for more detail on these problems and suggestions on solving them

4. Recreation

Our Division of Parks and Recreation is especially concerned about the impact of your proposed land allocation for the remaining roadless areas on the supply of primitive and semi-primitive recreational experiences These concerns are of four types: 1) contradictions in the DEIS and LRMP make it difficult to understand the division of these areas between motorized and nonmotorized recreation and demand for these activities on the Forest, 2) the DEIS lacks documentation on the criteria used to decide which roadless areas to develop and which to leave from the standpoint of meeting recreational goals, 3) contraction of the roadless areas around two superlative recreational streams, the Malheur and North Fork Malheur, lead to fears that the semi/primitive experience will be compromised, and 4) lack of coordinated planning with adjacent national forests may lead to valuable recreational resources being lost on one Forest while less valuable ones are maintained on another Please see Parks and Recreation's comments for more details on these subjects

In addition, both Parks and Recreation and EDD question the wisdom of reducing the number of developed campgrounds on the Forest As we understand it, the Forest Service proposes to manage 11 campgrounds as developed facilities, and, for lack of maintenance funds, convert 14 minimum development sites currently receiving low use to dispersed occupance sites through removal of existing facilities.

Tourism is a growth industry in Grant and Harney counties. More discussion on the potential impact of these reduced services on tourism over the next few decades would help us understand the significance of the proposed closures and whether we should assist you in finding the funds necessary to keep them open

5 Summary

Many State agencies were hamstrung in making effective comments to you because of the lack of geographic detail in your analysis and discussion Presenting resource effects on a forestwide basis may be valuable for some outputs such as the overall timber harvest, but has little value for other outputs such as sediment production, water flow, and habitat structure over time. Rather, we need information on proposed activities and their effects by watershed or some similar forest subdivision

Toward that end, the Water Resources Department has included a map in their supplemental comments dividing the Forest into 11 watersheds With the critical importance of your river basins, a breakdown by watershed can improve the estimation of effects for many resources The Siskiyou National Forest recognized 19 planning basins in their analysis which help immensely in making their plan understandable At a minimum, the Malheur should be able to provided information on proposed activities and their effects by the three major river basins on the Forest. 1) John Day River, 2) Malheur River, and 3) Malheur Lakes

We request that you divide your forest into watersheds, or some other logical geographic breakdown, and embed that structure in your forest planning analysis and in the presentation of resource effects in your Final Environmental Statement.

C. Economic Effects

We have a number of difficulties with the information provided on economic effects and the analyses used in their estimate We have highlighted here seven major areas of concern 1) characterization of the proposed harvest level; 2) information provided on the trade-off between timber production and other resource objectives, 3) portrayal of ponderosa pine value over time, 4) portrayal of recreational activity value, 5) estimation of supply and demand for timber; 6) estimation of supply and demand for recreational activities, and 7) budget uncertainty

1. The Proposed Harvest Level

You often compare the maximum timber harvest level under the proposed plan with the actual harvest level of the 1977-86 period As an example, your newspaper-like "OVERVIEW" states that "Timber harvests in the first decade will increase by 55 million board feet over the average timber volume sold over the last decade The total sell volume will average 258 million board feet per year under the Proposed Forest Plan " That 258 million is characterized elsewhere in your documents as the maximum timber harvest level permitted under the Plan. We found these comparisons unsettling for two reasons· a) technical inaccuracies, and b) potential confusion to the general public Each will be discussed in turn

a. Technical Inaccuracies in Comparisons of Past and Future Timber Harvests

The maximum timber harvest level presented in your preferred alternative, made up of the "allowable sale quantity" plus some other volume, sets an upper limit on what can be offered for sale, on the average, in the years of the Plan period As with the "potential yield" in your current Timber Resource Plan, some proportion of this maximum quantity will be offered for sale, depending on budgets and other considerations Then some proportion of those offerings will be purchased by timber buyers, depending on the demand for timber in the area and the appraised price of the timber. Finally, some proportion of those purchases will actually be harvested over the few years after purchase, depending on the timber market during those years and other considerations.

Comparison of the maximum timber harvest level proposed for the future with the harvest actually experienced in the past ignores all these possible reductions in timber volumes between the setting of the maximum harvest level and the harvest that will actually occur We believe that a discussion of the relationship between this upper limit on harvest and the harvest level that may actually occur would greatly improve your documents, especially if it included a historical perspective on their relationship in the recent past

We realize that you plan for actual sales and harvest to be closer to the maximum permitted than occurred in the past, so some perspective must be maintained in projecting past performance into the future Still, though, these comparisons would help deepen people's understanding of what is being proposed

b. Potential Confusion in Comparing Past and Future Harvests

Comparing proposed future harvest to a past harvest reflecting occurrences for the past 10 years may some validity on a long term basis since these years include a number of industrial cycles The 1977-86 averages for timber harvest, timber sales and timber/based employment, however, do not represent what surrounding counties have experienced in the last few years Rather, these counties have recently experienced a much higher timber-based employment level then the 10-year average as companies cut their accumulated timber-under-contract with the return of high stumpage prices

Thus, your portrayal that implementing the Forest Plan will enable an increase in timber harvest and related economic effects, while technically correct in comparison to the average for the last 10 years, has confused many people in at least two ways

First, people believe that the timber supply will expand under the new Forest Plan with the associated economic growth and economic benefits. In reality, though, the projected increase in jobs, personal income and payments to counties has already been realized though the higher harvest levels of the last few years. In fact, the 1985-87 harvest level slightly exceeds the proposed harvest level under the new Plan. Thus, we actually face a possible contraction of timber-based employment under the proposed Plan in relation to the situation that now exists

Second, people see the extent of the harvest from the last few years and become anxious over the proposed Plan· we repeatedly heard concern expressed in our public meetings and elsewhere that damage to the forest ecosystem may occur if a higher level of harvest is sustained than recently experienced Not only does the Forest need to point out that the proposed harvest level is slightly below the harvest level of the past few years but, also, the Forest needs to bolster its case that the this proposed harvest level is sustainable.

In summary, we believe it is imperative that the Forest compare the proposed timber harvest to the harvest of the last few years in addition to the 10-year average You should compare this proposed quantity to the 10-year average timber sales, 10-year average timber offerings, and potential yield to increase understanding of how a proposed timber harvest can be affected by budgets and other considerations Burying these discussions in the DEIS and LRMP will not prove sufficient they should prominently appear in your OVERVIEW and any other summaries of your Proposed Plan. We realize that such information is difficult to present compactly, but the willingness of resource professionals and the general public to accept your Plan depends on presentations such as these.

2. Highlighting the Trade-off between Timber Harvest and Other Objectives

Our analysis of different alternatives for the management of the Malheur National Forest, like yours, depends most fundamentally on trade-off information as the basis for informed judgement We have been disappointed with the amount of information available in your DEIS on the impact on timber production to achieve other resource objectives

We plan to make site-specific recommendations in our State alternative Thus we need to know the timber production gains and losses from different treatment of particular roadless areas, big game ranges and visual corridors Without the development of this information, our attempt to craft a realistic and responsible State alternative will prove difficult

This information will prove especially crucial in our recommendations on your roadless areas We need to understand their potential contribution of these areas, under different degrees of development, to such outputs as total timber harvest, ponderosa pine harvest, big game habitat, quality hunting experiences, and water quality including spawning and rearing habitat for native and anadromous fish

3. Recognizing the Increasing Scarcity of Ponderosa Pine

Ponderosa pine is the green gold of the Malheur National Forest. As pointed out by our State Economist, it has increased in value, and probably will continue to increase in value, more rapidly than other species Yet your analysis lumps all species together in applying a one percent real price increase over time Such an approach masks the virtue of continuing to grow high quality ponderosa pine which we mention elsewhere in this letter as a possibility that should be investigated further We request that your analysis be improved to project the value of ponderosa pine separately from other species

4. Improving Valuation of Recreational Activities

Your analysis apparently reduced the value of recreational activities by 37 percent In addition, you assigned a zero percent real price trend to these activities while applying a one percent real price trend for timber. These assumptions can result in a serious undervaluation of the contribution recreation makes to the wealth derived from the Forest, and you should support the assumptions or change them

5. Estimating Supply and Demand for Timber

The demand for timber off the Malheur, especially for ponderosa pine, appears to be on the rise The dramatic increase this year in purchases by mills located outside Grant and Harney counties probably is a harbinger of things to come Not unrelated, the supply of timber from nearby sources, be they other national forests or other owners, seems to be declining We believe that the Forest should take a fresh look at timber supply and demand in the Malheur's area of influence to help all people, including the State, better understand what the future may hold.

6. Estimating Supply and Demand for Recreational Activities

The Malheur's projections of future recreation demand appear grounded on State population trends Recreation use historically has grown much faster than population Therefore, we request that you consider basing your projections of recreation use on historical use trends from the Forest where such data exists.

7. Budget Uncertainty

Throughout the DEIS and LRMP, you refer to proposed actions that may or may not occur depending on budget constraints While the general discussion of budget constraints is useful, both OSFD and the Economic Development Department wish that you would address more specifically the likelihood of funding availability for the proposed actions and the impact on Forest resources if expected funding does not materialize

D Standards and Guidelines

We believe that the standards and guidelines for implementing a Forest Plan should state the bounds or constraints within which all practices will be carried out in achieving the objectives of the Plan Therefore, standards and guidelines must be measurable to be meaningful There is little purpose in defining standards and guidelines for which no methods exist for measuring the degree of compliance or attainment

As a whole, the standards and guidelines for Plan implementation seem weak, with few standards actually established This appears especially true in the statements on wildlife and fish, water, soil, and riparian areas The qualifiers that occur throughout this section, such as "some", "sufficient", "where needed", "as necessary", and "acceptable" are subjective and do not allow for comparison

The Forest should develop clearer and more objective standards which will provide guidance for plan implementation We recommend that your Forest utilize the terminology developed by the Siskiyou National Forest for the types of guidance or restriction you adopt In addition, please see the comments of ODFW, OSFD, and the Water Resources Department for other suggestions on what is needed

E. Monitoring

We believe that the purpose of a monitoring plan should be to establish methods and threshold levels for evaluating the direction, standards, and outputs of the Forest Plan Your proposed monitoring plan does not comprehensively establish threshold levels, address specific methods, describe frequency of monitoring, or establish responsibility for monitoring We recommend that the Malheur investigate the monitoring format proposed by the Wallowa-Whitman National Forest as a beginning point for improving your own program Also, see the comments of ODFW, OSFD, and the Water Resources Department.

Because so much is unknown about the effects of management activities on different forest resources, we must rely on monitoring to provide early warning signals about activities having effects beyond acceptable limits Therefore, we recommend that the budget for this monitoring be considered an integral part of the provision of outputs from the Forest and that the plans be structured so that output levels will be proportionately reduced if monitoring resources are not forthcoming as promised

F. Other Considerations

The Malheur National Forest is the fifth of the thirteen national forests in Oregon to publish a management plan When the aggregate effect of all Oregon's national forest plans on resource outputs such as timber, salmon and steelhead, big game, and recreation opportunity has been determined, the State may need to modify its position and recommendations on individual plans Therefore, we urge you not to adopt any plan until the cumulative effects of all draft, revised draft, and supplemental national forest plans are known by the public

We urge you to continue managing the Malheur National Forest under the existing management plan until a new plan is in place or until amendments to the existing plan are developed and approved with participation by the State of Oregon. New constraints should not be applied in the interim to existing plans in contemplation of the new plan without full public participation.

Attached to this letter are reviews of the Malheur National Forest DEIS and LRMP completed by affected State agencies. These reviews consider economic, social, environmental, and legal aspects of the planning documents They contain substantive technical comments that should be considered an integral part of the State response

Thank you for the opportunity to respond to the Malheur National Forest DEIS and LRMP. The State of Oregon stands ready to help you as you move forward in completion of your Forest Plan For assistance on our comments about the overall planning process and procedures, feel free to contact Norm Johnson, Federal Forest Plans Coordinator For assistance on particular resource issues, please contact the appropriate individual on the enclosed list of agency contacts

Sincerely,

Neil Goldschmidt
Governor

NG:cs

Enclosures

0850N

DEPARTMENT OF THE AIR FORCE
REGIONAL CIVIL ENGINEER, WESTERN REGION (AFESC)
630 SANSOME STREET - ROOM 1316
SAN FRANCISCO, CALIFORNIA 94111-2278

REPLY TO ATTN OF: ROVP (Tye/556-0557)

SUBJECT: Draft EIS: Malheur National Forest, OR.

TO: USDA Forest Service
Pacific Northwest Region
Portland, Oregon 97208
ATTN: Mr. James F. Torrence

This office has reviewed the subject document and has found no significant impact to Air Force installations in the region or to their activities.

PHILLIP E. LAMMI, Chief
Environmental Planning Division

cc: AF/LEEV (Defusco)

Oct 21

Forest Supervisor
Malheur National Forest
139 NE Dayton ST
John Day, OR

Dear Sir:

I would like to address your Forest plan from the viewpoint of a County Commissioner, Land owner & Citizen.

As a County Commissioner without the 25% of Gross Forest Receipts to our County & School, City tax structure would be in a State of collapse.

As a Land owner your present policies of overbuilding roads is forcing most of the

Big game population onto Private Land when there is not the available feed.

Finally I would like to state as a citizen if you do not bring the disease problem in the Malheur Forest Timber under control there will be no sustained yield of timber to harvest

I support the plan with the Exception of the reservations that I have stated

Yours truly, Robert Holland
Grant County Comm
3, 5 & W Bent, John Day OR



CONFEDERATED TRIBES
of the
Umatilla Indian Reservation

GENERAL COUNCIL
and
BOARD of TRUSTEES

P O Box 638
PENDLETON, OREGON 97801
Area Code (503) Phone 276 3165

December 10,1987

Mr. Chuck Graham
Acting Supervisor
Malheur National Forest
139 N.E. Dayton Street
John Day, OR 97845

Dear Mr. Graham:

The Confederated Tribes of the Umatilla Indian Reservation (C.T.U.I.R.) appreciate the opportunity to comment on the Malheur National Forest Proposed Land and Resource Management Plan and accompanying Draft Environmental Impact Statement.

The proposed Plan and D.E.I.S. were reviewed by a C.T.U.I.R./B.I.A. Interdisciplinary Team and C.T.U.I.R. Fish and Wildlife Committee. The I.D. Team consists of Tribal/Federal resource managers, professionals and technicians. The Fish and Wildlife Committee serves the Board of Trustees in an advisory capacity.

The Board of Trustees is required by it's Constitution and Bylaws to promote and protect Treaty Reserved Rights and resources. The attached comments are premised upon this perspective of protecting federally recognized treaty rights which include the traditional practices of fishing, hunting, gathering roots and berries, grazing of stock, and exercising religious rights in the ceded and usual and accustomed areas of the Confederated Tribes. The desire of the C.T.U.I.R. to retain and enhance a high degree of integrity within the ecology of the fish, wildlife, forest and range of the Blue Mountains is beneficial not only to tribal culture but to the public at large. These interests are verified by such examples as the B.I.A./C.T.U.I.R. Blue Mountain elk and deer telemetry research studies, expansive fisheries enhancement program, and lead role in the Umatilla Basin project.

The comments, of necessity, deal with the historical and proposed management of the Malheur National Forest in a frank manner and are intended to protect the treaty right and provide constructive recommendations. In general, the plan set and extrapolated goals and outputs without adequate baseline data and in a number of instances used misapplied models and models not accepted by state, federal and tribal agencies. There was a tremendous lack of information provided throughout the plan, D.E.I.S. and appendices from which to expedite a reasonable analysis of a tentatively viable forest plan. Actual implementation methodologies and structure were, for the most part, simply relegated to a project level basis with only best management practices and forest wide standards as guidelines. The B.M.P.'s and F.W.S.'s contained very minor measureable criteria and therefore were quite subjective in nature as was the entire plan.

The historical administrative philosophy of the Malheur National Forest has been overwhelmingly "commodity" oriented with a low regard for "amenity" values such as fish, wildlife, ecological integrity, native american culture and archaeology. This lack of sensitivity to these values, natural resources and to treaty rights are well exemplified by overgrazing damage to riparian areas and big game range areas, and harvest and thinning practices which are creating a tree farm environment that significantly diminishes large diameter ponderosa pine stands and old growth timber in general, thereby impacting nongame species, big game hiding and thermal cover and ecological diversity. The Confederated Tribes have not been notified of project level activities that have potential impacts on archaeological sites and cultural and religious values of the tribe. The C.T.U.I.R. is aware of specific sites that have not been adequately protected due to administrative direction.

The aforementioned historical management philosophy of the Malheur National Forest has produced a piecemeal de facto abrogration of the federally protected 1855 Treaty Right for which the Malheur National Forest has a direct responsibility and stewardship within its' jurisdiction to uphold. The continuance of this philosophy is well portrayed by the proposed forest plan and only adds insult to injury to the natural resources of the forest, the treaty rights of the Confederated Tribes, and the public as a whole. It is imperative at this time to clearly communicate to the U.S.F.S. that the proposed forest plan and all proposed alternatives including the preferred alternative are unacceptable to the C.T.U.I.R.

The C.T.U.I.R. is aware of the State of Oregon's rejection of any of the proposed alternatives and subsequent desire to work with the M.N.F. in developing a viable alternative and plan. The C.T.U.I.R. contends that because of the magnitude of lack of information and process of implementation in conjunction with unaccepted and misapplied models that a re-draft is merited. The U.S.F.S. is under executive order to deal with recognized tribes on a government to government basis. The C.T.U.I.R. should be a party to any potential re-draft or revised draft that is worked out with the State of Oregon and other appropriate entities. The C.T.U.I.R. encourages and suggests the utilization of a multiagency oversight group to provide recommendations, tentative solutions, and helpful review of, as yet unprovided and needed, information for an acceptable plan. An opportunity to review needed information and respond should take place prior to the final forest plan and D.E.I.S.

The C T.U.I.R. desires to work with the Malheur National Forest and Region 6 in providing solutions to the concerns of the Tribe. Additionally, the C.T.U.I.R. is a member of Columbia River Inter-Tribal Fish Commission and endorses their comments and recommendations regarding the proposed plan and D.E.I.S. Please refer to the attached supplement for specific comments and feel free to contact Randy Williams at 276-8221 if you have any questions or if we may be of further help.

Sincerely,

Jay Matthews for Rod Cowapoo
Rod Cowapoo, Chairman
Fish and Wildlife Committee

Elwood Patawa
Elwood Patawa, Chairman
Board of Trustees

cc: Region VI/Torrance
USFS, Washington/Robertson
OR/Goldschmidt
CRITFC
ODFW
Rights Protection File

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 6822 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 define 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 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 contructed 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 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 Cicuit 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 posses 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 not 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 territoy.'" 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 "accommodation" 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 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 resources.

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 andromous 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 839e (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 Malheur National Forest DEIS and proposed plan do not reflect the consideration of these processes required by the NFMA.

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. (5Pet.) I (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 Interior alleged that there was not 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 combines 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. Unfortunately, the DEIS did not devote this consideration to the tribes' interests.

Perhaps because none of the treaty tribes' reservations lie within the Malheur National Forest's "local area of influence," effects of forest management activities on the tribes were given scant 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 to not only 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.

GENERAL COMMENTS AND CONCERNS

1. The level of sensitivity of the Malheur National Forest (M.N.F.) toward Treaty Reserved Rights has historically been significantly negligent. The C.T.U.I.R. is also quite aware of the poor relationship that exists with O.D.F.W. because of the lack of reasonable consideration of fisheries and wildlife resources and consistent refusal to utilize O.D.F.W. recommendations. The Malheur National Forest cannot continue to manage fisheries, wildlife, natural resources and cultural values in a vacuum. A stewardship demands responsibility at both forest and regional levels with attendant implementation of timely enhancement and effective protection of the aforementioned values. The C.T.U.I.R. looks forward to working closely with the new forest supervisor and staff in establishing a high level of rapport and open communication.

2. Only by congressional action may federally recognized treaty rights be abrogated. The U.S.F.S. does not possess the authority to abrogate treaty rights by "balancing" the forest plan in a traditional bias toward timber harvest at the compromise of degraded fisheries and wildlife habitat and cultural sites.

3. There was no baseline water quality data presented. How can water quality needs be met, specific protective criteria set, historical management prescriptions be analyzed for effects, and geographical delineation of proposed management strategies take place without adequate baseline information.

4. There were no hard definitions of "satisfactory" or "unsatisfactory" ratings for riparian areas, no idea given as to how much of the total stream miles were inventoried, no separation into class I, II, III, and IV of riparian conditions and maps by stream reach, and O.D.F.W./U.S.F.S. interagency standards were not utilized. Miles of stream in "satisfactory" and "unsatisfactory" condition that are quoted are significantly different than those quoted in the M.N.F. "white paper on fencing of riparian areas to exclude permitted livestock" (11/26/85). What is the reason for this discrepancy?

5. There was no map of soil erosion classes and sensitive soils in particular. All alternatives and each managed strategy should be evaluated in relation to these various oil types for potential impacts.

6. A map of range allotments with information on each allotment condition and trend with intended management plans was not present in any of the documents. This should be contained in the D.E.I.S.

7. Summer thermal cover definitions and winter thermal cover were not clearly separated as to accepted (Thomas, U.S.D.A.) guidelines and correct thermal/hiding/forage ratios were not utilized. Adjacent private land thermal cover, hiding cover and forage was not analyzed and presented to truly give an integrated and adequate assessment of big game home range and the effects of strategies/alternatives.

8. The habitat effectiveness model for elk did not take into consideration road discounts for optimum standards. The obvious basic assumption was more forage, the result of intensive timber harvest and thinning, meant increased populations of elk regardless of other variables such as adequate canopy closure, hiding cover, and road impacts. This is part of the scientific vacuum that the N.N.F. operates in. It is quite clear that M.N.F. Big Game models are designed to enhance timber harvest - biological evaluation and enhancement of big game certainly has not been the primary intention.

9. Elk and deer winter range delineations are incomplete. Deer winter range is not totally synonymous with elk winter range and should be appropriately identified. Why has M.N.F. refused to implement O.D.F.W. recommendations for modifications and additions to winter range classified areas for over two years? It is C.T.U.I.R.'s understanding that the M.N.F. has stated that it will deal with these additions after the final plan is completed. The C.T.U.I.R. strongly recommends that these areas be classified on the forest before the final plan thereby enabling a reasonable judgement of strategy/alternative impacts. To do otherwise would be deficient planning and continuing in the traditional mode of M.N.F. biased "commodity" management without objective consideration of other resource values.

10. Old growth habitat retention and protection were obviously a very low priority in the Malheur National Forest preferred alternative F. A map of old growth was not presented. The C.T.U.I.R. recommends inclusion of a map and information concerning inventoried old

growth. Old growth stands are traditionally preferred by tribal members for elk hunting. Certain bird species indigent to old growth habitat have sacred religious values.

11. A 3.5% of the entire forest allocation to roadless areas in the preferred F alternative is yet another example of low regard for the values these semiprimitive areas provide. Only 2.5% is given the consideration of nonmotorized even though 89% of the total forest is to be exclusively roaded. The watershed values of these already diminished roadless areas were not evaluated in regard to water quality or quantity. Extensive substantiation by B.I.A., O.D.F.W., and U.S.F.S. research throughout the three national forests in the Blue Mountain region indicate an overproportionate use of these roadless areas by elk as opposed to roaded areas and a very strong preference by the hunting public to have such areas for quality recreational experiences as indicated by Oregon Statewide elk workshops (12/83-3/84)

12. There was no analysis or attempt made to consider in an integrated planning approach. The U.S./Canada Salmon Treaty, U.S. v Oregon Subbasin Planning and directives, B.P.A. Enhancement Project Protection, O.W.R.D. John Day Basin Plan, N.W.P.P.C. Subbasin Planning, O.D.F.W. Steelhead Plan, and Wildlife Policy for the State of Oregon (1985). Each of these plans and policies should be effectively evaluated by alternative and strategy guidelines.

13. The monitoring plan for fisheries and water quality was virtually nonexistent. Game and nongame wildlife monitoring provisions were also token at best. Additionally monitoring was subject to "available funding' rather than being directly incorporated into output funding. The C.T.U.I.R. strongly recommends a comprehensive monitoring program similar to the Umatilla National Forest Proposed Land and Resource Management Plan monitoring program be utilized. The Umatilla Forest seems to be light years ahead of the Malheur in this regard -- what is the excuse?

14. Standards and guidelines for the proposed plan were relegated to forest wide standards and best management practices. These F.W.S.'s and B.M.P.'s were very loosely termed by such nomenclature as should, when feasible, where practicable, significant, sufficient, etc., without consistent qualified definitions of these words. Measureable criteria was not utilized leaving application of these F.W.S.'s and B.M.P.'s to purely subjective judgement. In light of historic management of natural resources by the M.N.F. Does the Malheur actually believe that a "trust Us" attitude will be

amenable to the C.T.U.I.R. and other resource management agencies?

15. The above mentioned fourteen general comments and concerns only cover the major concerns of the C.T.U.I.R. hopefully, however, they help to point out the great lack of information provided in the proposed plan, D.E.I.S. and appendices. Unless and until appropriate revisions, modifications or a re-draft is accomplished the C.T.U.I.R. cannot reasonably be given an adequate opportunity to comment on a proposed plan that will affect federally recognized treaty rights. The C.T.U.I.R. requests a formal response to this concern in a timely manner before any decision is effectuated of a final forest plan and D.E.I.S. based upon the present draft plan and D.E.I.S.

PROPOSED LAND AND RESOURCE MANAGEMENT PLAN SPECIFIC COMMENTS

P.II-5 Table II-3 states a decade I projected demand for big game use of 95.1 and a decade I supply of 106.5 - In other words supposedly more supply is available than demand presently. How can this projection and statement have any merit at all in face of the fact that the Malheur National Forest is under limited entry hunting regulations because of limited populations, bull/cow ratios, and buck/doe ratios? All of these *ratios and total populations are* directly dependent on habitat management provisions, which have become limiting factors on the M.N.F.

P.II-6 "However, the production potential of the forest is a very small percentage of the total increase necessary in the entire Columbia River Basin to meet demand." What kind of statement of averting responsibility is this? The John Day River system has the greatest *salmon and steelhead* wild run potential of any Columbia River tributary in the State of Oregon! The original quoted sentence should be deleted and the above sentence referring to wild run potential inserted.

P.II-6 *Under "Recreation"* semiprimitive roadless area was not even mentioned. The M.N.F. should at least recognize these already overdemanded areas (1983/1984 State of Oregon Elk Workshops).

P.II-7 "The implementation of minimum management requirements, forest-wide standards, and management area standards will ensure adequate populations (i.e., supply) of nongame species under this forest Plan." Snag dependent species have not been protected by M.M.R.'s and F.W.S.'s historically-this is well known throughout all three of the Blue Mountain Forests. proposed F.W.S.'s are extremely general with little if any measureable criteria and accompanying attitude of enforcement. The quoted statement should be deleted and a qualified statement that proven, measureable and enforceablew M.M.R.'s and F.W.S.'s (yet to be presented by M.N.F.) are necessary.

P.II-7 "A *major factor affecting the forest's* ability to supply anadromous fish is the amount of money available to invest in habitat improvement projects and implementation of livestock management strategies which improve unsatisfactory riparian areas." Habitat improvement projects are needed for degraded habitat caused by timber management, road impacts, and as you point out above a lack of forest service enforcement of adequate grazing allotment management plans. If the M.N.F. cannot effectively mitigate for timber harvest, road, or grazing it has no business causing

degradation. An attitude of habitat protection is greatly lacking in the proposed plan.

P.II-7 "Forest wide and management area standards will ensure continued populations of resident fish under this forest plan." F.W.S.'s and area standards in the proposed plan are poorly conceived and too general to be objectively implemented. What data and research does the U.S.F.S. have to validly substantiate the above quote?

P.II-8 "The supply of forage available for livestock grazing under this forest plan will be near historic levels of use. Historic grazing levels have been detrimental to numerous riparian areas across the forest and substantial range areas. Are managed A.U.M. levels in the "unsatisfactory" rated riparian areas to be lowered but somehow recompensed in the total forest A.U.M. levels by the proposed lodgepole clearcutting in riparian areas and extensive tree farm thinning and silvicultural prescriptions thereby creating additional forage? Shifting impacts from one area of the forest to another is not acceptable to the C.T.U.I.R.

P.II-8 "The supply of recreation opportunities available on the Malheur National Forest currently exceeds the demand for all types of recreation." This statement is totally false, should be deleted, and should be replaced with an accurate statement regarding the following points: Habitat management provisions i.e., extensive open road systems, winter range thermal and forage quality and other limiting factors have forced O.D.F.W. to limit hunter harvest and hunter recreation days by limited entry and short seasons. O.D.F.W. has shown demand greater than supply for high quality resident trout fisheries such as the North Fork Malheur River; no salmon sports fishery exists on the M.N.F. due to reduced populations - certainly dependent on optimum habitat - the Northwest is famous for international demand for salmon sport fisheries!, 1983/1984 State of Oregon Elk Workshops indicated the number one concern of the hunting public was too many roads and not enough roadless quality hunting areas; C.T.U.I.R./O.D.F.W. Cooperative agreements extremely limit tribal fisheries on the John Day system-these fisheries are recreational as well as subsistence.

P.II-8 "Undeveloped areas' statement reflects the clear intent of the M.N.F. to place a low value on these roadless areas for fisheries and wildlife and watershed values. The M.N.F. has not even attempted to gather and present data on the above mentioned values of these areas. A proposed preferred alternative F reduction of present

roadless acreage by 63% for the purpose of fiber productions says it all. "Best available information" unfortunately is quite limited within data files of the M.N.F. or is simply not being adequately utilized.

P.II-8 "Research Needs' - While evaluating the proposed plan and D.E.I.S. perhaps the most evident feature noticed by C.T.U.I.R. staff was the continual lack of baseline data and specific information, creating a host of assumptions in developing outputs and reaching goal statements with no realistically defendable foundation. Water quality baseline data needs are not even mentioned in this section. This entire section is comprehensively deficient. How do sustained yield models have integrity without adequate timber growth data? Why haven't baseline data and research needs been prioritized and effectuated during the last seven years that the M.N.F. has taken to prepare this document?

P.II-9 "Table II-4" This table should reflect the baseline data needs being recommended by C.T.U.I.R., C.R.I.T.F.C., O.D.F.W., D.E.Q., U.S.E.P.A., and U.S.F.W.S.. The C.T.U.I.R. recommends that the M.N.F. correlate/meet with this multiagency group to assure acceptable baseline data needs are met. Data requirements should additionally include nongame species habitat inventory in old growth, road corridor and timber harvest areas; big game population distribution on summer/winter/transitional ranges both on and adjacent to M.N.F. lands; open road density information cover/forage ratios information including adjacent lands to the M.N.F. i.e., B.L.M., state and private areas' watershed, wildlife, fisheries and adequately assessed recreation values of roadless semiprimitive areas; grazing allotment conditions; water quality conditions forestwide by streamreach and class; deer winter range condition and boundaries on and adjacent to M.N.F. lands; and a total riparian condition inventory by reach and class with comprehensive ecosystem analysis - not just streambank and temperature variables.

P.III-1 "Community Stability" - The approximately 1500 members of the Confederated Tribes consider not being able to exercise their treaty right by fishing on the M.N.F. for anadromous fish to any degree a "direct impact". This statement should be so instated here. Natural Resource based economies do not necessarily equate with community stability as has been well evidenced in historic northwest mining, timber and cattle classic boom -bus cycles. True economic diversity must encourage recreation, tourism and other service oriented industries.

P.III-2 "Timber Management" - The M.N.F. has historically harvested timber at rates and by prescriptions that have virtually mined large diameter ponderosa pine from extensive areas and culminated in a final removal of these highly valued lumber and highly valued habitat producing trees. Shifting the *majority of the forest* to a tree farm, thinned out douglas fir, true fir ecosystem is a far cry from the tremendous attributes of diversified, multistoried, habitat and high quality lumber providing ponderosas pine sites. The M.N.F. has sacrificed fish and wildlife values and water quality by harvesting 203 MMBF annually -- How can an increase of 27% (203-258) be justified in the face of increased de facto abrogation to the treaty right by piecemeal degradation to long term natural resource values?

P.III-2 "An analysis of the Forest's ability to produce timber indicates that the forest could supply up to 59.2 million cubic feet (326 million board feet) per year on a nondeclining flow harvest schedule." What relevance is such a statement to a well balanced forest plan process when it is quite obvious such a harvest level, *if actually attainable, would be at the total cost of a* completely unnaturally occurring ecosystem on the M.N.F. and subsequent extreme fish, wildlife, and recreation detriment? Such statements and the mentality that accompany them have no place in balanced, legally and productively managed diversified forest for multiple use. A "physical ability of the forest to produce timber' alone does not substantiate a 27% increase in annual harvest as is implied here.

P.III-3 "The desire for old-growth habitat by groups such as Izaak Walton League, Audubon Society, Oregon. Department of Fish and Wildlife, Oregon Natural Resources Council, and Grant County Conservationists to meet the needs of specific plants and/or animal species or for other reasons would reduce the timber volume available to respond to national and regional demands and to maintain or expand the wood products industry in the community." This statement is an explicit example of the biased attitude which exists within M.N.F. administration and the pitting of natural resource values such as old growth habitat against "national and regional" demands and maintenance of the local wood products industry. The U.S.F.S. and M.N.F. in particular are evidently not on the list of those who desire old growth habitat to meet the needs of specific plants and/or animal species. A mere 3.4% (D.E.I.S. P.5-15) old growth allocation in the preferred alternative is ample evidence of the M.N.F.'s *low regard for this value despite the N.F.M.A.* multiple use mandate and concept. "Multiple Use" appears to translate into fiber production with all other uses

being subordinate - *even federally mandated* and protected treaty rights.

P.III-3 "This total sell volume averaging 258 million board feet per year is an increase of 55 million board feet over the timber volume sold over the past 10 years (1977-1986). This increase is proposed to meet increasing demand from local and nonlocal timber industries. Many of these producers are totally dependent on the Forest for raw materials." Here the M.N.F. admits their reasoning for a 55 MMBF average annual cut increase. The entire proposed plan and D.E.I.S. illustrate the fact that other multiple resource considerations did not reasonably formulate this increase.

P.III-4 The quoted drop from 55% to 30% composition of *ponderosa pine offered in the preferred plan strongly* indicates that an overcut of this species has already taken place and that sustained yield management has not taken place for ponderosa pine.

P.III-4 "Timber harvest on all lands will result in improved big-game cover/forage relationships temporary forage for wildlife and livestock and will promote vegetative diversity.' The intended clearcut and overstory removal with extensive thinning practices will create less old growth, less ponderosa pine ecosystems, less thermal cover (as defined by Thomas-Blue Mountain Handbook), less hiding cover, and simply will be directed more toward even aged management. Cover/forage models and definitions in the proposed plan are not accepted (O.D.F.W./U.S.F.S. agreements) models and the M.N.F. did not take into account *cover/forage ratios of lands adjacent to the M.N.F.*

P.III-4 "about one-third of these elk winter on the forest. Management of big-game herd levels is the responsibility of the State of Oregon. Department of Fish and Wildlife while the USDA Forest Service manages *the habitat occurring on the Forest.* Mule deer populations have fluctuated during the past forty years and are currently on a downward trend in two of the seven game management units which include the Forest. The limiting habitat factor on big-game populations is winter range. Management of big-game winter range for *elk will provide for the wintering needs of mule deer* as well since available mule deer winter range is minimal and overlaps with elk winter range.

All the winter ranges have more than enough forage (grass and grass-like species) to carry both the present number of livestock and the present number of

wintering elk. Ranchers on private land adjacent to the Forest are concerned about the movement of elk off of the Forest to winter and spring range on private land. The increased potential for the Forest to carry larger populations of elk will also increase the potential for more elk to winter on private land. The State management objective for big-game populations for Game Management Units which occur on the Malheur National Forest is to supply winter habitat for approximately 2,800 elk

1) A greater number of elk and deer would winter on the Forest if better protective criteria and management took place on winter range. Cattle should be removed form winter range by October 1 to preserve fall green up for wildlife forage needs. The lack of fall greenup this year clearly points out the validity of such management. Vehicular and snowmobile traffic must be withdrawn from all winter range with the exception of main arterials and collector roads to enable habitat effectiveness. Thermal and hiding cover must be up to standards. (Thomas-Blue Mountain Handbook) and provide for deficiences of adjacent lands.

2) Mule deer winter range is not synonymous with elk winter range necessarily and additional areas identified by O.D.F.W. should be immediately implemented to increase utilization of national forest. This will help alleviate burden on ranchers and help buffer private land impacts on winter range.

3) The M.N.F. should adopt an agressive attitude of optimally providing both quality winter and summer habitat for big game. Several areas adjacent to M.N.F. lands exist where elk ahve sought out year-long residency to avoid high density open road use impacts and poor habitat conditions.

4) Please present specific data that substantiates the blanket statement that "all the winter ranges have more than enough forage". This should include range condition by each allotment/winter range area.

5) Past management philosophy of the M.N.F. has been to virtually eliminate themselves from responsibility and committment toward quality management of big game populations, composition, and hunter recreation days. O.D.F.W.'s recommendations have been, for the most part, not addressed by M.N.F. over the last seven years. Only a genuine and highly integrated

habitat/population management scenario is sufficient for todays complex comprehensive planning and implementation needs. The C.T U.I.R. by virtue of the treaty right should be an integral part of this process.

P.II-5 "Most hunters are not concerned specifically about population numbers but are more concerned about the length of the hunting season opportunities for success and whether hunting will be on a limited entry basis that would reduce their hunting freedom." This statement is very misleading and should be modified to portray the fact that two game management units. Northside and Murderer's Creek for mule deer are below 1981 established objectives. Thomas, Leckenby and other well respected researchers have strong apprehensions of current U.S.F.S. big game habitat management and the ability of populations and compositions to maintain themselves. C.T.U.I.R., O.D.F.W., and the public at large also are skeptical of long term sustainment and enhancement of population and composition levels. Although state objective levels may be reached distribution throughout watershed and home range areas may not be sufficient. As previously stated in C.T.U.I.R. comments, the courts have clearly stated that fish must be present to catch in order for the treaty right to be exercised. If, by virtue of M.N.F. habitat management impacts, an area or watershed traditionally used by tribal members to hunt big game becomes deficient of elk or deer the opportunity to exercise the treaty right in that area also becomes deficient and an inherent de facto abrogration exists.

P.III-5 The M.N.F. cannot legitimately state: "Presently the Malheur National Forest cover/forage ratio of 71/29 provides too much cover to provide optimum big-game habitat. Timber management activities have imporved, and can further improve the balance and distribution of cover and forage. As a result population numbers have increased and are expected to continue to increase." Adjacent land cover/forage ratio's were not considered and in light of C.T.U.I.R./O.D.F.W. and other agencies including U.S.F.S. National Forests and Research stations that disagree with M.N.F. models, this statement should be deleted and replaced with a statement that reflects each of the aforementioned points specifically.

P.III-5 "The Forest activity that most affects the management actions of O.D.F.W. to meet its population objectives is the control of access for hunters using motorized vehicles." Add - thinning, clearcutting and other prescriptions affects hiding and thermal cover for big game also.

P.III-5 The discussion under "RESOLUTION" is replete with assumptions based on erroneous models, incorrect and unqualified summer thermal and winter thermal cover definitions, no cumulative assessment in terms of adjacent lands and no regard for roading discount variables, etc.. This entire section should reflect each of the above considerations and not make such unsubstantiated statements as currently exist in the text. The private land use section is very misleading. The impact of M.N.F road activity year long is a major reason for increased private land use and should be so stated. "Forage improvements" will increase use on M.N.F. winter range if they refer to forage quality not necessarily more opened harvested and thinned areas deficient of crucial hiding and thermal cover. Fall green-up must be prioritized for big game winter range use - not overutilized by cattle.

P.III-6 With the increase in available forage and the maintenance of livestock numbers near present levels, there should not be competition between elk and domestic livestock for available forage on the National Forest. Future management will ensure adequate forage for both through the implementation of management standards." Increased quantity of forage due to thinning and harvesting is not an acceptable trade off with loss of needed thermal and hiding cover for big game.

P.III-6 "National environmental groups (Izaak Walton League, Audubon Society, Sierra Club, etc.) believe that overgrazing and unregulated livestock use of these areas results in a loss of streamside vegetation, increased water temperature, excessive bank erosion, and accelerated sedimentation of gravel fish-spawning areas. These groups have raised riparian management concerns to a national level, often calling for elimination of grazing. They urge that these areas receive special attention in land management planning. This is reflected in the special mention of riparian area management in the NFMA regulations. Not necessarilly by M.N.F choice and desired direction.

Locally, environmental groups, Indian tribes and the Columbia River Intertribal Fish Commission, and other agencies such as Oregon Department of Fish and Wildlife and the Environmental Protection Agency share these concerns to varying degrees."

This is another example of the M.N.F. pitting natural resource concerned entities against industry. Apparently the M.N.F. does not identify itself with those who "believe that overgrazing and unregulated livestock use" results in thte above quoted impacts.

but rather poorly pretends to be the mediator. Stewardship responsibility on the part of the M.N.F. is highly lacking.

P.III-6 "The majority (95 percent) of the riparian areas on the Forest are in a satisfactory condition. Only 5 percent, 235 stream miles have been inventoried as unsatisfactory based on extensive areas of unstable, eroding banks and lack of stream surface shading however, these areas are in an improving condition. Although past logging practices, roads adjacent to streams, insect outbreaks, and fires can and have affected the riparian areas on the Forest, the largest impacts on stream temperature and the majority of the gullies in unsatisfactory riparian areas have been caused by reduction of hardwoods in these areas due to past livestock grazing practices and wildlife use."

The statistics states above are only assumptions without merit due to incomplete total inventory of all streams. Specifically identify and define with measureable criteria the ratings of "satisfactory", "unsatisfactory", "extensive" and "improving". Please provide data and documentation of wildlife causing "the largest impacts on stream temperature and majority of gullies... etc.". It is amazing to see the not so subtle attempt to blame wildlife for whatever impact or conflict of interest that the M.N.F. may deem supportive of their strategy.

P.III-7 "There are opportunities to increase the rate of improvement in riparian areas often these will reduce the amount of riparian areas available to livestock grazing for some period of time."

This statement conveys the idea that M.N.F. feels justified in continuing to graze in degraded riparian areas because of livestock demand regardless of actual need and opportunity to protect - planned maintenance of A.U.M. levels in the preferred alternative indicate this.

P.III-7 "In those riparian areas in satisfactory condition up to 55 percent of the annually available growth of grasses can be utilitzed. Riparian shrub use will be limited to not greater than 50 percent of the annual available growth."
"Satisfactory Condition' has been based only on erosion/gullying and water temperatures below "extensive" ratings without qualification. What types of shrub use will be maintained -- non-palatable species to livestock? Who decided "55" and "50" percent were acceptable and on what specific biological basis? Where is the data base information to support

this?

P.III-7 Certain riparian areas on the M.N.F. have greatly impacted young cottonwood shrubs for example. Composition quality of the naturally occurring riparian ecosystem must be maintained. What quality control measures, admittedly not taken in the past by M.N.F., will insure enforcement of adequate grazing controls?

P.III-7 "Instream habitat improvements will occur over 1.5 miles of stream annually" - How is this supposed to keep up with impacts of 258 million board feet harvest annually, extensive riparian lodgepole clearcuts, 116,000 annually allocated A.U.M.'s, and over 8500 miles of roads planned - many of which are in the riparian?

P.III-7 "The end result of these improvements is that overall anadromous fish numbers are expected to more than double by the year 2037.' the M.N.F. should specifically identify the portion of the doubling of the run that will be attributed to their efforts and properly qualify the substantiation.

P.III-8 "Roadless Areas' why is no new wilderness recommended when the national demand for such areas is high and on a steady long term increase? The exceptionally high values of the pine creek area merit serious consideration for wilderness area classification. The big game habitat, old growth ecosystem, bald eagle habitat and watershed values far outweigh the timber values that could be economically extracted. Not one alternative considered inclusion of pine creek roadless area into wilderness. Has M.N.F. taken it upon themselves to set wilderness policy without public opportunity to reasonably consider and provide input into the planning process? The Malheur National Forest is well in line with the rest of the Blue Mountain Forests in already having eliminated most roadless areas and establishing some of the highest road densities in the nation on national forests. The preferred plan to further eliminate 63% of the existing semiprimitive roadless areas and leave a meager 3.5 % of the forest outside wilderness and the scenic area is tipping the balance scale of multiple use to the point past the stop and absolving the original purpose of the instrument. Even if the entire 180,948 acreas of undeveloped areas were retained in roadless classification the additional computation of Strawberry and Monument Rock Wilderness and Vinegar Hill-Indian Rock Scenic Area acreage would bring the total to less than 20% of the entire forest. 80% roaded 20% unroaded certainly does not seem overbalanced in favor of roadless area values to the C.T.U.I.R., but apparently

is to the M.N.F. administration. The C.T.U.I.R. recommends very strongly that 100% of existing roadless area be retained and that no motorized use be allowed in these areas. 7,000 miles of existing roads is more than ample for motorized use.

P.IV-1 "2. Provide for a distribution and variety of developed recreation facilities that are consistent with public demand for activities and experiences and are compatible with a forest environment." Is the M.N.F. management of Big Creek campground in Logan Valley such an example? Most of the beautiful old growth ponderosa pine in this campground were marked with blue paint to be cut and then repainted with black paint. The blue paint remains outside the campground fence even though this oasis in the middle of a large high elevation prairie is home to nesting sandhill cranes, of high cultural value, and adjacent a diverse stream/aquatic ecosystem. On one visit this summer the C.T.U.I.R. staff photographed a number of cattle inside the campground fence and the accompanying dustbowl that was created. On another occasion it took several minutes to get through all the cattle adjacent to the outside fence while driving out of the campground. This type of situation should be an embarassment to the M.N.F. administration but obviously is not enough to stop harvest of this island of trees or curtail grazing impacts. The M.N.F. proposed plan to diminish campground services and the aforementioned type of management situation on Big Creek campground are opposed by the C.T.U.I.R.

P.IV-2 "26. Provide a favorable flow of water (quantity, quality, and timing)" twenty years of research data on the nearby Umatilla Barometer Watershed indicates strongly that current U.S.F.S. harvest prescriptions increase surface runoff of water. It seems quite reasonable that a subsequent higher potential of streambank erosion, siltation, and other aquatic damage may be the result. B.P.A., O.D.F.W., Tribal, and U.S.F.S. fisheries enhancement efforts and the tremendous associated costs of such projects cannot afford detrimental impacts. The M.N.F. has not even attempted to evaluate cumulative watershed impacts. This should be done in relation to each alternative and in relation to protection standards of each management strategy.

P.IV-5 "Approximately 5,000 acres of wildlife habitat improvements will have been completed by the end of the first decade." That would be an annual average of only 500 acres. A couple of good sized prescribed burns for big game range improvements could amount to 5000 acres. Why so meager an effort in wildlife ennancement?

P.IV-5 "There will be 14 fewer developed campground." The C.T.U.I.R. opposed this proposal by the M.N.F. to reduce recreation facilities on the forest. The M.N.F. seems to indicate a low demand for these campgrounds- if so the low use pattern would require low maintenance requirements and associated costs. The national demand for such facilities is on the rise not decline and M.N.F. policy should reflect this.

P.IV-7 "Approximately 1469 miles of road will have been constructed. Virtually all available and suitable commercial forest land will be accessed." Past transportation plans have not reasonably utilized tribal and O.D.F.W. input into big game, erosion, direct habitat loss, recreational values. and cavity nesting (snag retention) impacts. The proposed plan and D.E.I.S. are quite deficient in this regard and adequate information needs to be supplied for reasonable analysis and input by the C.T.U.I.R. The very high density of existing roads is of great concern to the C.T.U.I.R. particularly with the open road policies of the M.N.F. excepting a very small percentage of roads closed for a few weeks of hunting season. The M.N.F. manages the forest habitat and any negative impacts caused by that management are the M.N.F.'s responsibility. The U.S.F.S., including the M.N.F. has had the policy of placing road managment closure and enforcement costs on O.D.F.W. The U.S.F.S. is responsible for impacts, not O.D.F.W., and the M.N.F. has a direct and inherent management responsibility and accountability in this regard. If inadequate funding levels are the problem then a road should not be built that cannot be mitigated for. The C.T.U.I.R. is very willing to work with M.N.F., O.D.F.W., the wood products industry, etc., in solving these problems. The Umatilla Forest has proposed a 2.5 miles per square mile open road density forest wide. Though the C.T.U.I.R. recommends a 1.5/sq.mi. density at least the Umatilla is striving to protect wildlife values. The M.N.F. should implement such open road densities very seriously and develop transportaiton plans accordingly.

P.IV-22 "Wildlife". Mule deer are not mentioned in this section and are supposedly taken care of in other portions of the proposed plan and D.E.I.S. under elk habitat provisions. Mule deer have not been historically adequately protected. The loss of hunter recreation days by virtue of limited entry and short seasons plus two game management units that are below state objective levels are evidence of that fact. C.T.U.I.R. recommends that mule deer become an identified indicator species.

P.IV-12 "Emphasize uneven-aged management on 32,883 acres in riparian areas. In lodgepole pine riparian stands (4,257 acres) emphasize even-aged management." The extremely high values of the riparian system for watershed buffers, fisheries, non-game species, big game travel corridors, etc. merit staunch protection. The economic value of timber in the 3% portion of the entire forest identified to be in the riparian allocation (table S-2, D.E.I.S.) is in no way comparable to these aforementioned values. The C.T.U.I.R. recommends no-cut buffer zones of 100 ft. minimum on each side of all perennial, anadromous, and resident fish streams. Resident trout streams are very much a concern to the C.T.U.I.R. as these fish are traditionally utilized by the Tribes and legally protected by the 1855 Treaty right.

P.IV-20 "(c) It is not necessary to meet wildlife tree requirements on every acre: retain the desired number of trees, generally, on a total resource information compartment basis." In other words one clump of old growth might qualify an entire T.R.I. compartment for adequate snag level requirements? This is a highly subjective assumption on the part of M.N.F. The C.T.U.I.R. recommends State of Oregon objective levels and policy be utilized as minimum population and composition levels for game and non-game species.

P.IV-21 "Timber". The M.N.F. should include their disease and pest damaged stand maps and inventories and realistic impacts of harvesting these stands particularly with regard to the exception rule of larger than 40 acre clearcuts.

P.IV-22 "5. A harvested area of commercial forest land will no longer be considered a created opening for silvicultural pruposes when stocking surveys carried out in accordance with Regional instructions indicate prescribed tree stocking is at leaist 4 1/2 feet high and free to grow." Hiding cover needs of elk dictate a minimum of 10-12 feet high standards according to Thomas (Blue Mountain Guidebook) 4 1/2 feet is totally inadequate to hide a standing elk not to mention intended thinning prescriptions by M.N.F.

P.IV-22 "However, a reforestation period of more than 5 years may be planned to meet economic and other resource management objectives." There, in effect, is no guarantee of 5 year reforestation nor adequate reforestation levels within that time. There are plenty of existing areas on the M.N.F. where reforestation has not worked and the C.T.U.I.R. is concerned with this issue. Economic and viable reforestation efforts must be improved in order to

substantiate harvest of a particular stand and initiate prescriptions for a site. Timber sale funding must provide for economic needs or reforestation efforts.

P.IV-32 "2. Thin planted or natural stands to desired stocking levels by the time trees are 20 years old." So theoretically all stands under general forest management will be thinned by the time they are 20 years old. What is the effect to hiding and thermal cover to big game, grouse, and non-game species? The C.T.U.I.R. supports a responsible stewardship over the entire forest which does not include a biological desert on the timber managed portion.

P.IV-35 "Management area 2-rangeland (95,626 acres)... "Goals". This goal should specifically state forage is to be managed to enhance wildlife and also fisheries (riparian areas). Livestock forage need are important and integrated with wildlife needs but should not have priority over wildlife/watershed values.

P.IV-37 "Management area 3 - ... riparian" A specific inventory should be undertaken to identify all riparian zones and their conditions.

P.J-1 The monitoring section is extremely weak and should be modeled similar to the Umatilla Forest proposed forest plan monitoring program. Funding must be directly tied to planned output activities - not subject to current budget deficit cuts and therefore be uncertain. Monitoring schedules are in great need of more frequent implementation and reporting periods. The reporting, in many cases, needs to be on an annual basis in order for effective C.T.U.I.R., U.S.F.S., and O.D.F.W. management of fisheries and wildlife.

PROPOSED PLAN AND D.E.I.S. SPECIFIC COMMENTS SUMMARY

The C.T.U.I.R.'s thoughts concerning the integrity of the proposed plan and D.E.I.S. should be well noted by the preceding comments. The C.T.U.I.R. does not have adequate staff or time to, in essence, strive to rewrite the entire documents presented. The U.S.F.S. has that responsibility but unfortunately has produced a document of highly questionable worth. The concerns, comments, and recommendations contained in the preceding sections also apply to the D.E.I.S. It is important to note at this time that the C.T.U.I.R. supports the revised draft edition of State of Oregon O.D.F.W. comments to the M.N.F. proposed plan and D.E.I.S. Review of final O.D.F.W. comments was not possible before the comment submission deadline to the M.N.F. The aforementioned O.D.F.W. comments are enclosed. The "citizen's multiple use alternative" comments on roadless areas are also supported by the C.T.U.I.R. It is important to reiterate the desire of the C.T.U.I.R. to work with the M.N.F. and Region 6 in solving what the tribe contends as serious de facto abrogration of the 1855 Treaty Right. Whether or not the forest planning process will sufficiently address this issue remains to be seen. The Confederated Tribe are hopeful of resolving the issue's in a planning process forum rather than being forced to take legal action.

EUGENE D TIMMS
HARNEY, LAKE MALHEUR, GRANT
BAKER, CROOK & MORROW COUNTIES
DISTRICT 30

REPLY TO ADDRESS INDICATED:
☐ S-302
State Capitol
Salem, Oregon 97310-1347
☐ 1049 N. Court
Burns, Oregon 97720

OREGON STATE SENATE
SALEM OREGON
97310-1347

November 22, 1987

Forest Supervisor
Malheur National Forest
139 NE Dayton Street
John Day, OR 97845

Dear Forest Supervisor:

I am writing in regard to the Malheur Forest Ten Year Plan. First, I have six national forests in my senatorial district and it certainly isn't easy to evaluate the studies in all forests. My father at one time was the District Forest Ranger for the Malheur Forest and I have been raised in this environment all of my life.

The sustained yield basis relating to the allowable cut has been an argument of timber interest for years in this country. Since becoming a legislator I am astonished at the power the environmental community has with so little factual information. I guess the power comes from political clout! In Eastern Oregon we are all environmentalist and certainly want what is right for the future of our cities in the long run.

I believe the ten year plan should reflect a 260 million board feet target per year. This target could be achieved by adding back all of the roadless areas into the full multiple use category, plus removing 6,500 acres from the recommended 50,000 acres of restricted old growth material.

Wilderness designation has hurt the allowable cut in many forests. All areas not under this designation should be returned to multiple use.

Roads for timber sales should be closed after sales and the standard for their construction should be lowered. Construction of these roads should be sensitive to watershed and wildlife habitat.

Grazing should be maintained at 121,000 AUMs. My experience as an elk and deer hunter is that wildlife is continuing to move to lower ranges. Much of this habitat is on private property out of the national forests. Grazing properly

controlled is a good management tool.

The "Preferred Plus Plan" I feel is the preferable plan. We need better management and with wilderness preferably out of the way, we need a multi-purpose concept of forest management. The United States Forest Service must provide a sustained yield management long range program.

Thank you for the opportunity to answer the Malheur Forest Plan.

Sincerely yours,

Gene

Eugene "Gene" Timms
State Senator
District 30

EDT/ee

Dear Forest Supervisor

Please consider the following comments as my response to the Malheur's Draft Forest Plan

1. **I want the Malheur National Forest managed under the following alternative (check one):**

☒ Alternative "Preferred-Plus " ☐ The Forest's draft plan as proposed.

☐ Other

2. **I think the final plan's annual timber sale program ceiling for the next 10 years should be**

☐ Set at 270 million board feet/year as allowed in the Forest's current management plan

☒ Set at 245 million board feet/year as proposed in the Forest's new draft plan

☐ Set at the level achievable under Alternative "Preferred-Plus," approximately 260 million board feet/year

3. **I think the final plan's level of permitted grazing use should be.**

☐ Maintained at the current 117 thousand AUM's/year

☐ Increased ☒ Decreased

4. **I support seasonal road closures to enhance elk and deer habitat and to provide quality hunting opportunities**

☒ Yes ☐ No

5 **I think the roadless lands Congress did not designate as Wilderness should be managed for:**

☐ Multiple uses ☒ Roadless recreation only

COMMENTS I would like to see the allowable cut to be for the 200 MBF range to ensure that my children are able to enjoy the Malheur Forest as I have been able to. If the cut range is so be it we can enjoy our trees longer. If 245-270 MBF turned out to be too much we cannot replace those big trees.

(Signed) Calvin Clark Grant Co. Commissioner Address Box 100 John Day, Ore

THE COMMENT DEADLINE IS NOVEMBER 12

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
500 N E MULTNOMAH STREET, SUITE 1692
PORTLAND, OREGON 97232

TAKE PRIDE IN AMERICA

November 23, 1987

ER87/1055

Charles R Graham,
Acting Forest Supervisor
Malheur National Forest
139 NE Dayton St.
John Day, Oregon 97845

Dear Mr. Graham:

The Department of Interior has reviewed the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (PLRMP) for the Malheur National Forest, Oregon. The following comments are provided for use and consideration when preparing the final documents

GENERAL COMMENTS

Fish and Wildlife Resources

The Fish and Wildlife Service (FWS) believes the draft documents lack adequate baseline information for fish and wildlife resources. They also believe the guidelines and standards affecting fish and wildlife resources are not measurable as presented. Both documents contain numerous assumptions, especially concerning fish and wildlife resources, which are not substantiated. Both documents fail to identify specifically how, when and where fish and/or wildlife mitigating and/or enhancement actions are to be achieved. Specific information is also lacking in the following general areas: 1) big game numbers; 2) water quality and quantity data, 3) inventoried condition and classification of riparian areas; 4) distribution of old growth areas; 5) road management; and 6) grazing allotments.

Threatened and Endangered Species

This discussion should be expanded in the final EIS to include the following information:

There are no endangered or threatened fish on the Malheur National Forest. However, two category 2 candidate species are present. These are the redband trout, Salmo sp., and the Malheur mottled sculpin, Cottus bairdi ssp.

Redband trout, Salmo sp.

Neither the Proposed Land and Resource Management Plan (PLRMP) nor the Draft Environmental Impact Statement (DEIS) recognizes the presence of the redband trout.

The omission is not an oversight, but rather a belief that because the taxonomy of redband trout is uncertain the Forest Service does not need to afford it special protection. This is an unfortunate position because the native trout is a unique genetic resource regardless of its taxonomy and should be identified in the plan. The taxon is unique, whether ultimately it is called a redband trout, a subspecies of redband, or a subspecies of some inland rainbow.

The Forest Service should recognize the redband trout (apparently mentioned in the plan as inland native rainbow) as a unique genetic resource and a sensitive species. Locations where the redband trout occur should be identified in the Final EIS. In its present form, the plan only notes whether a drainage supports a "trout fishery" (DEIS, Page III-46). The plan should, however, make a distinction between streams that support redband (inland native rainbow), hatchery rainbows, or a mixture of the two. Special management should be afforded those streams supporting redband trout.

The plan should explain what is known about the taxonomy of redband trout. The Forest Service may want to describe how they intend to deal with changes as the taxonomy is resolved.

Malheur mottled sculpin, Cottus bairdi ssp.

The DEIS recognizes the Malheur mottled sculpin as a sensitive species (Page III-40). This fish probably occurs in only a few scattered streams in the Harney Basin, including in Rattlesnake Creek. Dr. Carl Bond of Oregon State University reported to FWS (pers. comm.) that the Malheur mottled sculpin also occurs in Devine and Poison Creeks. These streams are, in part, in the Burns District of the Malheur National Forest. Management for this fish should include protection and monitoring of known habitats, plus surveys for this fish in other forest streams that flow into the Harney Basin.

Questions concerning either species of fish should be directed to:

Jack E. Williams
U.S. Fish and Wildlife Service
c/o Department of Wildlife and Fisheries Biology
University of California
Davis, California 95616
(916) 978-4866 or 4873

Riparian Areas

The discussion on page S-10, third paragraph (DEIS) says 95 percent of riparian areas in the forest are in a "satisfactory" condition, and that only 5 percent are unsatisfactory. However, there are no studies, standards, inventories or data referenced to support these percentages, consequently, the proposed protection level for riparian areas from grazing may be inadequate to restore and protect fish and wildlife values of the Forest's riparian areas. The final document should include supporting documentation of the aforementioned percentages and clearly define the terms "satisfactory" and "unsatisfactory".

Under each alternative in Chapter II, DEIS, under "Riparian Area Management and

Fisheries Habitat" is the following statement:

> "The riparian area and fisheries management goal is to manage all riparian areas to meet Oregon State water quality standards and maintain or improve anadromous fish habitat. Improvement in resident trout habitat would generally be achieved through improvement in riparian condition rather than by habitat improvement work occurring in the stream itself. Structural habitat improvement work would generally be for mitigation only."

This statement is too general. In the final document, it should be expanded to include specific information as to how fish habitat and riparian areas will be managed to meet water quality standards and subsequently monitored. Specific improvements to the riparian condition to achieve fish habitat enhancement should also be explained. (Other concerns relative to riparian areas follow below under Specific Comments.)

Cultural Resources

The Forest Plan/DEIS treats cultural resources as if they are qualitatively different from other environmental resources and can be handled routinely on an individual basis. Cultural resources, however, are subject to the same kinds of cumulative impacts as other resources, and they are connected by prehistoric and historic contexts that can be destroyed by agency actions in the same way as ecological contexts. Today's standards attempt to establish the context of discovered cultural resources in advance, and it is not adequate to continue their identification and management solely on a project-by project basis.

The policy of not leaving discovered sites in the Class II "Unevaluated" category is laudable, but does this mean that the Forest has, or plans, a program of followup testing to better understand the significance of sites identified by surface survey? Already, 391 historic and 623 prehistoric sites have been found in 633,000 acres surveyed. What is the breakdown in number of Class I "Evaluated" vs. Class II sites? How many of the prehistoric and historic sites yielded sufficient surface evidence that their significance could be properly evaluated? How many needed subsurface testing to properly understand their significance and appropriate treatment or disposition? These questions should be addressed in the EIS.

The final EIS should also provide assurance that the evaluations of discovered prehistoric and historic sites are not premature, i.e., conducted in the absence of testing needed to properly understand their significance. Without such testing, there are, all too often, misconceptions about significance and the result is selection of inapropriate mitigation or management treatment.

The DEIS does not indicate whether the Forest intends to carry out Section 110 (National Historic Preservation Act) systematic survey guided by drainagewide, regionwide, or statewide research goals extending beyong the project level. Planning should be undertaken now in cooperation with the State Historic Preservation Officer. The selection of cultural resource management alternatives does not have to await completion of the State Historic Preservation Plan (DEIS, p. IV-64).

Mineral Resources

Locatable and saleable minerals are generally well covered in the PLRMP. Production of saleable minerals for local and Forest uses should have been included, along with a discussion of present locatable mineral activity. The latter could be readily achieved by

describing the number and approximate location of active notices and plans of operations.

The one paragraph devoted to geothermal resources (DEIS, page III-88) addressed resource development, but did not cover resource potential except on an outdated USGS map. A more up-to-date source would be the "Geothermal Resources Of Oregon" map of 1982 produced jointly by the State of Oregon and the U.S. Department of Energy. That map shows the entire planning area as a region favorable for discovery of shallow thermal waters of sufficient temperature for direct heat applications, as well as several hot springs.

The PLRMP should have a mineral potential map. The map on page III-83 of the DEIS meets the minimum criteria; however, it should be at the same scale as the management alternative maps for ease of comparison. The best examples are in plans for the Kootenai National Forest, Montana, and the Okanogan National Forest, Washington

For each of the roadless areas reviewed in DEIS Appendix C, there should be a discussion and illustrations of the mineral potential. The discussion of minerals is brief, and none of the illustrations of roadless areas give any indication of areas of mineral potential. Impacts of Alternatives on mineral accessibility and secondary impacts of such accessibility also need to be described.

Table IV-13, DEIS, could be expanded to include the restriction classification system as shown in table II-11, pages II-71 and II-72 from the Beaverhead National Forest DEIS. Bureau of Mines has suggested a modification of this table, using percentages rather than acreages, through which it may be easier to envision the comparison and comprehend the effects each alternative may have on mineral resources. (See attached example. The numbers are from the Beaverhead National Forest DEIS.) The potential classification consists of the same criteria presently used. The availability classification consists of four categories, including withdrawn, specific legal protection measures, special management conditions and standard operating conditions.

We suggest the following be added to the final documents:

- A definition of access categories such as that from the Beaverhead National Forest, Montana (copy attached).

- A discussion of how minerals are affected by each of the alternatives, and a section in the summary that compares how minerals fare by all of the alternatives.

- A point-counterpoint discussion of how minerals affect other resources and how decision affecting other resources will, in turn, affect minerals. (e.g DEIS from the Wenatchee National Forest, Washington).

- A large narrative section on minerals, containing history of development and mineral production, value of past production, projected mineral demand, and current operations in locatable, leasable, and salable minerals. (e.g. Wallowa-Whitman National Forest plan, Oregon).

- A list of current mineral withdrawals, acres involved, and mineral potential for locatable and leasable minerals. Los Padres National Forest, California, plan is a good example.

- A narrative section on definitions of mining exploration and development terms what the oprations involve, and the effects these activities have on the Forest. (e.g. Beaverhead National Forest plan).

Water Resources

The PLRMP and DEIS should address the occurrence and use of ground water and discuss measures to protect wells and springs against impacts on water quality. Monitoring plans should include water resources, particularly the quality of potable ground-water supplies provided to the public and the staff.

SPECIFIC COMMENTS

DEIS

Page II-35 Under each alternative, the "Wildlife Habitat" section contains the general statement that "Habitat improvement to mitigate timber harvest, road construction, or livestock grazing impacts to the wildlife resource s would occur. Habitat enhancement would occur at a low level." Additional information must be provided in the final EIS which specifically describes where and what kind of habitat improvement would occur, and when it would be implemented. Furthermore, what type of "habitat enhancement" would occur at a "low level" and where would it take place should be clearly described.

Page II-49, Riparian Area Management and Fisheries Habitat and Wildlife Habitat. General comments, riparian areas, and comments on page II-35 apply to this section also.

Page II-92, Table II-5. The preferred alternative (F) Fisheries discussion on page II-49 indicates that "Instream habitat improvements in anadromous streams would be applied at a rate of about 1.5 miles per year." According to Table II-5, in the first decade with this alternative's fish habitat improvements, there would be a 147 percent increase in pounds of anadromous fish over existing conditions. The FWS does not believe that improving 1.5 miles of stream per year (.03 percent of the total stream miles) would result in a 147 percent increase in pounds of anadromous fish, as implied, especially with a simultaneous 27 percent increase in timber harvest. In addition, improving conditions for anadromous fish on Forest lands does not necessarily mean a corresponding increase in fish numbers Other factors outside the Forest boundaries (such as upstream and downstream passage and sport, Indian, and commercial harvest) also influence anadromous fish numbers The final EIS should clearly describe the process and assumptions utilized to correlate the level of stream habitat improvements with the 147 percent increase in pounds of anadromous fish.

Page III-8, last paragraph. In addition to the reduction in aspen, all significant changes in vegetation types and their impacts on fish and wildlife should be thoroughly identified in the final EIS.

Page III-9, third paragraph. The list of species presented does not correspond with a similar list on Page III-40 and G-18. These lists should be consistent in the final document.

Page III-20, 1. Timber, third paragraph. Impacts to fish and wildlife resulting from the changes in timber age class diversity both long- and short-term, should be described in the final EIS.

Page III-32, second paragraph. This paragraph should be expanded in the final EIS to include a discussion of the adverse impacts of roads on fish and wildlife resources.

Page III-34 through 36, Forage. This section should be expanded to include actual levels of use by both livestock and wildlife by vegetative type, especially in riparian areas. Further, the condition and trend of those areas should be described in the final EIS.

The terms "satisfactory" and "unsatisfactory" need to be clearly defined. The opportunities to correct unsatisfactory conditions should also be clearly stated as to what will be done, where and when.

Page III-38, Special Habitat. FWS believes the assumed high rate of old growth occupancy is dependent upon very optimistic and unrealistic levels of management success. Accordingly, an alternative should be developed and presented in the final EIS which will provide for special and unique habitats under more realistic levels of management success.

Page III-41, Paragraph 3 and Page III-42, Paragraph 1. It is stated that the optimum cover to forage ratio is 40/60 but that existing conditions provide a 71/29 ratio. This implies forage should be increased significantly. However, information on page III-42 indicates there is currently more than enough forage for livestock and wintering elk. Then it is stated that "enough forage to carry increased wintering elk herds may not be available after livestock use on certain winter ranges." These statements appear to be in disagreement and should be clarified in the final document. In addition, the cover/forage ratios for the identified winter ranges should be provided.

Page III-43. The Forest needs to select an indicator species for resident fish habitat (e g. redband trout), and riparian zones (e.g. ruffed grouse).

Page III-45. Sections of the document indicate that the goal is to meet Oregon State Water Quality Standards. As indicated, there are some streams that exceed 80 degrees Fahrenheit; therefore, the final document should provide information that delineates which streams meet these standards and which do not. In addition, reasons for not meeting the standards should be included as well as any management action proposed to achieve the standards.

Page III-48. The first paragraph states that fish populations are tied to water quantity, quality and riparian condition. However, anadromous fish have numerous other factors affecting their populations such as passage by downstream dams and sport and commercial fisheries. The final EIS should be expanded to include a brief discussion of these other major factors.

Page III-53. The second paragraph indicates that 235 stream miles have been inventoried as being "unsatisfactory". The final EIS should clearly identify how many miles of the Forest streams have been inventoried and what specific criteria were used to determine which stream segments were satisfactory or unsatisfactory. It should also reference information which supports the classifications of the riparian conditions for each stream.

Page III-54, Paragraphs 6 and 7. The final EIS should clearly identify what portion of the riparian areas are unsatisfactory as a result of livestock grazing, what is the present condition and future trend of these areas, and what specific management actions will be employed to improve riparian habitat on the forest. In addition, anticipated impacts of Malheur Forest Management to riparian areas adjacent to the National Forest should be discussed.

Page III-57 and III-58, and figure III-6. The DEIS do not indicate any future demand for recreational mining. This demand may increase, particularly if gold prices remain at current levels or rise.

Page III-73, 10. Wilderness. We suggest this section reference the Bureau of Land Management (BLM) wilderness study areas adjacent to the Forest. These are the Aldrich Mountain WSA (OR-2-103), Malheur River-Bluebucket WSA (OR-2-14) and Strawberry Mountain WSAs (OR-2-98A, 98C and 98D). These WSAs were addressed in the BLM's Oregon Wilderness EIS (Draft, 1985) and/or in the Supplement (1986). The final EIS is under preparation. BLM's last published recommendation was in support of designation for OR-2-14 and in support of nondesignation for OR-2-98 and OR-2-103. Regardless of BLM's final recommendations, Congress will ultimately make the decision. A paragraph acknowledging the status of BLM WSAs, and impacts (if any) resulting from Forest management actions, should be added where appropriate.

Page III-74, a. Strawberry Mountain Wilderness. Three small BLM WSAs, Pine Creek (OR-2-98A), Sheep Gulch (OR-2-93C), and Indian Creek (OR-2-98D) are adjacent to the Strawberry Mountain Wilderness on the western and northern boundaries. These three WSAs, totaling 1,149 acres, were restored to study status as a result of the court decision in Sierra Club v. Watt (1985).

Pages III-83, III-84, III-85, III-87, and Appendix F, page F-8. There appears to be an inconsistent numbering system for the mining districts. For example, on page III-83 the district marked with an 8 is labeled "Greenhorn," but on pages III-84 and III-87 the Greenhorn is No. 4, and on page F-8, it is listed as No. 5. Also, the mineral areas on page III-83 are numbered to 16; however, the key on pages III-84 and III-85 ends with No. 12. These pages need some corrections.

Page IV-25. The final EIS should describe the effects to forage, cover, and other wildlife resources expected to occur as a result of changing from ponderosa pine to selected species of fir.

Page IV-29. The big game numbers generated from the forage model should not be used because of the exclusion of other relationships such as hiding and thermal cover and roads.

Page IV-29. The final EIS should describe the impacts to big game animals expected as a result of changing from pine to fir.

Page IV-30. The number of miles of fence and the impacts to big game movement associated with fences should be identified in the final EIS.

Page IV-34. The final EIS should identify and discuss the effects of management activities on old growth distribution by timber type.

Page IV-35. The final EIS should clearly state what "moderate-to-high levels of fish habitat improvement" mean. If this habitat improvement refers to the 1.5 miles of stream discussed on page II-49, it should be so identified.

Paragraph 5 mentions shade and woody material as two important water quality and habitat factors that timber harvest can affect. An equally important impact created by timber harvest is siltation and sedimentation from disturbed soils. This should be addressed in the final EIS.

Page IV-37, Paragraph 2. The term "limited livestock grazing" should be clearly defined in the final EIS.

Page IV-37, Paragraphs 5 and 7. It is indicated that under the preferred alternative limited livestock grazing could occur on 70 miles of stream with unsatisfactory riparian areas. The final documents should provide more information concerning the permitting of grazing on riparian areas identified as being significantly degraded.

Page IV-40, Paragraph 3. The final EIS should explain how State water quality standards will be met in the first decade on streams that presently do not meet the standards.

Page IV-63. In several cases, the DEIS states that cultural resources will be destroyed through the implementation of the Plan. Is this inadvertent or intentional destruction, and will such destruction be mitigated?

Page IV-72. While the Forest acknowledges the relationship between access and restrictive management, the definition of restrictive is not provided. For example, Table IV-13 shows a total of 8,340 acres under restrictive management for the preferred alternative, while Management Area 7 (Vinegar Hill) which would be managed for scenic values, exceeds 13,000 acres. Management for scenic values implies some restrictions of this historic mining area, but the impacts are not described.

Pages IV-73 and IV-74. These two pages need to be clarified regarding mineral development rights. The claimant does have an inherent right to reasonable access to claims and the 36 CFR 228 regulations also point out that "an operator is entitled to access in connection with operations... ." This should be mentioned in the discussion on roadless areas. It could be pointed out that access to mineral resources could prove to be an exception in keeping an area roadless as the Forest Service will recognize valid existing rights. Denying reasonable access would discourage mineral exploration and development which would be a violation of the laws and policy acts.

Page IV-88 Effects on Plans of Others--BLM We encourage the Forest to continue coordination with BLM. The documents contain omissions and errors regarding adjacent BLM lands and management plans For example, there is no mention of the Strawberry Mt. WSAs. While DEIS Appendix A (page A-6) references BLM's Burns and Vale Districts, Prineville District also manages lands adjacent to the Forest. Appendix A does reference Aldrich Mountain WSA, but Appendix C (page C-10) is in error by stating that BLM land adjacent to the Forest's Aldrich Mountain roadless area is "too small for consideration." Aldrich Mountain WSA (OR-2-103) contains 9,395 acres. BLM recommended that this WSA not be designated wilderness in the DEIS prepared by BLM in 1985. The final EIS is under preparation.

BLM is also involved in a significant effort to enhance riparian areas on lands it administers (Oregon/Washington Riparian Management Plan, BLM 1987). We are concerned that the Forest, in apparently not being aware of this, has the potential to jeopardize investments BLM expects to make over the next 5-10 years for restoration and enhancement of riparian areas.

VI-3. List of Recipients. Unless these organizations do not wish to be on the mailing list, we suggest the following be added to receive the final documents:

The Northwest Mining Association in Spokane; the Eastern Oregon Mining Association in Baker, the Geothermal Resources Council--Pacific Northwest Chapter; Northwest Petroleum Association; and the Oregon Department of Geology and Mineral Industries.

PROPOSED LAND AND RESOURCE MANAGEMENT PLAN

Page III-4, Big Game Habitat. The first paragraph states that "the limiting factor on big game populations is winter range." The next paragraph says "all the winter ranges have more than enough forage to carry both the present number of livestock and the present number of wintering elk." If there is more than enough (excess) winter forage, then why is it a limiting factor? The final document should clarify this apparent discrepancy.

Page III-6 and III-7. Refer to the Draft EIS comments provided above for Page S-10, third paragraph. Chapter III also refers to improvement of overall fishery habitat on 1.5 miles of stream annually under the preferred plan. This amounts to improvements on three-hundredths of 1 percent of the Forest's 4,700 miles of stream. The FWS cannot concur that this meager habitat improvement would result in a 62 percent increase in anadromous fish production (P. 10, overview) when. 1) timber harvest is increased 27 percent (over 77-86 average), 2) there is a 40 percent grazing utilization of "unsatisfactory" riparians, and 3) a 55 percent grazing utilization of "satisfactory" riparians. Projections of such increases in anadromous fish production must be substantiated with adequate supporting data in the final document.

Page III-8 and 9, Resolution. This section indicates that the preferred plan would maintain only 37 percent of the existing roadless areas. The remaining 63 percent of current unroaded areas would be developed. Roadless areas now provide quality fishing and hunting opportunities as well as other forms of recreation which are not available elsewhere. Optimum conditions for big game also exist in these unroaded areas with minimal human presence. The FWS recommends that 100 percent of the existing roadless areas continue to be managed as such to maintain their undeveloped status and fish and wildlife values. As a minimum, all roadless areas should be retained until the forest can complete and analyze a baseline inventory of existing fish and wildlife resources. Such an inventory has not been presented or referenced in the subject draft documents, and without it, it is impossible to identify impacts. Retaining all roadless areas would provide significant resource protection until a baseline for fish and wildlife resources is completed.

Page II-1, Management Direction. There should be a discussion of minerals as a resource and management practices related to minerals.

Page IV-33 Why are cultural resources investigations and management limited only to Management Areas 1, 3, 4A, and 14?

Page IV-35, Area 2, Rangeland. Why are no cultural resource investigations/management prescriptions planned for the Rangeland area of the Forest? The DEIS (Page III-70, 71) points out the destruction and damage that livestock can do through tramping and trailing, and states that cultural resources, around springs in the southern two-thirds of the Forest, are particularly vulnerable.

Page IV-39, Minerals and Geology, Item 2. The Forest should check with the National Marine Fisheries Service to determine if notification is desired of any mineral development that would affect anadromous fish habitat.

Page IV-48 and page IV-50; Minerals and Geology, Item 1. Where valid existing rights exist, activities that might otherwise impair Wilderness values may have to be tolerated and regulated only to insure against undue and unnecessary activity.

Page IV-50, Area 11, Semi-primitive Motorized. Why are there no cultural resource investigations/management prescriptions for these areas of the Forest? Motorbikes, 3 and 4-wheelers, cars and pickups not only directly damage cultural resources, particularly along ridges, prehistoric and historic access routes, and river terraces, but also provide access to these resources and increase the potential for vandalism.

Page IV-53, Minerals and Geology, Item 1. It might also be advisable to stipulate that access or new roads will be restricted, whenever possible, to existing ways, trails, or designated utility corridors.

Page IV-54. The Preferred Alternative map reveals that existing Special Interest Areas will be reduced in size and converted to general forest/range use. How will this affect the special protection provided all resources, including cultural? The historic railroad and mining districts on the Forest could also be given Special Interest protection.

Page IV-58. Under the discussion of "Resource Elements", a discussion of "Geology and Minerals" appears to have been inadvertently left out in the management discussion of "Semiprimitive Nonmotorized Recreation Areas." A discussion similar to the one under "Semiprimitive Motorized Recreation Areas" would be adequate.

Index. An Index showing the location of cultural resource discussions would be useful.

Appendix A, Activity Schedules In as much as inventory of mineral resources is essential to complete multiple resource management, it might be advisable to initiate mineral investigations as part of the initial Activity Schedule.

SUMMARY COMMENT

Prior to the development of a final EIS and Management Plan the Forest Service should complete a baseline inventory of all the Forest's major resources. Until this is done, the impacts to the existing environment of any plan cannot be either adequately analyzed or monitored. Further, usable guidelines, measurable standards and specific mitigative techniques and measures should be a part of any comprehensive plan subsequently adopted.

Thank you for the opportunity to comment on your Proposed Plan and Draft EIS.

Sincerely,

Charles S. Polityka
Regional Environmental Officer

Attachment

		Non-energy Mineral Potential Category (MPC)[1]					Energy Mineral Potential Category (MPC)				
		I	II	III	IV	V	I	II	III	IV	V
Total acres of potential		579,789	425,032	1,142,700	0	0	216,257	376,288	1,382,040	173,036	0
	Access Category[2]	Percent of total acres of each MPC affected					Percent of total acres of each MPC affected				
Alt 1	A	12	16	17	0	0	0	0	16	58	0
	B	27	2	4	0	0	1	4	12	7	0
	C	8	2	4	0	0	0	0	8	1	0
	D	53	80	75	0	0	99	95	6	34	0
Alt 2	A	0	0	16	0	0	0	0	6	58	0
	B	16	2	3	0	0	2	5	8	1	0
	C	29	45	42	0	0	54	58	34	17	0
	D	55	52	40	0	0	45	36	52	23	0

[1]See attachment 2, from DEIS, Wallowa-Whitman National Forest, Oregon.
[2]See attachment 3, from DEIS, Beaverhead National Forest, Montana

Table II-11

Mineral Evaluation Report

Alternative A

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	230,311	0	0	A	0	193,812	66,868	70,612
B	12,765	172,068	16,648	2,395	B	0	42,167	6,927	154,782
C	972	104,542	1,858	722	C	0	50,639	10,238	47,217
D	58,218	875,119	357,782	213,140	D	0	856,082	340,999	307,178

Alternative B

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	76,532	0	0	A	0	177,613	0	0
B	2,471	116,094	19,317	3,369	B	0	35,877	10,914	94,460
C	29,666	467,929	220,241	115,770	C	0	474,729	191,967	166,910
D	39,818	721,428	136,762	97,043	D	0	455,906	221,941	317,204

Alternative C

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	128,066	481,154	329,998	165,242	A	0	704,850	267,623	131,987
B	3,835	105,873	223	110,690	B	0	27,091	7,832	75,767
C	10,889	169,777	8,569	11,263	C	0	95,162	29,873	75,463
D	30,246	625,104	37,530	38,993	D	0	315,597	119,704	296,572

Alternative D

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	127,970	402,124	201,920	125,976	A	0	564,337	193,234	100,399
B	4,072	207,232	44,843	14,872	B	0	83,286	49,076	138,657
C	22,309	302,479	50,680	24,115	C	0	190,031	68,515	141,037
D	18,685	470,073	78,877	51,294	D	0	305,026	114,207	199,696

Alternative E

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	112,520	326,993	40,857	125,976	A	0	433,889	98,997	73,460
B	5,277	112,218	29,458	12,822	B	0	46,025	23,517	90,233
C	38,575	560,449	151 230	36,396	C	0	370,867	180,352	235,431
D	16,664	405,538	123,090	49,458	D	0	291,919	122,166	180,665

Alternative G

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	85,511	40,857	0	A	0	225,309	2,140	0
B	3,004	139,404	0	0	B	0	18,517	12,730	111,161
C	33,572	459,851	188,380	97,431	C	0	446,052	178,442	154,740
D	35,379	697,507	147,083	118,661	D	0	454,037	231,720	312,673

Alternative H

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	101,081	152,261	12,907	0	A	0	126,769	68,868	70,612
B	95	185,669	13,068	0	B	0	42,368	63,272	93,192
C	27,092	466,101	226,368	132,792	C	0	503,529	197,358	151,466
D	44,768	566,754	135,220	83,345	D	0	397,530	154,971	277,506

Alternative I

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	128,405	809,421	330,757	168,615	A	0	848,419	329,759	259,020
B	1,750	66,933	636	943	B	0	6,136	1,462	62,664
C	9,885	116,556	3,679	9,090	C	0	80,952	11,709	46,549
D	32,996	388,998	41,248	37,609	D	0	207,193	82,102	211,556

Alternative V

Access Category	Energy Low	Mod	High	Very High	Access Category	Non-Energy Low	Mod	High	Very High
A	118,629	355,544	32,039	0	A	0	304,971	106,567	94,674
B	1,561	91,450	1,966	3,225	B	0	21,094	8,748	68,360
C	38,655	506,842	170,956	119,536	C	0	437,432	176,320	222,237
D	14 191	428,072	171,359	93,496	D	0	379,203	133,397	194,518

Category A	Withdrawn or proposed for withdrawal from mineral entry.
	1. Wilderness areas. 2. Wild and scenic rivers 3. Sites for facilities 4. Historic and cultural sites 5. Developed recreation sites.
Category B	Statutes or executive orders require specific protection or mitigation measures.
	1. Proposed wilderness areas. 2. Congressionally mandated wilderness study areas. 3. *RARE II Further Planning areas.* 4. T & E Species. 5. Roadless (Type I) dispersed recreation areas. 6. Culturally significant areas.
Category C	Special conditions exist on lands which require special lease stipulations or plan of operation conditions.
	1. Big game winter range. 2. Elk calving area. 3. Riparian area.
Category D	*Standard* lease stipulations and plan of operation conditions apply.
	1. Timber production areas. 2. Existing mineral processing areas.

Attachment 2

U S ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

REPLY TO ATTN OF WD-136

Kenneth L. Evans, Forest Supervisor
Malheur National Forest
139 NE Dayton Street
John Day, Oregon 97845

Dear Mr. Evans:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) and proposed Land and Resource Management Plan (LRMP) for the Malheur National Forest, Oregon, prepared by your staff. The DEIS presents several alternatives *for management of the* Forest's 1.4 million acres, while the LRMP expands on the DEIS preferred alternative. Our detailed comments concerning the combined DEIS/LRMP are enclosed. *Our review was conducted in accordance with the* National Environmental Policy Act, and our responsibility under Section 309 of the Clean Air Act to determine whether impacts of proposed federal actions are *acceptable in terms of environmental* quality, and human health and welfare.

We appreciate your staff taking the time to meet with us in Seattle on October 26, 1987, to go over the documents, and to answer questions over the phone during our review. The LRMP/DEIS is a major planning document which deserves both the efforts put into its development by your staff and the close attention of the public and agencies.

The DEIS raised some concerns and the proposed LRMP, as written, does not clearly preclude the possibility of adverse environmental impacts. We have, therefore, rated the DEIS/LRMP EC-2 (Environmental *Concerns - Insufficient* Information). A summary of the EPA rating system for draft EIS's is enclosed for your reference. This rating reflects our primary concerns that the DEIS and LRMP did not clearly provide the necessary protection *for water quality* and sensitive beneficial uses given the high level of grazing and timber harvesting outputs proposed. The major reasons for this are:

1. Insufficient presentation of existing conditions;

2. *Standards relating to fish habitat, riparian areas,* water, soil and air that are much too general to assure adequate protection of these important resources;

3. The lack of a clear commitment that activities unable to meet the adopted standards would not be allowed to occur unmodified,

4. Insufficient analysis of risks to water quality and beneficial uses caused by stream sedimentation from planned activities, and

5. The lack of any monitoring plan proposed for water quality and soils, and insufficient monitoring plans proposed for fisheries and riparian areas.

We believe that some of the information and analyses that were not in the draft documents exist, and that the final EIS and LRMP can be made to adequately address our concerns. In doing so, some significant revisions or new analyses may be necessary. Once you have had a chance to consider these comments, we will contact you to offer our assistance during the process of finalizing the documents. We are confident that we will be able to work together positively to prepare an effective final EIS/LRMP.

Thank you for the opportunity to review the DEIS/LRMP. Continued coordination and any questions should be directed to Mr. Steve Bubnick of our Environmental Review Section at (206) 442-8512 or FTS-399-8512.

Sincerely,

Robert S. Burd
Director, Water Division

Enclosures

cc: ODEQ
ODFW
CRITFC
CTUR
BLM, Portland
USFS, R-1
USFS, R-4
USFS, R-6

U.S. ENVIRONMENTAL PROTECTION AGENCY REVIEW REPORT: PROPOSED FOREST PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE MALHEUR NATIONAL FOREST

General

The EIS describes the affected environment and analyzes the environmental consequences of implementing alternative schemes for managing the Malheur National Forest (MNF's) natural resources, it is meant to support the reasonableness of the selected Forest Plan (LRMP). The LRMP itself is designed to establish the framework for planning during the next 10 to 15 years We recognize, however, that LRMPs typically do not provide detailed planning for individual projects Given the projected outputs of the EIS preferred alternative, the LRMP describes how these outputs may be achieved. The key is that the outputs are targets. The standards and guidelines presented in the LRMP (both forestwide and management area-specific) are interpreted as the primary "rules."

In order to determine whether the standards and planning framework in the proposed LRMP will sufficiently protect environmental quality, and public health and welfare, the associated EIS should include more detailed descriptions of the affected environment and environmental consequences. In particular, too little information regarding existing conditions of fish habitat and riparian areas on the Malheur National Forest (MNR) is presented. Without thorough descriptions of existing conditions (including any current degradation), an adequate environmental consequences analysis is difficult to perform Similarly, it is difficult to determine whether the levels of impacts that are predicted are acceptable, or whether the proposed standards sufficiently avoid or minimize impacts Many of our following comments should be read with this in mind

Additional discussions of existing conditions and the processes the Forest Service will utilize during implementation of the LRMP will help provide the necessary support for later specific planning decisions We expect that much of what we suggest for inclusion in the final EIS and LRMP is available or can be reasonably obtained. We are optimistic that the final documents will be adequate for decision making and for planning future activities on the LRMP that are environmentally sound.

Water Quality and Water Supplies

Current water quality conditions are not described in the DEIS. There is some general discussion on the major rivers and anadromous fisheries use, but no specific information on where the sensitive uses occur (e.g., spawning and rearing, and water supplies)

The stated management direction of the Malheur National Forest includes a goal to "Maintain or enhance water quality to meet State of Oregon standards, considering downstream uses and protection of other riparian and floodplain values" (LRMP IV-2). We feel this should be accomplished through stated fishery/water quality drainage objectives for the Forest; careful riparian area management; application of best-management practices; and soil, water, and fishery resource improvement projects.

The draft plan does not adequately identify drainage objectives and it lacks a watershed resource inventory. A watershed resource inventory summarizes facts, recorded measurements, observations, and other evidence which can be used to determine management objectives for rivers and streams. Oregon's water quality standards and water quality management plans, for instance, were developed using inventory information An inventory is a key element needed for effective resource management The drainage objectives derived from the resource inventory then provide a means of implementing the plan

From information provided in the DEIS, there is no assurance that Oregon Water Quality Standards will be met. For instance, the DEIS mentioned that anadromous fish spawning occurs in the John Day basin It was also stated that there are 409,000 acres of old growth habitat, nearly 30 percent of the forest (DEIS III-9) The location of the spawning areas and the old growth was not identified. If logging occurs in old growth areas which also support salmonid spawning, the use of the stream could be adversely affected. This could constitute a violation of the antidegradation part of Oregon's Water Quality Standards This subject is not addressed in the DEIS

Increases in sediment which affect fisheries are identified in the DEIS. Yet there is no data which shows where this occurs in the forest Furthermore, no plan for monitoring future increases is mentioned. This makes it extremely difficult to evaluate effects on water quality which would result from implementing the various options identified in the plan

Other beneficial uses of the water resource may be affected and need to be more thoroughly addressed in the plan There are two municipal watersheds in the Malheur National Forest Are these unfiltered, surface water supplies? Under an EPA proposed rule, as required by the 1986 amendments to the Safe Drinking Water Act, an agreement would have to be reached with the Forest Service that would allow the municipalities to have control over activities in the watershed that could adversely affect water quality in order for the municipalities to continue to use these sources without filtration.

To assist with the overall water quality management program, we are developing water quality summary sheets for each of the National Forests The purpose is similar to that of a "Fact Sheet" used to evaluate NPDES permits A draft copy for the Malheur National Forest is being enclosed for your information. The intent is to identify a form for watershed resource inventories which could be used by EPA and the Forest Service to address water quality concerns. Streams listed under "Drainage Objectives" only represent a starting point. The Forest is encouraged to expand this list

Fish and Fish Habitat

Discussions of fish and fish habitat should be expanded in order for us to determine that adverse impacts to fish are avoided The process that will be followed to protect fish habitat must start with consideration of the existing condition of the habitat. The adequacy of the standards designed to maintain habitat quality, and of the monitoring program used to determine that the standards are being achieved, relates directly to the current status of the fish populations and their habitat. The fish sections of both Chapters III and IV are appropriate places to summarize much of what we suggest be included elsewhere in the documents in terms of impacts from grazing, timber harvest, and roading in riparian areas, as well as sediment yields from upslope activities.

It is noted that where fish habitat has declined it has been due to livestock damage to riparian areas, loss of stream shade, placer mining activities, and increased sedimentation Areas where this has occurred have not been identified, however.

We agree with emphasis being placed on undertaking fish habitat improvement projects It should also be emphasized that fish habitat improvement work, while important and potentially very successful, does not take the place of avoiding impacts from the beginning.

EPA concurs with the recommendation of the Oregon Department of Fish & Wildlife that some species of resident fish be included as indicator species on the forest Certain resident fish species on the forest are especially sensitive to temperature increases or have narrow temperature tolerances. Protection of these species could further the protection of water quality in non-anadromous streams.

Sediment

The discussions of sediment yields and impacts should be expanded in the final EIS Information summarizing the extent and location of high hazard lands (relative to erosion and mass wasting potential) needs to be mapped.

Erosion standards would be appropriate to develop, especially for the high hazard lands. Considering the additional input from roads, and from other activities such as livestock grazing that may occur in the same basin, concern for fishery impacts becomes more significant Ideally, sediment yield predictions, coupled with appropriate standards and more emphasis on monitoring, could be used in planning as one screening tool to help determine allowable levels of activities within a basin over time.

The final EIS should summarize the knowledge regarding sedimentation and fishery impacts, and describe any mitigating factors that may exist on the MNF. For example, approximately 20 percent fines by depth appears to be a threshold above which survival to emergence of eggs and alevins decreases dramatically. How would sediment yield increases relate to instream sedimentation on the MNF?

Finally, forestwide averages are useful for general comparison among alternatives; however, beneficial uses of water must be protected wherever they occur. High sediment yields in one basin averaged against no increases in another do not establish that beneficial uses are protected.

Grazing

The final EIS should identify the areas where grazing-related water quality or other riparian area problems exist. For the portions of these areas that support anadromous fish habitat or other highly sensitive beneficial uses, the final EIS should specifically identify the steps (structural or non-structural) that will be taken to reduce the risk of damage to acceptable levels. Domestic water supply watersheds and anadromous fish habitat should be managed for particularly low levels of impact. For anadromous fish, 90 percent of the Smolt Habitat Capability Index may be appropriate. Where it is concluded that impacts to beneficial uses would be unavoidable, grazing should be considered an incompatible use and livestock should be excluded. Included in this evaluation should be estimates of the amount of land that would be unavailable for grazing should identified significant conflict areas be excluded. The potential impacts to the local and regional economies should also be estimated.

Riparian Area Management

Riparian areas are designated in the proposed Plan for providing timber and other outputs, with the intent of allowing long-term maintenance or improvement of riparian-area quality at the same time In order to support that the proposed levels of these other outputs can be obtained without seriously damaging the functions and values of riparian areas, discussions dealing with them should be expanded The relative importance of different riparian areas on the MNF, their existing conditions, and the impacts of grazing and timber harvesting activities on them should be more fully addressed.

A map depicting the grazing allotments of the forest was supplied directly to this office. This map also identified the riparian areas within each allotment that have been inventoried as having an unsatisfactory condition. This information should be included in the final EIS with a reasonable explanation of the information contained on the map It should include an inventory of the grazing allotments along with a quantification of total riparian areas and unsatisfactory riparian areas within each allotment. The inventory discussion should also include existing and planned improvement projects within each allotment and any known (or expected) recovery rates resulting from the improvements.

Cumulative Impacts

We have discussed the use of "area analyses" with other national forests and generally support their use. It would appear 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. The FEIS should describe the role that "area analyses" will play during the plan implementation.

Because detailed and specific analysis of cumulative impacts are extremely important, the final Plan should discuss in some detail the process for assessing them on the MNF 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?

There is potential for conflicts to occur over significant portions of the MNF especially between grazing and timber harvest activities and important aquatic resources Also, relatively large acreages are proposed to be developed for the first time We therefore believe that area analyses would be appropriate to perform 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.

Standards and Guidelines

The standards and guidelines adopted in the LRMP define the bounds within which individual activities on the Forest must be undertaken The ultimate acceptability of activities depends on their being implemented under appropriate standards. It is with this in mind that we reviewed the standards and guidelines presented in Chapter IV of the proposed LRMP. Along with the proposed monitoring program (which is intended in large part to ensure that standards are being met), we consider the adoption of adequate standards and guidelines to be the heart of the LRMP.

It would be useful to separate standards from guidelines in the final Plan. The definitions of each should be provided in the glossary; having both clearly presented can make the plan much more understandable as well as easier to implement. (See our comments for chapter IV of the LRMP for specific remarks on the standards and guidelines)

Monitoring

For the most part, the monitoring requirements are too general and are inadequate to assess the effectiveness of practices applied or the implementation of the Forest Plan An example of what we consider to be the essential elements of a monitoring program is attached for your reference.

Achievement of the drainage objectives and improvement projects (as discussed previously under Water Quality and Water Supplies) can only be evaluated by water quality monitoring and fishery habitat surveys The draft plan does not identify a water quality monitoring program, nor criteria for evaluating riparian areas (vegetation condition, streambank erosion, etc.)

For water quality, our primary concern is the protection of beneficial uses Standards and guidelines, and BMPs, are meant to provide this protection but they may not always be sufficient. Monitoring must therefore be directed at the beneficial uses, as well as to determining that BMPs etc., were applied The role of project sampling, as well as monitoring not tied to any one project, should be outlined. Long-term monitoring need not be reported any more often than five years. However, if at any time standards or guidelines are being violated or beneficial uses being significantly affected, project or Plan revisions/evaluations should be triggered.

Monitoring of fish and riparian habitat condition is not discussed This is a significant omission Not only should the Plan emphasize avoiding problems (i e., avoiding the need for improvements), but without ambient condition monitoring new needs for improvement projects or management direction modification could not be easily identified or predicted. Also, the reporting period for habitat condition monitoring would need to be more frequent than every five years if individual projects are to be revised before significant damage has occurred. Monitoring for the ambient condition of range, soils, watersheds, and roads should also be included in the LRMP.

DEIS SPECIFIC COMMENTS

P III-3 It is stated that "Erosion is continuing, and landslides are common in steep areas where hard resistant rocks cap soft volcanic ash/tuff units which typically have a high clay content." There is a need to detail these areas of ash/tuff units with high clay content showing the locality and approximate frequency of occurrence

P III-4 Soils - The discussion on management concerns and hazard of erosion needs more detail, especially on the risk of excessive sedimentation caused by *activities on these soils*

P.III-7 Mixed conifer stands occupy moister, higher elevation sites and cover more acreage than pine stands. P. III-4 of the plan says mixed forest harvest will comprise 70% of timber sales by the year 2037, as opposed to 45% presently. How will this increase in higher elevation harvest activities affect the watersheds? One common problem is increasing runoff for several years (depending upon revegetation rate) This needs to be discussed.

P.III-9 Old Growth - 287,958 acres of reduction is planned (approximately 70% of *the old growth forestwide). There is a need for more information on the* effects of this large scale reduction.

P.III-36 "Riparian areas in unsatisfactory condition occur on all grazing allotments on the Forest These areas comprise 3-5% of the forest " Unsatisfactory condition should be defined. Grazing activities along the stream are common sources for water quality degradation. If management is indeed difficult, perhaps exclusion from these areas should be the emphasis until satisfactory condition is restored.

Information of grazing effects upon the water quality, in general, needs to be disclosed, along with an inventory of the problem areas and existing improvements (and direction of range management program). The U S Fish and Wildlife Service and National Marine Fisheries Service have conducted riparian vegetation surveys in eastern Oregon and may be able to assist you with some of the needed information

P.III-49 Placer mining effects on fish habitat are discussed During the meeting with Forest staff, it was disclosed that some of the "unsatisfactory" stream reaches were attributed to past placer mining activities An inventory of these affected reaches is needed, along with what reclamation has occurred, *its success, and areas where reclamation is pending or planned* "Proper reclamation" needs defining

P.III-50 It states that " many streams which experience heavy livestock concentration in streamside areas may have conditions offensive to humans " with respect to bacterial contamination. What is considered "heavy livestock concentration?" Which streams experience these concentrations? How often are streams checked for unacceptable bacterial levels? What corrective steps are taken when a stream is found to have unacceptable bacterial contamination?

P III-52 Stream Classification - Streams on the forest are classified into 4 groups. The Forest staff supplied a map of these streams to EPA along with their classification. This information should be included with the FEIS. Along with the inventory should be an explanation of what constitutes a major stream, and the difference between high-value fisheries and significant fisheries. This will allow for understanding how a stream is considered as Class I or II.

P III-53 Approximately 235 stream-miles of riparian areas have been inventoried as being in unsatisfactory condition. How many stream miles have been inventoried as satisfactory? How complete is this riparian area inventory? Are satisfactory and unsatisfactory the only categories considered for riparian area classification? What are the criteria for these classifications?

P III-53 Approximately 35 miles of gullied streams have been identified. How complete is this inventory? At what rate is active gullying continuing? What is being done to stabilize the presently gullied areas and prevent future gullying? What are the principle activities that cause the loss of cover and precipitate subsequent gullying? Which soil types, if any, are most susceptible to gullying? Is there a need for monitoring this phenomenon? Why or why not?

P III-53 EPA understands the Forest's concern for riparian hardwood - dependent species and concurs with a continued *monitoring of the trend of conditions* that affect these species

P.III-54 What are the effects of riparian-area regeneration harvest on water quality? How much acreage will be clearcut during the 21-year period of planned "accelerated harvest" in riparian areas? Alternatives to this regeneration harvest practice should be considered such that impacts to water quality "during the intervening period" can be minimized.

- Paragraph 6 states "Forestwide, abundance and diversity of deciduous woody and herbaceous riparian vegetation has been reduced In some areas the change has been fairly small. Along some stream reaches the deciduous woody component has been largely eliminated from the streamside area." This topic deserves much more detailed discussion How much reduction in abundance and diversity has occurred and over what time frame? What is considered a "fairly small" change? What is considered to be "largely eliminated" and from which particular stream reaches? How many streams have been affected, even to a "fairly small" degree, and where are these streams? What is being done to improve the existing situation?

P.III-55 "Since many of the roads were built in riparian areas"... How much roading (miles of road, acres) presently exists *in riparian areas? Where are the roads* in riparian areas (i.e , which drainages)? What is the condition of the riparian areas that have roads? Are some of these considered as part of the 235 stream-miles being of unsatisfactory condition? How many streams have been adversely affected by roads? The topic of riparian-area roads should be discussed more fully. Inventory maps would be helpful.

P III-88 What is the quantity of sand, gravel (common-variety minerals) and rock presently mined from the Forest? Where are the quarries/pits located? How much river rock is mined from the Forest? Are these activities expected to contribute sediment to the streams?

P III-91 30% of the 1,515 miles of Forest arterial and collector roads are said to be "in need of reconstruction" This is over 450 miles of roadway What activities are generally involved in reconstruction of this road type? How many are in riparian areas? What kinds of environmental impacts can be anticipated? Is there opportunity for mitigation?

- Several hundred miles of abandoned railroad grades exist on the Forest An inventory is underway. How close is the inventory to being completed? What is the anticipated completion date (& mileage)? What condition are the grades in? Are any near streams (i e , in riparian areas)? What kind of erosion (sediment contribution) potential is expected?

P IV-2 Statement "Adherence to standards and mitigation measures should prevent all but minor and temporary impacts on these areas" This pertains to Wetland/Floodplains There are no specific standards addressing these ecosystems in the proposed Forest Plan Specific standards should be developed and included in the FEIS/LRMP. Definitions of "minor" and "temporary" impacts (in this context) should also be included

P IV-3 The phrase "unacceptable condition" should be defined with respect to the soil criteria mentioned - compaction, displacement, puddling, mass wasting, surface erosion What are the acceptable limits of these soil impacts/conditions? This should be defined in the Forest-wide standards

P.IV-9 We encourage the use of (existing) designated skid trails whenever possible and would like to commend the Forest in making this a common practice on timber sale units How many exist in the Forest?

- Figure 3 - This figure shows relative sediment yield for the proposed alternatives. Preferred alternative F appears to be the 3rd highest in relative sediment yield over the first two decades. Why is there no data presented for the alternative NC? If proposed alternatives can be compared, "based largely on professional judgement" (P.IV-8), why can't alternative NC be included in the comparison? Sediment yield is an important process/concept that should be well documented and in the Forest records If this data does not presently exist, then we suggest this effort be given a high priority so that specific sediment yield data and analyses can be included in the FEIS How much of this sediment yield is anticipated from road activities and how much from timber harvesting?

P IV-10 Paragraph 3 We agree with the Forest that soil moisture values need to be tested and validated, especially if no such information presently exists. We would like to encourage the Forest in this endeavor.

- Paragraph 5 Has scarification ever been used on the Malheur National Forest, and, if so, what method was used and how effective was it? Is there any areas of the Forest presently scheduled for scarification? In this discussion, the phrase "compaction problem" needs to be defined quantitatively.

P IV-12 Paragraph 1 Why are riparian acres in lodgepole pine sites planned to receive clearcuts, under the preferred alternative, while all other sites will have a "continuous stand of trees on every forested riparian acre?" The effects of this activity should be discussed in detail in this section of the DEIS. How many lodgepole pine riparian acres exist on the Forest? What are the stream classes in theses areas and where are they? The phrase "continuous stand of trees" should be quantified.

P IV-15 Figure IV-5 - This shows a comparison of old-growth acres by alternative. At what elevations are the proposed old-growth areas for alternative F? Will low-elevation, old-growth dependent species be excluded from the forest because of management practices?

P IV-19 Paragraph 4. Mitigation measures for effects on vegetation/trees are projected to be successful 75% to 80% of the time. In light of this discussion, the term "successful" should be defined The stated success rate has apparently been taken from two cited references Have these measures been studied for success rate on the Malheur?

P IV-25 Figure IV-7 - The discussion with this figure needs much more detail In this figure, alternative F will receive about 80,000 acres of clearcut in decade 4 and 90,000 acres in decade 5. This activity could surely increase the sediment yield significantly, yet Fig IV-3 shows a drastic decrease in sediment yield from this amount of clearcutting There is also some confusion as to the significance of road building in decades 1 & 2 under alternative F pertaining to sediment yield.

P.IV-26 The entire section b - Range Management Effects on Forage - is much too general and discussion is inconclusive. The problem is that there is no specific discussion of range management effects for any alternatives The following phrases need defining. "Limited livestock use and curtailed livestock use," what is the difference? "Accelerated recovery of streamside vegetation," what is the growth rate and accelerated compared to what? What are the effects of slowed or eliminated shrub growth along streams and "moderate level" of grazing pressure? Moderate level of grazing should be defined

P IV-28 The statement at the top of the page relating that Forest-wide standards for browsing and grazing will be followed and "include specific objectives" has generated some confusion There does not appear to be any specific objectives in these Forest-wide standards, except as pertaining to the range management for the Murderers Creek wild horse herd

P IV-35 Effects on riparian areas & fish habitat More specificity is needed to understand the ramifications associated with the management activities. We suggest that a more detailed discussion be included in the Final EIS.

P IV-36 Paragraph 5. - There should be discussion added that addresses the environmental consequences to the abundance and diversity of riparian vegetation <u>without</u> adequate funding for range administration and improvements If good livestock distribution cannot be assured, then grazing activities should be curtailed until such a time that adequate funding for needed environmental protection components can be assured.

30 years for unsatisfactory riparian areas to attain a satisfactory condition seems extraordinarily long. Exclusion of livestock from these areas could increase the recovery rate dramatically. Given the habitat and water quality values of the riparian areas, all known measures to expedite functional & ecological recovery should be considered and the most effective adopted

P IV-37 Paragraph 4 - The discussion suggests that fish production will increase because vegetation utilization will drop from 70% to 55% in riparian areas Amount of vegetation utilization does not in itself assure adequate stream structure or protect against streambank damage. This discussion needs to detail how these fish production goals are to be achieved in practical terms.

P IV-38 Paragraph 5 - BPA funds for fish habitat improvement are meant to be used for mitigation of effects from dams on the Columbia River. K-V funds could be used for mitigation of effects from Forest management activities These two fisheries mitigation efforts should be concurrent but separate activities. This discussion should be changed to clarify any confusion that K-V funds usage for fisheries mitigation is dependent upon termination of BPA funds availability.

P.IV-40 The discussion on Effects on Water is inadequate to determine what effects might take place under certain management activities or alternatives. Widespread regeneration harvest (clearcut) has ramifications not detailed in the discussion.

P IV-44 There is no data or documentation offered to support the claims that modified grazing practices should result in a decrease in sediment and low-flow summer stream temperatures. Decreasing shrub utilization does not in itself assure habitat improvement. The reduced shrub utilization practice will require a sufficient budget for livestock permit administration There is no assurance given that the budget will be sufficient for such administration. Contingencies for an insufficient administration budget should be discussed.

P IV-48 Paragraph 6 - The statement that water quality will show improvement by the end of the 50-year period has no supportive documentation or substantiating facts. There is nothing offered to show how 55% forage utilization will cause these changes. Supportive information should be included with all conclusions regarding effects of management activities.

P.IV-50 There was difficulty in determining the definition of Cumulative Effects that was used by the Forest in the DEIS. The discussion on cumulative impacts failed to link the roles of the various activities in environmental degradation. We would be pleased to offer you assistance in developing a more comprehensive discussion of cumulative effects. (Also, see our discussion under General Comments - Cumulative Effects above).

P IV-53 The special clauses of paragraph 2 should be defined. The definition should be followed with an explanation of how each clause allows satisfaction of water resource objectives and how they provide for the unique nature of riparian areas

Ch IV There is no discussion on ground water of the Forest. The DEIS should include: an inventory of wells in use and any existing ground-water mining activities, known areas of ground-water discharge (e g , seeps & springs) and how management activities affect this resource (e.g , compaction of highly permeable soils during grazing & harvest activities in a known recharge area). Are wells used for potable water at public recreation sites?

MALHEUR LAND AND RESOURCE MANAGEMENT PLAN (LRMP)

The management direction goals and the discussion on the desired future condition of the forest seem well-intended and have positive benefits. However, some of the activities needed to obtain these goals and conditions could have adverse environmental effects. These activities should be discussed in the DEIS/LRMP by disclosing known potential impacts and defining certain terms and phrases. Below is a list of some of these goals and statements that could be clarified through a detailed discussion in the DEIS/LRMP.

P.IV-1 Wilderness (Goal #9) - This goal is confusing to the reader and does not lend itself to an easily definable concept. It is even more confusing as to how this might be achieved.

P.IV-2 Water, Soil, and Air (#26) - To provide favorable flow and maintain watersheds in a stable condition appears to be a goal that should already be the existing watershed condition. To better understand the idea, favorable flow and stable condition should be defined. The watersheds would be in a very poor condition if a "favorable flow" and "stable condition" did not define their present physical state. There is no discussion of watershed conditions or quality in the DEIS/LRMP, other than Byram Gulch and Long Creek municipal supply watersheds.

Water, Soil, and Air (#27) - How are water quality, and riparian and floodplain values to be managed? There are no specific Forest standards to ensure protection of these values.

P IV-4 There could be widespread environmental impacts associated with the activities of harvesting 37% of the forested lands within the first decade How much harvesting will occur in riparian areas? How much of this acreage will have regeneration harvest activities? Where will these harvesting activities take place? How many of the anticipated sale units will need new roads and where are these? What would be the effects upon the soil in these areas?

Approximately 96,000 acres of old growth habitat will be harvested Where are these timber sale units? What harvest methods will be used and where? How many new roads (and where) will be built to accommodate these harvest activities? How much old-growth is present and how much will be left after this planned reduction? Previous discussions on this are confusing and need to be clarified i e , P III-9 of DEIS states "there are approximately 409,000 acres of old-growth habitat within the mature successional stage on the forest ." This is seral stage 5. How much more acreage is considered to be old-growth habitat that is in the "old-growth" successional stage (seral stage 6)? An inventory of the old-growth areas should be included.

P.IV-5 Para. 2 - "...population levels of cavity nesting species should stay well above 20 percent of the population level..." How much above 20%? This discussion offers no assurance this condition can be achieved or maintained. How will this be measured?

P IV-6 By 2037, "old-growth habitat will occur on 121,208 acres.. " Again, what is the present acreage (total) and how much reduction does this figure represent? What is the definition for viable populations of dependent species?

P IV-15 The Forest's Watershed Improvement Needs Inventory, mentioned here, should be included in the EIS This would give the public basic information on the condition of the watersheds and current improvement techniques used by the Forest

Forest-wide Standards are much too general, as are the management area standards, for consistency in their application and evaluation We have emphasized below some of the standards that lack proper specificity, and then some that contain good detail for your comparison. These standards are all found within chapter IV of the LRMP

P IV-18 General #2 - "Significant riparian areas" should be defined here. What acceptable methods are to be used to delineate these areas?

- Recreation #1 - To "Develop, revise, review, and provide input " does not provide any specific guidance to those who must carry out these revisions and reviews This standard offers no specificity or quantification This standard should include how the development, revision, review, and input provision is to be exercised

- Recreation #2 - This is a succinct and understandable standard that provides a specific directive with some degree of latitude

- Recreation #5 - Lacks detail for consistent application Where, how, and under what conditions/scenario are the restrictions to be used? What restrictions? If this information is found elsewhere, it should be so stated

P IV-19 Visuals #9 - This is a good example of providing references to where the reader can find specific details to carry out the objective of this standard, assuming that the second paragraph is part of the standard and not just an explanitive narration

- Wildlife and Fish #2 - This needs to be rephrased Until we are aware of the current habitat condition, it would be difficult to determine if the habitat is impaired, the same, or improving. The standard needs to be linked to a data collection

- Wildlife and Fish #4 - What management techniques are to be used for the bald eagle sites? How many are needed per unit of land? What manner will ensure their use? The reader should be directed to specific documents if the information is found elsewhere

P.IV-20 Wildlife and Fish #9 - How are these habitats to be managed? What is considered a viable population? This standard allows far too much latitude for consistent application to occur.

- Wildlife and Fish #10 - Very good, explicit standard. Provides specific detail such that the employee can independently evaluate his success in complying with the standard.

P IV-21 Timber #2 - Very detailed and clearly understandable

P.IV-22 Timber #8 - What does this imply, exactly? How strong of a term is "favor?" When and where is natural regeneration to be favored?

P IV-23 Water, Soil, and Air #1 & #2 - These read more like goals than standards When would these inventories be needed? How would they be prepared? Application of BMP's does not ensure compliance with water quality standards (WQS). This should be changed to indicate that application of BMP's is intended to ensure compliance with WQS. Compliance with WQS rather than application of BMP's is the bottom line requirement for forest practices.

P IV-24 Water #4 - How will the stated rehabilitation be achieved? What constitutes a disturbed area? Why is only direct sediment contribution to perennial streams considered here? Indirect contribution could cause severe water quality problems, also (i e., disturbed areas could contribute sediment to ephemeral drainages, which in turn, once activated, could introduce large amounts of sediment into perennial streams)

P IV-24 Soils, #7, #8, #9 - These are much too general How is the valuation to be conducted? What happens once the soil impact potential has been deemed high? What is the soil condition that has acceptable productivity potential (i e , define this condition)? How is this to be achieved? What is the definition for effective ground cover? What is the minimum percentage of ground cover for the first year after disturbance? For the second year?

- Water #3 - Good standard on water quality Needs to be linked to monitoring, however

P IV-25 Minerals and Geology #9, #10, #11 - These are good examples of understandable standards. The reevaluation process should be defined or the reference given Monitoring of the reclaimed areas should be done to ensure objective accomplishment

P V-2 Monitoring and Evaluation - The concept of the monitoring program being based on "available funds" should be further explained. If funds are not available to monitor the implementation of the plan, the plan should be amended, revised, or specific actions cancelled. The proposed monitoring plan lacks accountability to interested and affected groups and publics It is not clear how monitoring results will be communicated to outside groups Accountability or the ability to assess effectiveness of actions is essential for a successful monitoring program.

STANDARDS - MANAGEMENT AREA 3

Although this is a relatively small part (37,140 acres) of the Forest, it is critically important in water quality protection Because the standards in this section are extremely general, we offer below some questions and suggestions pertaining to a few of the standards and are meant to be used as guidance for revisions.

P IV-37 Recreation #2 - Through what means will recreation use be limited and distributed? When and how will it be determined that it is necessary to limit or distribute use in riparian areas?

- Habitat Management #1 - How will the rate of recovery in unsatisfactory riparian areas be improved? What is the natural rate of recovery of unsatisfactory areas when access is excluded?

- Habitat Management #4 - When are the mentioned spawning and egg incubation periods (i e , what time of year and for how long)?

P IV-38 Range Management #2 - How will livestock grazing be managed to ensure compliance with water quality standards? What is an acceptable condition for fish populations?

- Timber Harvest #2 - This standard supplies sufficient detail to the reader so it can be understood which management practices should be applied and where.

P.IV-39 Water, Soil, and Air #1 - This standard should describe the evaluation process to be used or give guidelines to what constitutes a satisfactory evaluation. Which effects are to be evaluated? Perhaps evaluation guidelines could include a list of beneficial and adverse effects, possibly including relative weights of importance.

P.IV-40 Fuels #4 - It is not understood what connection there is between machine piling of slash and the protection of fuels in a riparian area. Perhaps this could be explained here.

Many of the other management area standards suffer from the same lack of detail as found in management area 3. For example, how are activities near bald eagle roosting areas going to be restricted? And what is the bald eagle roost site utilization period? What is the definition of significant cultural resources and what are the guidelines for their evaluation (P.III-47). When and how is it decided that existing range improvements are unnecessary and how will they be removed (P.IV-47)? What criteria must be met for a decision to be rendered that epidemic levels of infestations would severely threaten adjacent lands (P.IV-51, #3)?

Many questions are left unanswered by standard #1 under Minerals and Geology (P.IV-61). Some of those are: When and by whom would it be deemed necessary for the next logical stage of development? What is the next logical stage? What would make other means of access infeasible/unreasonable and roads not? What determines feasible extent of road obliteration and how is the decision made? By whom (Forest, industry)?

APPENDIX J - Monitoring

P.J-7 We suggest adding a second question to this issue area that addresses habitat suitability. Question 2 might read: Is the habitat provided suitable to maintain the desired population levels?

P J-16 This monitoring effort only focuses on population trends of anadromous fish, and timber and range outputs from riparian areas. Conditions of the riparian area and water quality should be monitored for adverse effects caused by the timber and grazing activities. Trends of other species populations should also be monitored (e g , resident fish). Population trend monitoring should include observations of population response to habitat condition changes.

- The suggested monitoring methods of only: (1) reviewing annual Oregon Department of Fish and Wildlife steelhead and chinook spawning counts, and (2) annually reviewing timber sale and allotment reports, are inadequate to assess the effectiveness of the proposed Forest Plan. At a minimum, the monitoring plan should include detailed strategies for how implementation and evaluation monitoring will be done. Compliance with water quality standards should be one of the baselines for assessing the adequacy of the plan.

P.J-20 This is an adequate plan for monitoring the implementation and effectiveness of management standards However, this is not sufficient to substitute for specific monitoring of water quality and fish habitat condition, as mentioned by the forest staff at our October meeting.

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 for application of mitigation measures that could be accomplished 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 fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA intends to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant 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.

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 of 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 to 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

February, 1987

Attachment A

USFS -- FOREST PLAN REVIEW

Water Quality Summary

Malheur National Forest
139 N.E. Dayton Street
John Day, Oregon 97845
(503) 575-1731

USFS File Number: OR-03
Draft Plan: August 1987

Significant Features

1,459,422 acres	Grant, Harney, Baker, and Malheur counties
Ranger Districts:	Bear Valley (John Day) Burns (Hines) Long Creek (John Day) Prairie City (Prairie City)
Major Basins:	Malheur, John Day, and Silvies
Aquatic Ecoregion:	Blue Mountains (09)
Special Protection:	68,700 ac. Strawberry Mountain Wilderness 12,620 ac. Monument Rock Wilderness 13,322 ac. Scenic area

Background

The Malheur National Forest is located in eastern Oregon. The forest is a diverse landscape of grasslands, sage, and juniper with mountain lakes and meadows. Major tree species include ponderosa pine, lodgepole pine, Douglas fir, grand fir, and other mixed conifers. The Strawberry-Aldrich Mountain Range splits the forest into two physiographic divisions: the Blue Mountains to the north and the High Lava Plains to the south. Elevations vary from 3,300 feet along the Middle Fork of the John Day River to 9,038 feet on top of Strawberry Mountain.

Most of the Malheur National Forest receives 20 to 40 inches of annual precipitation. This precipitation occurs primarily from November to May in the form of snow. Dry periods occur annually and vary from 1 to 3 months duration. Stream drainage density ranges from one and a half to two miles of perennial streams per square mile in wetter areas, to no perennial stream flow in drier areas.

Forested areas are used for timber production, grazing, wildlife habitat, and recreation. Lower elevation shrub and grassland areas are widely used for rangeland. Meadows on upper mountain slopes serve as summer grazing grounds. Numerous streams in the area have been mined intensively for metals.

Streams originating in the forest supply water for irrigation, domestic use, and livestock use. Livestock in and near streams affect stream bank stability and stream sedimentation. Historical overgrazing has caused a drop in the water tables and subsequent downcutting of streams in most of the lower valleys, accelerating deterioration of stream bank stability and sedimentation. Removal of vegetation for timber harvest and road construction contribute toward increased hillslope erosion. A variety of past and present mining practices have introduced significant disturbance to stream quality. Open pit and shaft mines have had localized effects where tailings were pushed downslope towards drainages. Placer mining, prevalent in streams of all sizes, has resulted in major physical disruption of stream beds and biota.

The Malheur National Forest contains a highly diversified fishery ranging from coldwater dependent Yellowstone cutthroat and dolly varden to coolwater smallmouth bass. In addition, the John Day River drainage supports anadromous runs of spring chinook salmon and summer steelhead trout. Major drainages important to fisheries include:

North Fork John Day River	Resident trout
Middle Fork John Day River	Spring chinook salmon Summer steelhead trout Rainbow trout
John Day River	Spring chinook salmon Summer steelhead trout Rainbow trout Cutthroat trout Dolly varden Brook trout
South Fork John Day River	Summer steelhead trout Rainbow trout
Malheur River (including North Fork)	Rainbow trout Dolly varden Brook trout
Silvies River	Smallmouth bass Resident trout

Approximately 235 stream miles have been inventoried as being in unsatisfactory condition based on areas of unstable, eroding banks and lack of stream-surface shading.

Drainage Objectives

Drainage objectives identify the level of water quality or fishery habitat potential to be achieved in a given watershed. These are the basis of evaluating management options.

Watershed Number	Watershed Name	Beneficial Use	Current Status	Monitor Needs
17070201-A-010	John Day River	A		***
020	Deardorff Creek			
030	Reynolds Creek			*
040	Strawberry Creek			*
050	Dixie Creek			
060	Bear Creek			
070	Indian Creek			
17070201-B-010	John Day River	A		***
020	Canyon Creek			***
030	E.F. Canyon Creek			*
040	Byram Gulch	MW		*
050	Laycock Creek			*
060	Beech Creek			
070	E.F. Beech Creek			
080	Riley Creek			*
090	Birch Creek			
100	Fields Creek			***
17070201-C-010	S.F. John Day River	A		***
020	Venator Creek			
030	Grasshopper Creek			
040	Deer Creek			***
050	S.F. Deer Creek			
060	N.F. Deer Creek			
070	Murderers Creek			***
080	S.F. Murderers Creek			
17070202-A-010	N.F. John Day River	A		***
020	Deer Creek			
030	Fox Creek			***
040	Cottonwood Creek			
17070203-A-010	M.F. John Day River	A		***
020	Clear Creek			***
030	Vinegar Creek			
040	Camp Creek			***
050	Lick Creek			
060	Big Creek			*
070	Slide Creek			
080	Long Creek	MW		***
090	Basin Creek			

A: Anadromous Fish ***: High Priority
R: Resident Trout * : Medium Priority
MW: Municipal Water

Watershed Number	Watershed Name	Beneficial Use	Current Status	Monitor. Needs
17050116-A-010	Malheur River	R		***
020	McCoy Creek			*
030	Bosonberg Creek			
040	Summit Creek			***
17050116-B-010	Pine Creek			***
020	Alkali Creek			
17050116-C-010	Wolf Creek			***
020	Squaw Creek			
030	Calamaity Creek			***
040	Schurtz Creek			
050	Gunbarrel Creek			
17050116-D-010	N.F. Malheur River	R		***
020	Crane Creek			
030	Bear Creek			***
17050116-E-010	Malheur River	R		***
020	Cottonwood Creek			***
17050116-F-010	Little Malheur River			***
020	Camp Creek			*
030	Squaw Creek			
17120002-A-010	Silvies River	R		***
020	Wickiup Creek			
030	Keller Creek			*
040	Scotty Creek			***
050	Bear Creek			*
060	Antelope Creek			*
17120002-B-010	Silvies River	R		***
020	Camp Creek			***
030	Bridge Creek			
040	Hall Creek			
17120002-C-010	Silvies River	R		***
020	Sage Hen Creek			*
030	Myrtle Creek			***
040	Emigrant Creek			***
050	Blue Creek			
060	Sawtooth Creek			***
070	Yellowjacket Creek			*

A: Anadromous Fish ***: High Priority
R: Resident Trout * : Medium Priority
MW: Municipal Water

Attachment B

NATIONAL FOREST WATER QUALITY MONITORING RECOMMENDATIONS

GENERAL MONITORING GUIDELINES

Priorities. Greatest priority should be given to assessing fishery impacts in the following order: 1) endangered anadromous runs; 2) other anadromous runs; 3) resident salmonids; 4) and others, including warm water species.

Site Selections. Site selection for monitoring impacts on the above fish population should reflect the need for a representative range of environmental conditions, e.g., soil type, channel morphology, and erosion potential. Special attention should be given to watersheds with the greatest sediment production potential. Consideration must also be given to monitoring in heavily developed watersheds and in watersheds developed or disturbed in increments over time to evaluate cumulative effects upon fishery resources.

Paired Watersheds. Paired watersheds should be selected wherever possible, consisting of a representative stream reach in the watersheds to be developed and a comparable reach in an undeveloped watershed. Control (or reference) reaches should be selected based upon similarity in stream slope, elevation, streamside vegetation, bank stability, fishery, soil type, stream classification, etc.

Timing. Timing of monitoring should emphasize detecting impacts from first entry into a watershed. This may require prior monitoring to establish adequate baseline data in both the developed and undeveloped watersheds.

Frequency. Frequency and location of monitoring should be periodically adjusted to reflect needs or problems identified in the ongoing monitoring. Typically, monitoring at a specific site will be initially intensive, with a later shift to periodic trend verification.

Long-Term Monitoring. Certain aspects of the monitoring should be designed to evaluate impacts not detectable on a short-term basis. Examples are long-term stabilizaton of logging roads, recovery rates of degraded streams, presence of large woody debris, etc.

IMPLEMENTATION MONITORING

This on-site monitoring should evaluate the correctness of Best Management Practices (BMP) implementation. This information will be critical in determining whether adverse instream habitat impacts were caused by inadequate BMPs or improper implementation of BMPs. In general, however, we feel that the specific method used to evaluate the correctness of BMP implementation are best identified by the U.S. Forest Service (USFS).

EFFECTIVENESS MONITORING

Stream Monitoring Parameters. Both fish density (by species and age class) and fish habitat quality should be evaluated. Habitat quality should not be confined solely to substrate composition (e.g., cobble embeddedness and percent fine sediment by depth), but should also include such factors as pool/riffle ratio, amount and size of large organic debris, vegetative cover, channel morphology, etc. Data should be gathered by the most cost effective method while insuring data quality, and utilization of standard methods of measurement and analysis.

CALIBRATION MONITORING

The total monitoring effort should be carefully designed so that one outcome is to improve our ability to predict via models: 1) the actual sediment loading to a stream, 2) the actual impact of those sediments on fish habitat, and 3) the actual impacts of those sediments or other fish habitat changes on fish population.

INTERAGENCY SUPPORT/COORDINATION

Technical Fisheries Advisory Committee. To improve interagency coordination (and to provide technical assistance and support), we suggest that the USFS establish a technical fishery advisory committee in each state. This group could consist of representatives of government agencies who manage the resource or whose activities impact the fisheries resource. By meeting quarterly, or as significant issues arise, this group could identify, and hopefully resolve problems as they develop. They could also play a key role in assisting the USFS in preparing and presenting the annual monitoring report discussed below.

Annual Monitoring Report. We suggest that an annual public meeting be held to brief all parties on the monitoring results. To minimize travel costs, the USFS could review results from individual forests within a state at a single meeting. This would also facilitate comparison of results from different forests. The technical fisheries advisory committee could help the USFS develop, and present a consensus on impacts and needed actions.

Written material should focus on an analysis of planned vs actual actions and impacts. For example, where water quality problems occurred, the USFS should clearly define the nature and cause of the problems, the corrective actions taken, and the procedures to be used to prevent future occurrences. This material, together with supporting data, should be made available to all parties prior to the public meeting. A more formal written report summarizing long-term trends and impacts should be prepared periodically, possibly at 5-year intervals.

U.S. Department
of Transportation
Federal Aviation Administration

Northwest Mountain Region
Colorado, Idaho, Montana,
Oregon, Utah, Washington,
Wyoming

17900 Pacific Highway South
C 68966
Seattle, Washington 98168

Mr. Kenneth L. Evans
Forest Supervisor
Malheur National Forest
139 N.E. Dayton Street
John Day, Oregon 97845

Dear Mr. Evans

We have reviewed your proposed Malheur National Forest Land and Resource Management Plan and associated draft Environmental Impact Statement and do not foresee any impact on aviation or its activities.

Thank you for the opportunity to comment on your proposal.

Sincerely,

Marlin E. Binger
Policy and Planning Officer

U.S. Department
of Transportation
Federal Highway Administration

Region 10
Alaska, Idaho
Oregon, Washington

708 S.W. Third Avenue
Portland, Oregon 97204

November 6, 1987

In Reply Refer to:
HPP-010.2

Mr. Kenneth L. Evans, Forest Supervisor
Malheur National Forest
139 N.E. Dayton Street
John Day, Oregon 97845

Dear Mr. Evans:

Federal Highway Administration, Region 10, has reviewed the Draft Environmental Impact Statement for the Malheur National Forest Land and Resource Management Plan and offers the following comments for your consideration:

Oregon highway Routes 7, 26, and 395, which are on the Federal-aid highway system, are within the National Forest. Quite often such highways in National Forest areas do not have defined right-of-way. To make highway improvements with FHWA funds on any of the above routes, or any Forest Highway System routes which may use any lands designated as recreation, requires a determination by FHWA that there is no other feasible and prudent alternative than the selected proposal. Without an adequately defined right-of-way, this has, in similar situations, caused considerable delay in project implementation and increased taxpayer expense.

We suggest the final EIS acknowledge that when right-of-way for Federal-aid highway routes or forest highway routes are not defined, a management effort will be made to work out such details with the government officials having operating responsibilities for that route.

Ideally, in any area designated recreation by you, the designated right-of-way should be of sufficient width to allow bridge replacements, roadway widening, or elimination of safety hazards such as bad curves. Roadway improvements within a defined corridor designated for highway use do not require a 4(f) determination. NEPA action will apply to all highway improvements.

Sincerely,

M. Eldon Green
Regional Administrator

BY: Ernest J. Valach, Director
Office of Planning
& Program Development

NASA

National Aeronautics and
Space Administration

Washington, D C
20546

Reply to Attn of NXG

Mr. Kenneth L. Evans
Forest Supervisor
Malheur National Forest
139 NE Dayton Street
John Day, OR 97845

Dear Mr. Evans:

We have reviewed the Draft Environmental Impact Statement and Proposed Forest Plan for the Malheur National Forest and have no comments to offer.

Sincerely,

Billie J. McGarvey
Assistant Associate Administrator for
Facilities Management

DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT CORPS OF ENGINEERS
BUILDING 602 CITY COUNTY AIRPORT
WALLA WALLA WASHINGTON 99362 9265

November 12, 1987

REPLY TO ATTENTION OF:

Planning Division

Ms. Jennifer L. Harris
Malheur National Forest
139 NE Dayton Street
John Day, Oregon 97845

Dear Ms. Harris.

This is in response to your letter dated August 18, 1987 concerning the Draft Environmental Impact Statement and Management Plan for the Malheur National Forest. Those documents were forwarded to the Walla Walla District Environmental Resources Branch for review. This letter also reflects the previous discussion that you and Mr. William McDonald had concerning these proposals.

We have reviewed the proposals for the areas of our concern. This review did not reveal any affects on navigation or our hydropower development. Moreover, we have reviewed the projects for flood control and hydrologic concerns and found no inadequacies.

In accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344), a Department of the Army permit is required for the discharge of dredged or fill material into waters of the United States, including wetlands. As we discussed, the Portland District will assist you regarding Clean Water Act permits.

Should you need any additional information, please contact Mr W. E. McDonald at FTS 434-6627 or 509-522-6627.

Sincerely,

Michael F. Passmore, Ph D
Chief, Environmental Resources Branch

Department of Energy
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

November 10, 1987

In reply refer to SJ

Mr. Kenneth L. Evans, Supervisor
Malheur National Forest
USDA Forest Service
139 Northeast Dayton Street
John Day, OR 97845

Dear Mr. Evans:

Bonneville Power Administration (BPA) has reviewed the Draft Environmental Impact Statement (EIS) on the Malheur National Forest Proposed Land and Resource Management Plan. We offer the following comments for your consideration.

1. As noted in the draft EIS, BPA is currently funding a number of fish and wildlife enhancement projects on the Malheur National Forest. These projects were implemented through the Northwest Power Planning Council's Columbia Basin Fish and Wildlife Program, as part of the Pacific Northwest Electric Power Planning and Conservation Act of 1980. BPA has invested ratepayer money for these projects through an interagency agreement with the Malheur National Forest. The enhancement projects also represent investments in planning and coordination by other Federal, state, and local agencies.

   The enclosed table from the John Day River Basin "Working Paper" shows the projects that BPA is funding on the Mainstem, the Upper Mainstem, the Middle Fork, and the South Fork of the John Day River. These have been identified as priority opportunities for increased fish production. We urge you to protect the enhancement projects and the entire watershed by giving special attention to riparian and adjacent terrestrial areas where logging and road building activities are planned. Specifically, riparian areas should be protected within 100 feet of project sites, and preferential consideration should be given for adequate protection from sedimentation.

   If you have any questions about BPA's fish and wildlife projects, please call Mr. Larry Everson, 503-230-5199 (FTS 429-5199), of BPA's Division of Fish and Wildlife.

2. The draft EIS and Proposed Land and Resource Management Plan (Plan) fail to address utility and transportation corridors as required by the Federal Land Policy and Management Act (FLPMA). To facilitate the timely and orderly development of future utility projects, the EIS and Plan should designate existing and proposed transportation and utility corridors, and should address the impacts, if any, of alternative management plans on rights-of-way and corridors. Please refer to the 1986 Western Regional Corridor Study for a list of corridors recommended for designation by the Western Utility Group and for guidance on how corridors should be treated in the EIS and Plan. We recommend that a management area for designated corridors and avoidance and exclusion areas be established, and that corridors be shown on a map. BPA does not have any transmission lines that cross the Malheur National Forest, but Idaho Power Company and California Pacific Utilities Company do have lines crossing the Forest. These utility companies should be consulted.

3. BPA has some communication facilities within the Forest. Since BPA must have access to these facilities at all times for maintenance and emergency situations, we request that you contact BPA's Snake River Area Operations and Maintenance Manager, Mr. Truman Conn, to discuss any actions the Forest may take that could affect BPA's facility access or system reliability. Mr. Conn's address is West 101 Poplar, Walla Walla, Washington 99362, telephone 509-522-6238 (FTS 434-6238).

4. We recommend that the EIS and Plan address renewable energy resources such as wind, hydroelectric, geothermal, and biomass. In particular, you could identify the type and potential of the resource, the impact of the management alternatives on it, and any conflicts that might be involved with resource development. BPA has information on Northwest energy resources which may be of help to you.

Thank you for the opportunity to comment on the draft EIS. If you need additional information, please feel free to contact me.

Sincerely,

Nicholas J. Stas
for Anthony R. Morrell
Assistant to the Administrator for
Environment

Enclosure

Department of Fisheries and Wildlife
College of Agricultural Sciences
Oregon State University
Corvallis Oregon 97331 3803 (503) 754 4531

October 29, 1987

Mr. Charles Graham, Acting Forest Supervisor
Malheur National Forest
139 NE Dayton Street
John Day, OR 97845

Dear Mr. Graham·

Biologists of both the U.S. Fish and Wildlife Service and the Oregon Department of Fisheries and Wildlife have been in contact with me concerning the provisions for protection of fishes in the Malheur National Forest Plan now under consideration Because I have some familiarity with the Harney Basin and the isolated fish fauna there, I am taking the liberty of writing you in regard to two fishes that I believe should be accorded protection in any future management of the Malheur National Forest.

The first of these is the trout generally known as redband", a representative of the genus Salmo that currently has no formal scientific name. This apparently is a form ancestral to other members of the "rainbow series", having achieved its inland distribution after the spread of the cutthroat group and before the invasion of the more typical rainbow found in drainages open to the sea. The lack of a scientific *name - whether that name would designate* the redband series as a full species or one or more subspecies of rainbow - is not the fault of the trout. This is a fish that has been long established in isolated streams and basins and in headwaters of streams from well south in California to well north in British Columbia. It is basically recognizable by its pigmentation, fine scales, gill raker and pyloric caeca count, and its ability to withstand severe environmental conditions including elevated water temperatures. It generally resembles rainbow, but some stocks have basibranchial teeth, a cutthroat characteristic.

As one would expect from long isolation of stocks of a representative of such a genetically plastic genus as Salmo, there are many morphotypes and genotypes of this remarkable taxon. These are under study by ichthyologists at several universities and by biologists of several state and federal agencies. Anyone considering action that could cause

diminution or extinction of any stock of this fish should consider also the problems faced by the scientists who are trying to make sense of this evolutionarily interesting group of stocks that have *important potential* for fisheries management in inland areas with marginal habitat. In order to describe and name this intriguing biological entity, specimens must be studied from throughout the very considerable range and from many streams *and tributaries* in that range. (For instance my student Peter Bisson collected three definitely recognizable morphotypes of rainbow-like or redband-like trout during his study of the Silvies.) Data of many sorts, including meristics, morphometrics, biochemistry and ecology must be assembled, studied and evaluated, and opinions of the ichthyological community must be sought and considered. We must be forgiven for being slow in trying to find real answers to a difficult and important taxonomic problem

Because the trout has no name and has no current concensus among ichthyologists as to whether it is a species, subspecies or a series of races of inland rainbow" does not mean that it is a non-entity and can be ignored as a potential source of hatchery stocks, as an angling resource or as a possible item on the federal list of threatened species.

I note that Dr. Graham Gall (even though he does not consider the redband a separate species), in his September 1981 report to the Malheur National Forest calls for management policy of a type ". . . that the diverse resource will be maintained in such a way as to allow *evolutionary processes to continue.*' The enclosed copy of Dr. Robert Miller's August 1970 letter to Mr. William Delbert, although specifically dealing with the smooth sculpin of the Harney basin, expresses in the second paragraph the general importance of protecting stocks such as the redband trout.

The second species of concern is Cottus bairdi subsp., the Malheur mottled sculpin. The proper application of a subspecific name to this sculpin awaits a general study of the subspecies of C. bairdi. I personally believe it should be a subspecies (bendirei) separate from the upper Snake River form (punctulatus) from which it evolved. Although this fish has no potential economic value, it should be protected for many of the reasons outlined for the redband.

I am enclosing two letters concerning *protection of C. bairdi subsp.* The major change in knowledge of this subspecies since 1971 is that there are populations in high tributaries of Silver Creek; which, I presume are not in the Malheur National Forest.

I hope this letter will be of help in planning for the proper protection of the fishes of the Malheur National Forest. I would be happy to respond to questions you might have concerning these species.

Sincerely,

Carl E. Bond

Carl E. Bond
Professor Emeritus of Fisheries

Enclosures

CEB/cv

- UNION COUNTY -

County Court

JOHN J. HOWARD County Judge
MIKE CALDWELL Commissioner
MARIE C. LESTER Commissioner

1100 L Avenue | La Grande, Oregon 97850 | Phone (503) 963-1001

December 10, 1987

Forest Supervisor
Malheur National Forest
139 Dayton Street
John Day, Oregon 97845

Dear Forest Supervisor.

The Union County Court supports the management of the Malheur National Forest under the "Preferred-Plus" alternative with an annual timber sale program ceiling for the next 10 years at approximately 260 million board feet per year.

We also feel that the roadless areas need to be reconsidered primarily because of fire control access.

We appreciate the opportunity to comment on the management of the Malheur National Forest.

Sincerely,

John J. Howard
County Judge

Mike Caldwell
Commissioner

Marie C. Lester
Commissioner

sb

GRANT COUNTY COURT
COURTHOUSE
CANYON CITY, OR 97820
503-575-0059

4 November 1987

Chuck Graham, Acting Supervisor
Malheur National Forest
John Day, Ore, 19845

Re. Management plan for Malheur National Forest

After considering the various alternatives, and after consultation with various citizens groups, we support Alternative F, as being the best mix for responsible management for all concerns. We do, however, have some comments and suggestions. Mr Holland has chosen to make his own comments.

1. Rather than maintain roadless areas vs. roaded areas, we recommend that road standards be reduced, and seasonal road closures be used. Reducing road standards will result in less soil disturbance, slower travel, and less travel when conditions are poor. Access roads for logging can simply be obliterated when logging is finished.

2. We realize that the big game is managed by the State of Oregon, while the habitat is managed by the USDA This results in some lack of direction in the numbers of animals and fish that are considered optimum. However, it is our position that reasonable timber harvest and reasonalbe numbers of game can co-exist, if both are properly managed. Rather than set aside areas for each, we recommend that management plans provide for use by both.

3. We find some confusion in the mass of data concerning timber harvest. From all we can gather, the total allowed harvest is no greater than has been historically harvested. Perhaps we should be talking about what we cut, rather than how much. We favor a ponderosa pine forest over one of associated species, and uneven aged management over even aged In connection with harvest, we strongly urge an aggresive reforestation plan, favoring ponderosa pine.

4. We urge management of the water resource by watershed, rather than emphasis on riparian areas. This need not reduce the allowable AUMs, rather it will move them around.

5 We find the recreational goals a little confusing. There is more than adquate provision for roadless recreation, there is acknowledgment of the need for roaded recreation, but there is lack of upkeep and development of forest camps. The deplorable condition of access roads to forest camps is of special concern to us. The roadless recreation provisions answer the need for the able bodied and those seeking solitude; we see a need for provision for those less able bodied. Many of the visitors to our forests now are retired persons--they seek a forest experience, but have limited capability for walking. In this same line, we would like to see an aggresive program of signing of areas of historic and geoligic interest within the forest.

6. The National Forests have an on-going problem with pests. We agree with F-departure which provides for salvage sales. We also need a management plan, and provision for funding, timely treatment of pest infestation and on-going harvest of the resulting dead trees.

7 In general forest management, we urge the utilization of various means of slash disposal to present a cleaner, more pest-free, and less fire-hazardous forest. This would also reduce the need for extensive visual corridors.

8. We realize the best plan is no good without a budget for carrying it out, and that most intensive management practices carry a high price tag. Do we know at what level the National Forest operation will be funded? Is there a possibility that some intensive management practices could help pay for themselves?

Thank you for this opportunity to comment on the proposed Malheur National Forest plan.

Lorene Allen, County Judge

Calvin Clark, County Commissioner

cc: Congressional delegation

County Court *for* Harney County

P.O. BOX 1147
BURNS, OREGON 97720

December 11, 1987

Forest Supervisor
Malheur National Forest
139 Dayton Street
John Day, Oregon 97845

Dear Sir.

The Harney County Court appreciates the opportunity to comment on the draft environmental impact statement for the proposed Land and Resource Management Plan for the Malheur National Forest.

Harney County is opposed to Alternative F, the Forest Service preferred alternative.

Harney County does not have a single preferred alternative, but would appreciate your consideration of incorporating the following thoughts in your final EIS:

1. We believe that Ponderosa Pine production is essential to the economic future of Harney County. That Ponderosa Pine is the product that gives us a competitive edge in the lumber market both in times of housing booms and housing busts.

2. That the plan's decision to permit Ponderosa Pine sites to be converted to associated species is an unwise decision.

3. Emphasize the management of the Forest for the production of Ponderosa Pine on sustained yield basis. This would maximize community stability by providing an even flow of high value Ponderosa Pine that would maintain jobs and revenues to counties and schools on a long-term basis. This could mean managing the Forest for Ponderosa Pine in the 20 to 22 inch diameter range.

4. Maintain timber sales at a sustained yield level by continuing the selective logging of individually marked trees.

5. Eliminate clear cutting except in the non-Ponderosa areas where clear cutting is the preferred practice.

6. Manage the Forest for uneven (multiage) timber stands.

7. Harney County questions whether the Forest Service has adequately addressed the increased economic value of a quality Ponderosa Pine log. We believe that a separate study of the

value of Ponderosa Pine should be conducted instead of lumping it in with all other species.

8. Harney County questions the validity of the increase in employment levels in the EIS.

9. Harney County is opposed to the plan's proposal to permit big game numbers to almost double This would not only reduce the forage on the Forest but would result in increased pressure on adjacent private lands where the animals spend a part of each year.

10. Harney County is concerned that the plan's policy of increased big game numbers would result in a decrease of AUM's. If the Forest can sustain increased forage consumption, as you suggest, we would then recommend that grazing levels for domestic livestock remain at present levels.

11. Consideration should be given for additional water development to permit utilization of forage that is unavailable for use and divert some of the present pressure from riparian areas.

12. Maintain the present park-like old growth appearance along most major travel routes.

13. Road closures should continue to be used as a wildlife management tool.

14. Retain the necessary land allocation for timber production that would continue to sustain Ponderosa Pine production at or near present allowable cut levels.

15. Timber growth should continue to be measured on a board foot unit instead of a cubic foot unit. The cubic foot growth measurement could give the false impression that we are growing an adequate amount of timber when in reality all we are producing is fiber and have lost our ability to produce timber that will provide a high-quality board.

16. Riparian areas should be subject to enhanced management techniques that will permit continued AUM and timber production while protecting the resource and providing for fish, wildlife and scenic benefits.

17. Eliminate the consideration of additions to wilderness and special set aside areas that are in fact mini-wilderness areas. Proper consideration for wilderness in the Malheur Forest

was accomplished by the Oregon Wilderness Act and there is no justification to attempt to modify the Act by management planning.

18. Concern that the proposed slash management policy of letting slash lay on the ground will result in increased insect and disease problems, make cow movement difficult, reduce the AUM's of forage and will have serious visual impacts.

19. Concern that the proposed riparian management policy could drastically effect individual ranchers, perhaps even to the point of forcing them out of business.

20. Increase the emphasis on the salvage of dead and dying trees on a timely basis to ensure that they are harvested while they are still in a marketable condition.

In summary, Harney County supports a multiaged forest managed on a sustained yield basis that emphasizes the continued production of quality Ponderosa Pine that will permit an allowable cut that will maintain the counties' work force and stabilize the economic return to the county for now and for the future. We believe that by considering our comments and recommendations and with the Forest Service's expertise that a plan can be developed that will protect our economic base and still provide for the amenities that cause most of us to live here.

I appreciate very much the efforts of Burns District Ranger Hal Beamer and the Malheur Forest's planning staff to review and explain the plan to the Court. It was very informational and helpful and made the plan more understandable. They are to be commended for the professional manner in which they presented and explained the planning process.

Please feel free to contact me if you have any questions or if I can expand on any of our thoughts.

Sincerely,

Dale White

Dale White
Harney County Judge

DW:ed

cc: K. Norman Johnson
Federal Plan Coordinator

City of Prairie City
P.O Box 577
Prairie City, Oregon 97869
Phone (503) 820 3605

October 7, 1987

Malheur National Forest Supervisor
139 N.E. Dayton
John Day, Oregon 97845

Dear Sir:

Members of the Prairie City Council have attended several of the information programs on the Malheur Forest Plan (Alternative P). They have expressed concern that Dixie Creek Drainage is not listed as a Municipal watershed.

The Prairie City Council would like to go on record as requesting that the Dixie Creek Drainage be considered as a primary watershed for the City of Prairie City.

We are now in the process of expanding and improving our water source on Dixie Creek.

Thank you for your consideration.

Sincerely,

Donald L. Parker

Donald L. Parker, Mayor
City of Prairie City, Oregon

cc: Long Creek Ranger,
Long Creek District

VI

List of Preparers

VI List of Preparers

The following is a list of Forest Interdisciplinary Team (IDT) and Forest Planning Core Team members who developed the Malheur National Forest Land and Resource Management Plan, Final Environmental Impact Statement, and supporting documents.

Numerous other Forest employees contributed to the completion of these documents through assignments to the Land Management Planning shop, by providing needed information, or by assuming the duties of co-workers who were deeply involved in the planning effort

A. Forest Leadership Team

Mark A Boche - Forest Supervisor
Cathy S Barbouletos - Planning Staff Officer
Charles R Graham - Timber Staff Officer
Michael J. Cavin - Administrative Officer
Jim Payne - Fire Management, Lands, and Minerals Staff Officer
Francis E. Fiebiger - Forest Engineer
Richard J Haines - Fish and Wildlife Staff Officer
Tim Kimble - Recreation, Special Uses, Cultural Resources, Visual Resources Staff Officer
Ernest V Kehrberg - Range and Watershed Staff Officer
Jennifer L Harris - Public Affairs Officer
Doug Robin - Bear Valley District Ranger
Harold L Beamer - Burns District Ranger
John L Shoberg - Long Creek District Ranger
L J Sloan - Prairie City District Ranger

B Planning Team Present Members

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BS Outdoor Recreation, MS ForestManagement, MS Hydrology
10 years experience in hydrology, timber and resource management

Crist, Carey - General Information System (GIS) Coordinator
BS Forest Management, MS Forest Pathology
15 years experience with USDA Forest Service

Gray, Vern L. - Fire Planner
BS Chemistry
28 years experience in fire management with USDA Forest Service

Gritz, Richard L. - Fishery Biologist
BS Biological Science
13 years experience with USDA Forest Service

Haines, Richard J. - Fish and Wildlife Staff Officer
BS Wildlife Management
11 years experience with USDA Forest Service

Kehrberg, Ernest V. - Range Staff Officer
BS Range Management
33 years with USDA Forest Service

Kimble, Tim - Recreation Staff Officer
BS Forest Management Science
12 years experience with USDA Forest Service, 1 year experience as a Forester with the Wisconsin State Department of Natural Resources; 1 year with Rocky Mountain Forest and Experiment Station

Krause, Catherine A. - Writer-Editor
BS Secondary Education/Language Arts
6 years experience with USDA Forest Service.

Lindley, Peter A. - Operations Research Analyst
BS Mechanical Engineering
4.5 years experience with USDA Forest Service; 20 years experience in nuclear power industry, 8 years experience in petroleum industry; and 9 years experience on computer programming and analysis.

McArthur, William L. - Forest Silviculturist
BS Forest Business Management; MS Forest and Range Science
21 years experience with USDA Forest Service.

Payne, Jim - Fire Management, Lands, and Minerals Staff Officer
BA Outdoor Recreation, post-graduate studies in Fire Science
20 years experience with USDA Forest Service

Peterson, William C. - Planning Team Leader
BSF Forest Science; MF Silviculture
10 years experience with USDA Forest Service

Stoddard, Gini S. - Data Base Administrator
BS Natural Science (Earth Sciences)
6 years with USDA Forest Service

Sullivan, Timothy E. - Soil Scientist
BS Forest Management; MS Soil Science
14 5 years experience with USDA Forest Service, 1 year related experience with Soil Conservation Service and Forestry Science Laboratory, Logan, Utah

Weber, Deena M. - Planning Clerk/Editing Assistant
2 years experience with USDA Forest Service, 9 years other computer experience

Weideman, G. A. - Engineering Representative
BS Forest Engineering
33 years experience with USDA Forest Service

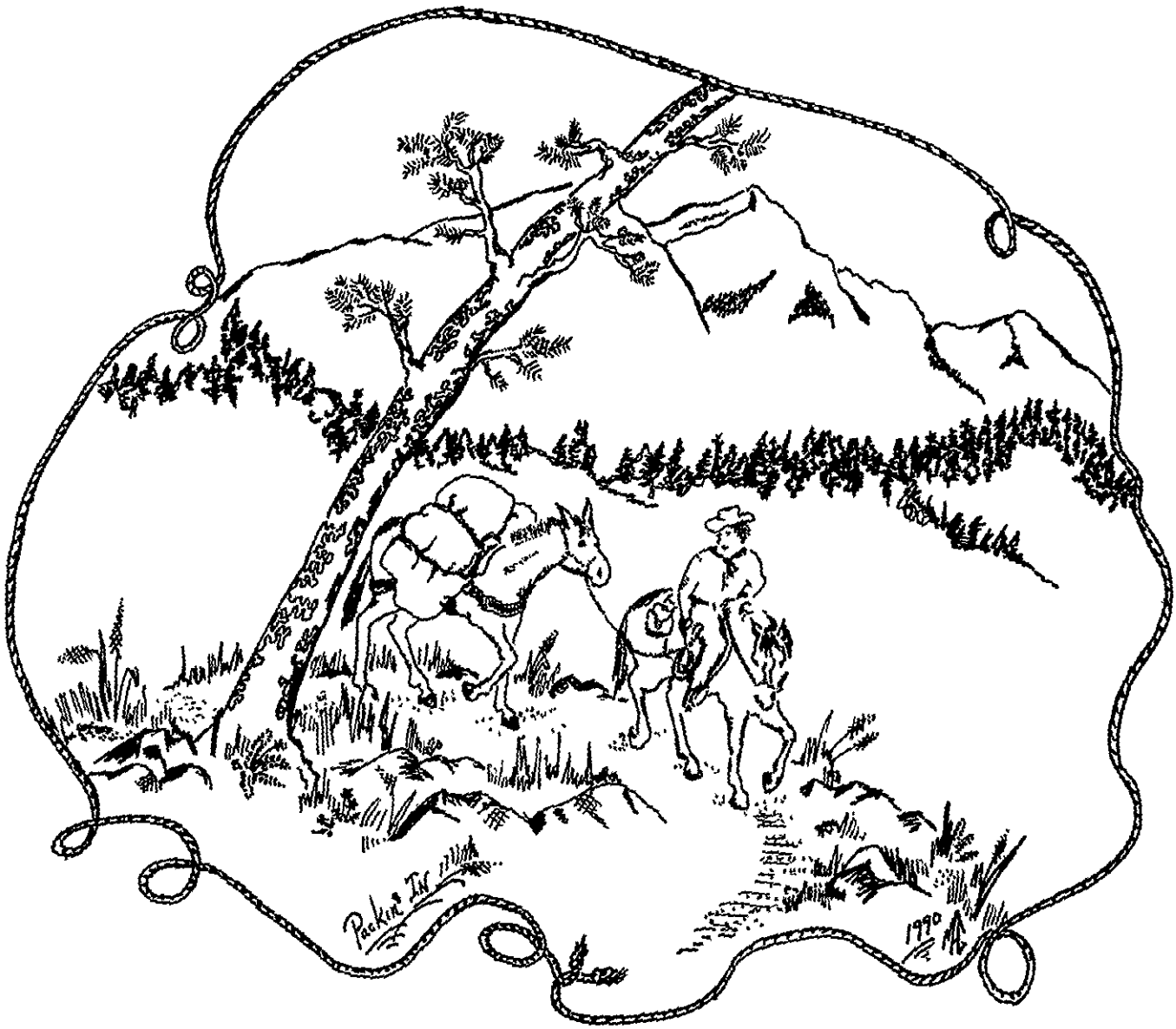
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E. Others Providing Substantial Contributions	Abercrombie, Sandra A. - Computer Specialist *Anderson, Linda - Cartographic Technician *Avery, Daniel G. - Area Mining Geologist Ball, Edward A (Bud) - Resource Assistant Crowley Thomas, Suzanne - Forest Archaeologist Deschene, Wallace A. - Computer Specialist, R4/INT *Dezellem, Richard L - Silviculturist **Johnson, Dr K Norman - Federal Forest Planning Coordinator, State of Oregon Keegan, Stephen P - Landscape Architect Krause, Joel A - Civil Engineer *Lowrie, James C. - Wildlife Biologist McIntosh, Pamela J - Data Processor Powell, David C - Silviculturist Steggell, Norman H - Forest Archaeologist Stratton, Mary Jo - Forest Supervisor's Secretary
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* No longer with the Malheur National Forest
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1990

VII

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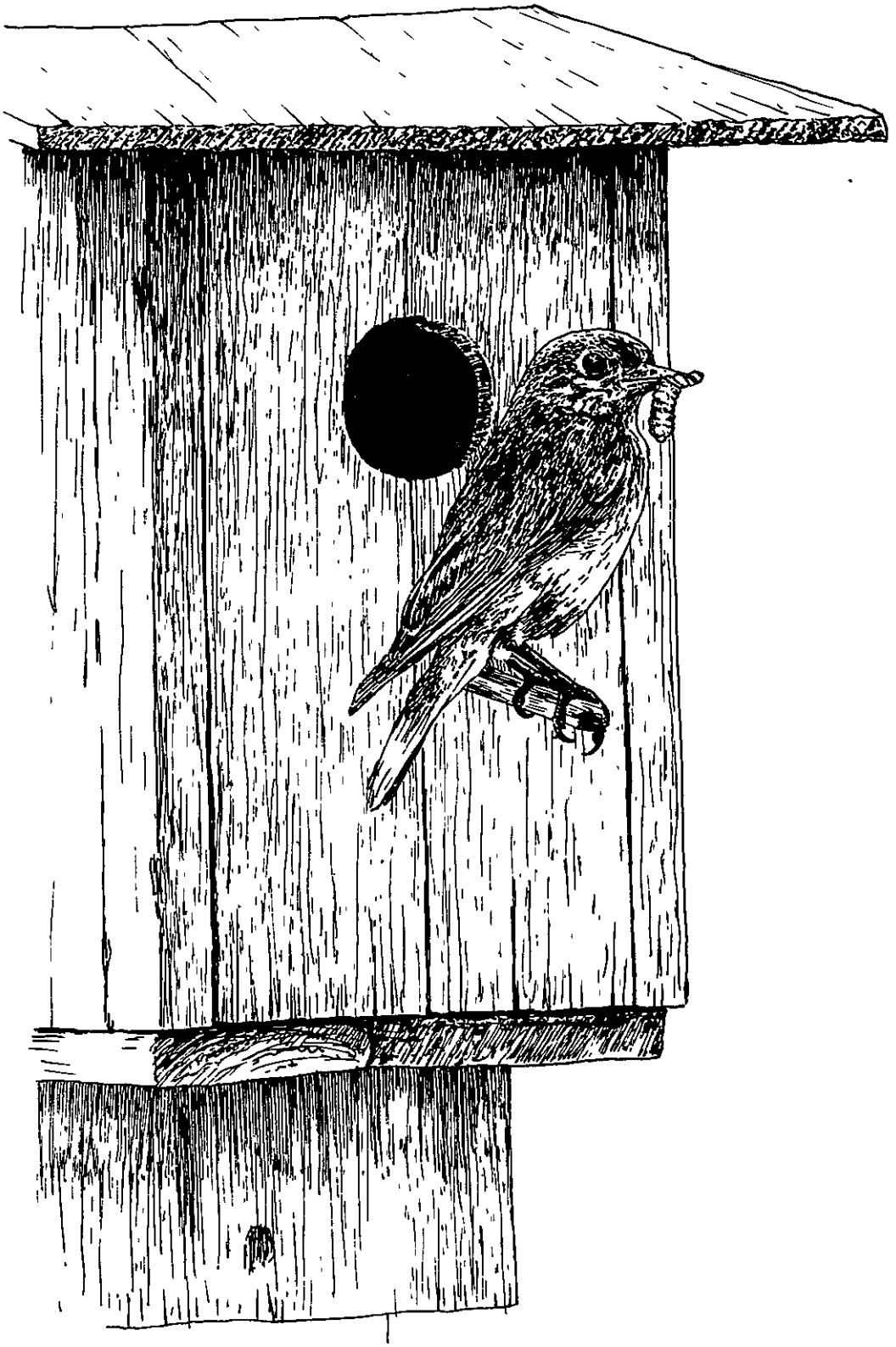
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VIII

Glossary

VIII Glossary, Acronyms, and Abbreviations

Acronym, Abbreviation	Definition
BLM	Bureau of Land Management
BMP	Best Management Practices
BTU	British Thermal Units
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CFL	Commercial Forest Land
CFR	Code of Federal Regulations
CRM	Cultural Resource Management
CMAI	Culmination of Mean Annual Increment
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
DEP	Departure Alternative
DEQ	Oregon Department of Environmental Quality
DF	Douglas-fir
EA	Environmental Assessment
EEO	Equal Employment Opportunity
EHE	Earned Harvest Effect
EIS	Environmental Impact Statement
EO	Executive Order
FEIS	Final Environmental Impact Statement
FMEI	Fire Management Effectiveness Index
FORPLAN	Forest Planning Model
FPFO	Forestry Program for Oregon
FSH	Forest Service Handbook
FSM	Forest Service Manual
FUD	Fishing User Days
FY	Fiscal Year
HCI	Habitat Capability Index
ICOs	Issues, Concerns, and Opportunities
ID	Interdisciplinary
IMPLAN	Forest Service Input-Output Model
K-V	Knutsen-Vandenberg Act of 1924
Kv	Kilovolt
LTSY	Long-Term Sustained Yield
M	The Roman Numeral for 1000
MM	The Roman Numeral for 1,000,000
MBF	Thousand Board Feet
MCF	Thousand Cubic Feet
MIS	Management Indicator Species
MMBF	Million Board Feet
MMCF	Million Cubic Feet
MMR	Minimum Management Requirements
MRVD	Thousand Recreation Visitor Days
MVP	Minimum Viable Population

Acronym, Abbreviation	Definition
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NFF	National Forest Fund
NFMA	National Forest Management Act
NFS	National Forest System Land
NWPS	National Wilderness Preservation System
ODF&W	Oregon Department of Fish and Wildlife
ORV	Off Road Vehicle
PAMARS	Program Accounting and Management Attainment Reporting System
PAOT	People at One Time
P L.	Public Law
PNV	Present Net Value
PP	Ponderosa Pine
R-6	Forest Service, Pacific Northwest Region
R-6 FEIS	Final EIS, Pacific Northwest Regional Guide
RARE II	Roadless Area Review and Evaluation
RIM	Recreation Information Management
RN	Roaded Natural
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974
RVD	Recreation Visitor Days
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan (for Air Quality)
SMU	Streamside Management Unit
SPM	Semiprimitive Motorized
SPNM	Semiprimitive Nonmotorized
SRI	Soil Resource Inventory
T&E	Threatened and Endangered Species
TRP	Timber Resource Plan
TSI	Timber Stand Improvement
TSP	Total Suspended Particulates
USDA	United States Department of Agriculture
VIS	Visitor Information Service
VMS	National Forest Visual Management System
VQO	Visual Quality Objectives
WFUD	Wildlife and Fish User Day
WUD	Wildlife User Day

GLOSSARY

A

AA	See Analysis Area
Acre Equivalent	A unit of habitat output related to fish and wildlife habitat improvement projects Habitats influence the quality and usefulness of surrounding acres, not just the land directly treated Acre equivalents represent the number of acres which benefit by the habitat improvement project
Acre-Foot	A measure of water or sediment volume equal to the amount which would cover an area of 1 acre to a depth of 1 foot (325,851 gallons or 43,560 cubic feet)
Activity	A measure, course of action, or treatment that is undertaken to directly or indirectly produce, enhance, or maintain Forest and rangeland outputs or achieve administrative or environmental quality objectives
Activity Area	The total area of ground impacted by the activity, and is a feasible unit for sampling and evaluating
Activity Fuels	Debris generated by a Forest activity that increase fire potential such as firewood gathering, precommercial thinning, timber harvesting, and road construction
Actual Use	The use made of forage on any area by livestock and/or game animals without references to permitted or recommended use It is usually expressed in terms of animal unit months or animal units
Aerial Logging System	A method for moving logs from the stump to a collecting point which fully suspends the log above the ground while transporting it, e g , balloons or helicopters, as opposed to ground (tractor) skidding
Affected Environment	The biological, social, economic, and physical aspects of the environment that will or may be changed by proposed actions
Age-Class Diversity	The location and/or proportionate representation of different age classes in a forest Age-class diversity implies tree site diversity.
Air Quality	The composition of air with respect to quantities of pollutants there in, used most frequently in connection with "standards" of maximum acceptable pollutant concentration
Airshed	Basic geographic units in which air quality is managed
Allotment	See Range Allotment
Allotment Management Plan (AMP)	A document that specifies the program of action designated to reach a given set of objectives It is prepared in consultation with the permittee(s) involved and prescribes the manner in and extent to which the permittee's livestock operations will be conducted in order to meet multiple use, sustained yield, economic, and other needs and objectives as determined for the lands involved It describes the type, location, ownership, and specifications for the range improvements in place or to be installed and maintained on the lands to meet the livestock grazing and other objectives of land management It contains such other provisions relating to the permittee's livestock management responsibilities and other objectives as may be prescribed by the Forest Service consistent with applicable law

Allowable Sale Quantity (ASQ)	The quantity of timber that may be sold from the area of land covered by the Forest Plan for the time period specified. This quantity is usually expressed on an annual basis as the average annual allowable sale quantity
Alternative	A combination of management prescriptions applied in specific amount and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making. An alternative need not substitute for another in all respects.
Amenity	An area or location that provides comforts, conveniences, or attractive surroundings to residents or visitors. A feature, trait, or characteristic that creates pleasantness
Amenity Value	Resource use for which market values (or proxy values) are not or cannot be established
Anadromous Fish	Those species of fish that mature in the sea and migrate into streams to spawn, i e , salmon and steelhead trout.
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.
Analysis of the Management Situation	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.
Animal Unit	Considered to be one mature (1,000 pound) cow or the equivalent based upon average daily consumption of 26 lbs of dry matter/day
Animal Unit Month (AUM)	(1) The amount of feed or forage required by an animal unit for one month (2) Tenure of one animal unit for a period of one month
Appropriated Funds	Money made available by Congress for the various activities of the National Forest System and other Federal agencies
Appropriate Suppression Response	The kind, amount, and timing of suppression action on a wildfire which most efficiently meets fire management direction under current and expected burning conditions The action may be from prompt control to confinement.
Arterial Road	A road that provides service 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
Artifact	A sample object (such as a tool or ornament) showing early human workmanship or modifications.
Assigned Value	A monetary value that represents the price consumers would be willing to pay for Forest outputs, whether or not such prices are actually paid to the Federal Government by consumers In Forest planning, the term "assigned values" refers to both market and nonmarket outputs because it is national policy to provide most Forest outputs at either no charge to consumers or at a price less than the willingness-to-pay price
Available Forest Land	Land that has not been legislatively withdrawn or administratively withdrawn for timber production by the Secretary of Agriculture or Chief of the Forest Service

B

Background	The portion of a view between three and five miles from the observer and as far into the distance as the eye can detect the presence of objects.
Background Value	The constant, ever-present condition or output above which a change is measured
Base Sale Schedule (BSS)	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
Bedrock	Any solid rock exposed or overlain by unconsolidated material
Benchmark	Reference points that define the bounds within which feasible management alternatives can be developed Benchmarks may be defined by resource outputs or economic measures
Benefit/Cost Ratio	Measure of economic efficiency computed by dividing total priced benefits by total economic costs
Best Management Practices (BMP)	The set of practices in the Forest Plan which, when applied during implementation of a project, ensures that water-related beneficial uses are protected and that State water quality standards are met Best Management Practices can take several forms Some are defined by State regulation or memoranda of understanding between the Forest Service and the State Others are defined by the Forest interdisciplinary planning team for application Forest-wide Both of these kinds of BMPs are included in the Forest Plan as Forest-wide Standards A third kind is identified by the interdisciplinary team for application to specific management areas, these are included as management area standards in the appropriate management areas A fourth kind, project level BMPs, are based on site-specific evaluation and represent the most effective and practicable means of accomplishing the water quality and other goals of the specific area involved in the project. These project-level BMPs can either supplement or replace the Forest Plan standards for specific projects
Big Game	Those species of large mammals normally managed as a sport hunting resource
Big-Game Winter Range	The area available to and used by big game through the winter season
Biological Potential	The maximum possible output of a given resource limited only by its inherent physical and biological characteristics
Biological Growth Potential	The average net growth attainable in a fully stocked natural area of forest land
Biomass	The total quantity at a given time, of living organisms of one or more species per unit area or of all the species in a community.
Board Foot	A unit of measurement represented by a board one foot square and one inch thick
Broadcast Burn	Allowing a controlled fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard, as a silvicultural treatment, or both
Browse	Twigs, leaves, and young shoots of trees and shrubs which animals feed on; in particular, those shrubs which are utilized by big-game animals for food
Bulk Density	See soil bulk density

C

Cable Logging	A method for transporting logs from stumps to collecting points which utilizes a cable system as the main device for moving them.
Canopy	The more-or-less-continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth
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 a given level of management intensity. Capability depends upon current site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fires, insects, and disease
Capability Area	A geographic delineation 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.
Capital Investment Cost	The cost of structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods
Carrying Capacity	*Recreation*: The amount of recreation use an area can sustain without deterioration of site quality. *Wildlife*. The maximum number of animals an area can support during a given period of the year. *Range*: The maximum stocking rate possible without damaging the vegetation or related resources Carrying capacity may vary from year to year on the same area due to fluctuating forage production
Cavity	A hollow in a tree that is used by birds or mammals for roosting and reproduction.
Characteristic Landscape	The overall impression created by a landscape's unique combination of visual features (such as land, vegetation, water, structures) as seen in terms of form, line, color, and texture.
Chargeable Volume	All volume that is 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.
Check Dam	A structure of wood, rock, or brush built across a watercourse to reduce the flow rate of water and thus the rate of erosion
Class I Area (Airshed)	One of three classes of areas provided for in the Clean Air Act for the Prevention of Significant Deterioration program Class I areas are the "cleanest" area and receive special visibility protection. They are allowed very limited increases (increments) in sulfur dioxide and particulate matter concentrations in the ambient air over baseline concentrations (See 42 U S C 7473 for description of the specific increments).
Class I Wilderness	*Refers to airshed management See Class 1 Airshed*

Clean Water Act of 1987	Amends the Federal Water Pollution Control Act of July 9, 1956. The purpose of the 1956 act is to enhance the quality and value of the water resource, and to establish a national policy for the prevention, control, and abatement of water pollution Among the important provisions are authority for the State and Federal Governments to establish water quality standards, provision for water pollution grants for research and development, control programs, construction of treatment works, and comprehensive programs for water pollution control; enforcement measures against pollution from Federal facilities, and provision for the control of pollution by oil, hazardous substances, or sewage from vessels The basic act (Public Law 84-660), is amended by the Federal Water Pollution Control Act/Amendments of 1961 (Public Law 87-88); Water Quality Act of 1965 (Public Law 89-234), Clean Water Restoration Act of 1966 (Public Law 89-753Z); Title I, Water Quality Improvement Act of 1970 (Public Law 91-224), Title I, National Environmental Policy Act of 1969 (Public Law 91-224), Federal Water Pollution Act of 1969 (Public Law 91-224), Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), Clean Water Act of 1977 (Public Law 95-217), Clean Water Act of 1987
Clearcutting	Harvesting of all trees in one cut It prepares the area for a new, even-aged stand The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as a separate age class in planning Regeneration is obtained through natural seeding, or through planting or direct seeding
Climax	The highest ecological development of a plant community capable of perpetuating under the prevailing climatic and edaphic conditions
Climax Ecosystem	See Climax Plant Community.
Climax Plant Community	The final or stable biotic community in a developmental series
Closed Roads	A road, or segment thereof, is closed to use when the official having jurisdiction to regulate the use on the road has issued an order and posted that order in accordance with 36 CFR 261.
Coefficient	The numeric units used to include costs, values, and outputs in the analysis model used in the formulation of the Forest Plan
Cogeneration	The process of producing steam or electrical power for one's own use and the selling of the excess electrical power produced to others
Cogeneration Facilities	Power plants, often associated with forest product industry mills, that use forest residue to produce electric power for their own use and for public consumption through public or private electric utilities
Collector Roads	These roads serve smaller land areas than a Forest arterial road, and is usually connected to a Forest arterial road or public highway. Collects traffic from local Forest roads and/or terminal facilities. The location and standard are influenced by both long-term, multi-resource 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
Commercial Forest Land (Suitable Timber 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) where existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity or watershed conditions, and (3) 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 harvest

Commercial Thinning	Thinning is an intermediate step in even-aged management It is a cutting made in a stand under rotation age to remove excess merchantable trees in order to accelerate growth in diameter and to improve the average form of the trees that remain without permanently breaking the canopy.
Commodity	A transportable resource product with commercial value; all resource products that are articles of commerce
Commodity Output	Goods or services normally bought and sold in a marketplace
Common Minerals	See Minerals, Common.
Compaction	See Detrimental Compaction.
Community Stability	The capacity of a community to absorb and cope with change without major hardship to institutions or groups within the community.
Comparison Communities	Communities that have been subject to actions similar to those being proposed by the Forest Service and that can be used to help predict possible social effects on the impact analysis area.
Confine	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 established by Congressional legislation, such as National Wilderness, National Wild and Scenic Rivers, and National Recreation Areas
Constraint	A confinement or restriction on the range of permissible choices.
Consumptive Uses	Uses of a resource that reduces the supply Examples of some consumptive uses of water are irrigation, domestic, and industrial water use, grazing, and timber harvesting
Contain	To surround a fire and any spot fires with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions.
Control	To complete the control line around a fire, any spot fires, 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.
Cord	A unit of gross volume measurement for stacked roundwood based on external dimensions, generally implies a stack of four feet by four feet vertical cross-section and eight feet long, contains 128 stacked cubic feet
Corridor	A linear strip of land which as ecological, technical, economic, social, or similar advantages over other areas for the present or future location of transportation or utility routes.
Cost Effective	Achieving specific outputs or objectives under given conditions for the least cost
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-cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate.

Council on Environmental Quality	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
Cover	Vegetation used by wildlife which provides shelter and protection from predators and from weather extremes
Cover/Forage Ratio	The ratio of tree cover (usually conifer types) to foraging areas (natural openings, clearcuts, etc)
Created Opening	Openings in the Forest created as the results of even-aged silviculture through clearcutting, group selection or shelterwood regeneration systems
Critical Habitat	Specific areas within the geographical area occupied by the species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection Critical habitat shall not include the entire considerations or protection Critical habitat shall not include the entire geographic area which can be occupied by the Threatened and Endangered Species
Crown Closure	The amount of cover provided by tree crowns over a given area, expressed in percent
Cubic Foot	The amount of timber equivalent to a piece of wood 1 foot by 1 foot by 1 foot
Culmination of Mean Annual Increment (CMAI)	The point at which the volume increment for a tree or stand of trees has achieved its highest mean value Mean annual increment is based on expected growth according to the management intensities and utilization standards assumed in the Forest Plan The CMAI is calculated by dividing the attained growth (volume) by its corresponding age
Cultural Resource	The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc) and conceptual content or context (as a setting for legendary, historic, or prehistoric events, as a sacred area of native peoples, etc) of an area of prehistoric or historic occupation

D

Decision Space	The range of permissible choices defined by restrictions
Decking Areas	Any place logs are temporarily stored prior to their removal from a timber sale
Deferred Forest Land	Productive forest lands withdrawn from cutting until further classification has been determined, i e , areas of potential resource protection
Deferred Rotation	A systematic rotation of pastures on which grazing is discontinued, allowing each pasture to rest during a growing season to permit seed production, establishment of seedlings, or restoration of plant vigor
Deficit Timber Sale	A timber sale in which the costs associated with producing the primary product plus the profit margin are greater than the selling value of the same product
Demand	The amount of an output that users are willing to take at a specified price, time period, and condition of sale
Demand Analysis	A study of the factors affecting the schedule of demand for a good or service, including the price-quantity relationship if applicable

Demand Schedule	The relationship between price and quantity demanded The demand schedule expresses how much of the good or service would be bought or consumed at various prices at a particular point in time
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.
Detrimental Compaction	*Volcanic Ash Soils.* An increase in bulk density of 20 percent or more from the undisturbed level. *Other Soils* An increase in bulk density of 15 percent or more from the undisturbed level.
Detrimental Displacement	The removal of more than 50 percent of the topsoil or humus enriched Al and/or Ac horizon from an area of 100 square feet or more which is at least 5 feet in width
Detrimental Puddling	Tracks where the soil has been molded and the depth of rutting has reached six inches
Developed Recreation	Recreation that occurs where improvements enhance recreation opportunities and accommodate intensive recreation activities in a defined area
Diameter at Breast Height (DBH)	The diameter of a tree measured 4 1/2 feet above the ground
Discount Rate	An interest rate that reflects the cost or time value of money. It is used in discounting future costs and benefits to present values
Dispersed Recreation	That portion of outdoor recreation use which occurs outside developed sites in the unroaded and roaded Forest environment this includes activities such as hunting, fishing, berry picking, off-road vehicle use, hiking, horseback riding, picnicking, camping, viewing scenery, snowmobiling, and many others
Displacement	See Detrimental Displacement
Diurnal Fluctuations	The rise and fall of temperature that occurs over 24 hour period
Diversity	The distribution and abundance of different plant and animal communities and species within an area
Draft Environmental Impact Statement (DEIS)	The statement of environmental effects 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

E

East-Side Forests	The 10 National Forests of the Pacific Northwest Region that lie east of the Cascade Mountain Range crest (Colville, Deschutes, Fremont, Malheur, Ochoco, Okanogan, Umatilla, Wallowa-Whitman, Wenatchee, and Winema National Forests)

Ecoclass	A classification system for the biological and earth sciences based on linking together existing disciplinary classification of the major ecosystem components It is a unifying framework for linking three basic biological and earth science stratifications or classifications, the vegetation subsystem, and the aquatic subsystem A hierarchical structure is given in which the lowest level units are the "ecological land unit" (ELU), a composite of the land and vegetation subsystems, and the "ecological water unit" (EWU), a composite of elements of the land and aquatic subsystems
Ecological Status	The degree of similarity between present community and the potential natural community for a site It considers only secondary succession.
Ecological Trend	The directional change in kind, proportion, and/or amount of plant species or soil characteristics The principal criteria to interpret trend in ecological status should be vigor and reproductive success of plant species that are indicative of later seral stages as compared to those of an earlier seral stage for the site The potential natural community is used as the reference plant community and trend is described as toward or away from the potential natural community, or not apparent Trend of soil surface conditions is interpreted from evidence of accelerated soil erosion
Ecology	The study of the interrelationships of organisms with their environment
Economic Efficiency	See Cost Efficiency
Ecosystem	A complete, interacting system of organisms considered together with their environment (for example a marsh, a watershed, or a lake)
Ecotone	A transition or junction zone between two vegetative communities.
Edge Effect	The increased richness of flora and fauna resulting from the mixing of two communities where they join
Effect (Impact), Physical, Biological	The change, positive or negative, in the physical or biological conditions which directly or indirectly results from an activity, project, or program
Effect (Impact), Economic	The change, positive or negative, in economic conditions, including the distribution and stability of employment and income in affected local, regional, and national economies, which directly or indirectly result from an activity, project, or program
Effect (Impact), Social	The change, positive or negative, in social and cultural conditions which directly or indirectly result from an activity, project, or program
Effective Ground Cover	All living or dead herbaceous or woods material and rock fragments greater than 3/4 of an inch in diameter in contact with the ground surface Includes tree or shrub seedings, grass, forbs, litter, woody biomass, chips etc
Elasticity, Price	A measure of the sensitivity of the quantity of a good or service exchanged to changes in price
Elk Wallow	A depression, pool of water, or wet area produced or utilized by elk during the breeding season
Empirical Yield Table	Tables reflecting the existing stand timber volumes today and how they would grow in the future if left untreated
Endangered Species	Any species, plant or animal, which is in danger of extinction throughout all or a significant portion of its range Endangered species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act

Endemic Infestations	Native or confined to a certain area, region, or county
Ending Inventory Constraint (ETC)	Constraint to ensure that the total timber volume left at the end of the planning horizon will be equal to or exceed the volume necessary to perpetuate a regulated Forest.
Enhancement	A short-term management alternative which is done with the express purpose of increasing positive visual or riparian variety where little variety now exists.
Environmental Analysis	An analysis 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
Environmental Impact Statement (EIS)	A document prepared by a Federal agency on the environmental effects of its proposals for major actions used as a tool for decision making. It is a formal document which must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal
Epidemic	Occurrence of insects or disease contained in population and location to a normal, balanced level.
Erosion	The group of processes whereby earthy or rocky material is worn away by natural sources such as wind, water, or ice, and removed from any part of the earth's surface.
Erosion Pavement	A layer or residue of more resistant material left exposed by the erosion of materials overlying it
Even-Aged Management	Application of a combination of actions that results in 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 the 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
Evident	That which is apparent to the casual forest visitor
Existing Visual Condition (EVC)	The present state of visual alteration of the landscape measured in degrees of deviation from the natural-appearing landscape
Extended Rotation	Retaining a timber stand beyond the time when economic return is greatest or the wood production objectives are best met
Extensive Forest Management	A low-investment level of management on regulated timber lands that requires initial harvest, regeneration, and final harvest. Some precommercial thinning may be done to prevent stand stagnation and disease buildup

F

Fee Site	A Forest Service recreation area in which users must pay a fee. Fee sites must meet certain facilities as specified in the Forest Service Manual.
Filter Strip	A designated land or water area, along the perimeter of some land use, whose own use is regulated so as to resist, absorb or otherwise preclude unwanted development or other intrusions into the filter strip

Final Cut	Removal of the last seed-bearers or shelter trees after regeneration is considered to be established under a shelterwood system
Final Environmental Impact Statement (FEIS)	The final statement of environmental effects 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
Fire Management Action Plan	Standards, guidelines, and practices to be used in wildfire suppression on the Malheur National Forest based on management practices presented in the Forest Plan
Fire Management Efficiency Index	An index based on the presuppression cost and expected net value change for a planning period
Final Overstory Removal	Removal of a mature timber overstory from a manageable immature timber understory
Fixed Costs	Costs that do not change with a varying level of output With respect to Forest planning, these costs include nondeferrable activities for ensuring public safety, environmental protection, and to maintain capital assets at agreed-upon levels of services
Floodplain	The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year
Forage	Forage refers specifically to all browse and nonwoody plants that are available to livestock or wildlife
Forage Condition	See Range Condition
Forage Trend	See Range Condition Trend
Forage Utilization	The portion of current year's forage production by weight that is consumed or destroyed by grazing animals Synonym, degree of use Expressed in percent of current year's growth utilized by grazing animals on an average over time.
Forb	Any herbaceous plant other than true grasses, sedges, or rushes
Foreground	The detailed landscape found within 0 to 1/4-1/2 mile from the observer. A term used in visual management to describe the landscape immediately adjacent to a high-value scenic area, recreation facility, or Forest highway (See background, middleground)
Forest Land	Land at least 10 percent occupied by forest trees of any size 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 clearing and powerline clearing of any width
Forest Land Use Plan (Forest Plan)	A plan which gathers and coordinates the direction to be followed in the overall management of a National Forest The implementation plan of a selected alternative for management of a National Forest
Forest and Range Land Renewable Resources Planning Act (RPA)	An Act of Congress requiring the preparation of a program for the management of the National Forest's renewable resources and 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
Forest Residue Biomass Potential	That material that is remaining after management activity that could be used for other uses, e g , fuelwood, particle board, fuel for cogeneration facilities, pulp, etc

Forest Residues (Logging)	The unused portions of sawtimber and poletimber trees cut or killed by logging
Forest Road Sign Plan	A plan that displays the type and location of all Forest signs
FORPLAN	A linear programming system used for developing and analyzing Forest planning alternatives.
Forest-Wide Standards	An indication or outline of policy or conduct dealing with the basic management of the Forest. Forest-wide management standards apply to all areas of the Forest regardless of the other management prescriptions applied.
Free-to-Grow	A term used to indicate that trees are free of growth restraints, the most common of which is competing overtopping vegetation.
Fuel	Plants, both living and dead, and woody vegetative materials which are capable of burning
Fuel Hazard	An accumulation of vegetative fuel that has a high risk of ignition or difficulty of suppression.
Fuel Treatment	The rearrangement or disposal of natural or activity fuels to reduce the fire hazard
Fuels Analysis Process	An analysis process developed by United State Forest Service, Region 6, to analyze the cost effectiveness of fuel treatment alternatives for the purpose of hazard reduction as it relates to wildfire protection.
Fuels Profile	Synonymous with Residue Profile Usually refers to activity created fuels, but may also relate to natural fuels
Fuelwood	Wood (round, split, or sawn), generally refuse material cut into short lengths for burning.
Full-Service Management	The administration, operation, and maintenance of developed recreation sites to established standards with the objective to provide a pleasant recreation experience for the visitor and exceed the minimum health and safety needs of the visitor
Fully Stocked Stand	A stand in which trees fully occupy the space but do not compete with each other.
Further Planning Areas	Areas designated by the RARE II process for further study to determine their use for wilderness or other resource management and development This will be done during the development of the Forest Plan

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 fisherman under State or Federal laws, codes, and regulations.
Geological Area	An area which has been designated by the Forest Service as containing outstanding formations or unique geological features of the earth's development such as caves, fossils, dikes, cliffs, or faults
Geologic Province	A large region characterized by similar geologic history and development

Geomorphology	A science that deals with the land and submarine relief features of the earth's surface or the comparable relief features of a celestial body (as the moon) and seeks a genetic interpretation of them
Geothermal	Heat from within the earth.
Goal	A concise statement that describes a desired condition to be achieved 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.
Goods and Services	The various outputs, including on-site uses, produced by forest and rangeland renewable resources
Grasslike	A plant of the Cyperaceae or Juncaceae families which vegetatively resemble a true grass of the Gramineae family
Grazing Allotment	See Range Allotment
Grazing Capacity	The number of animal unit months of livestock grazing an area will support while meeting basic resource needs and associated resource management goals
Grazing Distribution	The dispersion of cattle grazing over an entire pasture or allotment
Grazing Permits	Official, written permission to graze a specific number, kind, and class of livestock for a specific period on a defined range allotment
Group Selection Cutting	A cutting method to develop and maintain uneven-age stands by the removal of small groups of trees to meet a predetermined goal of size distribution and species composition in remaining stands
Growing Stock Level	A relative stand density measure used to guide a management objective, such as maximizing timber volume yields or optimizing big game thermal cover.
Gully	A furrow, channel or miniature valley, usually with steep sides through which water commonly flows during and immediately after rains or snow melt
Gully Erosion	The erosion process whereby water accumulates in narrow channels and over short periods removes the soil from the narrow area to considerable depths.
Guideline	An indication or outline of policy or conduct

H

Habitat	The natural abode of a plant or animal including all biological and climatic factors affecting life
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 Capability Model	A model which depicts the relationship of a species to a variety of habitat factors which provide for quantitative predictions of a species response (animal numbers) to habitat change.

Habitat Effectiveness Index (HEI)	An index of a Rocky Mountain elk habitat model. Habitat Effectiveness Index is the relative value of habitat conditions based on the potential of the habitat type to provide cover, the quality of existing cover, and the miles of road open to vehicular traffic
Habitat Type	An aggregation of all land areas potentially capable of producing similar plant communities at climax
Hard Snag	A snag composed primarily of sound wood, particularly sound sapwood, that is generally merchantable
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.
Herbicide	A chemical compound used to kill or control growth of undesirable plant species
Hiding Cover	Vegetation capable of hiding 90 percent of a standing adult deer or elk from human view at 200 feet.
Horizontal Diversity	The distribution and abundance of plant and animal communities or successional stages across an area of land, the greater the number of communities, the higher the degree of horizontal diversity. This concept is close to but not exactly the same as even-aged management, although each may influence the other Application of even-aged management, for example, can be designed to accomplish horizontal diversity objectives. See also Vertical Diversity
Hunter-Days	A measure of hunter use equal to 6 hours by one person

I

Impact, Economic, Direct	Impact caused directly by forest product harvest or processing or forest uses
Impact, Economic, Indirect	Impacts that arise from supporting industries selling goods or services to directly affected industries
Impact, Economic, Induced	Impacts resulting from employees or owners of directly or indirectly affected industries spending their income within the economy
Implementation	Those activities necessary to respond to the approved land and resource management plan.
Improvement Cutting	Removing trees of undesirable species, form, or condition from the main canopy in stands past the sapling stage to improve the composition and quality of the stand.
Indicator Species	Species identified in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important
Industry	A class of firms engaged in raw material production, manufacture, or trade
Infiltration	The passage of water or absorption of water into the soil surface
Infiltration Rates	Maximum rate at which soil under specified conditions can absorb rain or shallow impounded water, expressed in quantity of water absorbed by the soil per unit of time.

Inholding	Lands within the proclaimed boundary of the Forest that are owned or managed by some agency, organization, or individual other than the Forest Service
Input/Output Analysis	A technique for analyzing the interdependence of producing and consuming sectors in an economy
Insecticide	An agent used to control insect population
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 pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these 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
Intensive Forest Management	A high investment level of timber management that utilizes initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, pre-commercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest
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 Through interaction, participants bring different points of view to bear on the problem
Intermediate Harvest	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
Intermittent Stream	A stream which flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow
Irretrievable	Applies primarily to the use of nonrenewable 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
Irreversible	Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long time periods Irreversible also includes loss of future options
Issue	See Public Issue

K

Key Winter Range	The smaller portion of the total year's range where big-game animals find food and/or cover during severe winter weather "Key winter" areas limit the number of animals the range can support

L

Land Use Planning	The process by which decisions are made on future land uses over extended time periods that are deemed to best serve the general welfare. Decision-making authorities on land uses are usually vested in state and local governmental units, but citizen participation in the planning process is essential for proper understanding and implementation, usually through zoning ordinances
Landform	A natural feature of a land surface
Landtype	An inventory map unit with relatively uniform potential for a defined set of land uses. Properties of soils, landform, natural vegetation and bedrock are commonly components of landtype delineation used to evaluate potentials and limitations for land use
Landtype Group	A logical grouping of landtypes which facilitates resource planning.
Leasable Minerals	See Minerals, Leasable
Level Identifiers	Symbols used in FORPLAN (the Forest planning model) to designate or label unique area characteristics
Lifestyle	The characteristic way people live, indicated by consumption patterns and work, leisure, and other activities
Life Zone	Merriam's life zones - based on broad vegetational zones.
Linear Programming	A mathematical method used to determine the most effective management 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 (e g , y=a+bx)
Livestock Forage Condition	A resource value rating which is an index designed to depict grazing impacts on vegetation and to portray grazing opportunities It is not a single index for a range site, plant association, or community type It is the status of herbaceous vegetation rated against the maximum possible under existing environment This existing environment is the amount of tree crown cover as well as intensity of grazing use Forage condition rating in numerically indexed or rated by class
Local Roads	Roads constructed and maintained for, and frequented by, the activities of a given resource element These roads connect terminal facilities with Forest collector or Forest arterial roads or public highways. The location and standard usually are determined by the requirement of a specific resource activity rather than by travel efficiency.
Locatable Minerals	See Minerals, Locatable
Long-Term Sustained Yield Capacity (LTSY)	The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified intensity of management consistent with multiple-use objectives

M

MM Standard	A fire term meaning medium rate of spread/medium resistance to control
Managed Yield Table	A table that shows the growth pattern for one or more tree species in a managed, even-aged stand; includes mean DBH and tree height, number of stems, and standing wood volume per unit area; may include volume of thinning or main crop or both
Management Action	Any activity undertaken as part of the administration of the Forest.

Management Area	An area with similar management objectives and a common management prescription.
Management Concern	An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process
Management Direction	A statement of multiple use and other goals and objectives, the associated management prescriptions, and standards for attaining them
Management Emphasis	A management practice or combination of management practices designed to stress production of a particular type of output or mix of outputs
Management Indicator Species	See Indicator Species
Management Intensity	A management practice or combination of management practices and associated costs designed to obtain different levels of goods and services.
Management Practice	A specific activity, measure, course of action, or treatment Proposed management practices are those scheduled in the first decade of Forest Plan implementation Probable management practices are those scheduled in the second decade of Forest Plan implementation
Management Prescription	Management practices and intensities selected and scheduled for application in a specific area to attain multiple use and other goals and objectives
Management Requirements	Standards for resource protection, vegetative manipulation, silvicultural practices, even-aged management, riparian areas, soil and water, and diversity, to be met in accomplishing National Forest System goals and objectives (See 36 CFR 219 27) and/or other legal requirements
Marginal Land	Land of questionable physical or economic capabilities for sustaining a specific use
Market	The processes of exchanging goods or services 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
Market Assessment	A market study describing sources of supply and demands for goods or services, pricing processes, and influences on value
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
Market Benefits	Resources valued in terms of what people are willing to pay for them as evidenced by market transactions
Market Resources	Products derived from renewable and nonrenewable resources that have a well-established market value, for example, forage, timber, and water
Marginal Costs	The change in total costs associated with a given change in output.
Mass Wasting	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
Mean Annual Increment	The total volume increment in a tree or stand of trees up to a given age, divided by that age

Mechanical Treatment	The treatment of forest fuels or residue using mechanized equipment to rearrange, dispose or remove unwanted fuels.
Middleground	The visible terrain between the foreground and the background in a viewed landscape The area located from 1/4-1/2 to 3-5 miles from the viewer.
Migration Routes	Routes followed by an animal species during periods of annual movement, usually between summer and winter ranges
MTH Codes	*Management Information Handbook codes which are used for budgeting purposes*
Mineral Entry	The filling of a mining claim on Federal land to obtain the right to mine any locatable minerals it may contain. Also the filing for a millsite on Federal land for the purpose of processing off-site locatable minerals
Minerals, Common Variety	Deposits of sand, stone, gravel, etc of widespread occurrence and not having distinct or special value These deposits are used generally for construction and decorative purposes and are disposed of under the Materials Act of 1947.
Minerals, Leasable	Those minerals which are disposed of under authority of the various mineral leasing acts Minerals include coal, oil, gas, phosphate, sodium, potassium, oil shale, sulfur (in Louisiana and New Mexico), and geothermal steam.
Minerals, Locatable	Those minerals which are disposed of under the general mining laws Included are minerals such as gold, silver, lead, zinc, and copper, which are not classed as leasable or salable.
Minimum Level of Management	*A benchmark level used to develop alternatives Also a management prescription in* which the only actions taken are those to assure public safety and meet custodial needs
Minimum Viable	See Viable Population
Mitigation	Avoiding or 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 by preservation and maintenance operations during the life of the action.
Mixed Conifer	Stand containing a mixture of tree species including, but not limited to, ponderosa pine, western larch, western white pine, white fir, Douglas-fir, subalpine fir, Engelmann spruce, and lodgepole pine
Modification (VQO)	See Visual Quality Objectives.
Monitoring and Evaluation	The periodic evaluation on a sample basis of Forest Plan management practices to determine how well objectives have been met and how closely management standards have been applied
Multiple Use	The management of all 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; 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, with consideration being given to the relative values of the various resources, and not necessarily with the combination of uses that will give the greatest dollar return or the greatest unit output.

Municipal Supply Watershed	A municipal supply watershed is one that serves a public water system as defined in Public Law 93-523 (Safe Drinking Water Act), or as defined in State safe drinking water regulations The definition does not include communities served by a well or confined ground water unaffected by Forest Service activities

N

NDSY	See Nondeclining Sustained Yield.
National Forest System	All National Forest land 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, 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
National Forest System (NSF) Land	Federal lands that have been designated by Executive order or statute as National Forest, National Grasslands, or Purchase Units, and other lands under the administration of the Forest Service, including Experimental Areas and Bankhead-Jones Title III lands
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
Net Value Change	An estimation of positive and negative fire effects on each resource allocation. The evaluation of physical effects and economic consequences of wildfire
No-Action Alternative	The most likely condition expected to exist in the future if the current management direction would continue unchanged.
Nonchargeable Volume	All volume that is not included in the growth and yield projections for the selected management prescriptions used to arrive at the Allowable Sale Quantity It also includes all volume removed from unsuitable lands
Noncommodity Outputs	A resource output that cannot be bought and sold
Nonconsumptive Use	Those uses of resources that do not reduce the supply For example Nonconsumptive uses of water include hydroelectric power generation, boating, swimming, etc
Nondeclining Flow	The principle that the quantity of timber planned for sale or harvest for any future decade must be 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
Nondeclining Yield	See Nondeclining Flow.
Nongame	Species of fish or animal which is not managed as a short hunting or fishing resource; all mammals, birds, reptiles, amphibians and fish, not classified as game species by the Oregon Department of Fish and Wildlife
Nonmarket	Products derived from National Forest resources that do not have a well-established market value, for example, recreation, wilderness, wildlife

Nonmarket Benefits	Goods and services valued in terms of what reasonable people would be willing to pay rather than go without the output. Those obtaining the outputs do not pay all or part of what they would be willing to
Nonrange	Those areas with a productive potential of less than 50 pounds of palatable forage per acre, or those areas that are inaccessible and cannot be feasibly be made accessible
Nonstocked	A stand of trees or aggregation of stands that have a stocking level below the minimum *specified for meeting the prescribed management objectives*

O

Objective Function	A term used in linear programming describing the criteria to be optimized. Examples of objective functions are: maximize present net value, minimize cost, or maximize timber.
Ocular Estimate	An estimate based on a visual observation
Off-Road Vehicle	*Any vehicle capable of being operated off an established road or trail, e g , motorbike,* four-wheel drive, or snowmobile.
Old Growth	For all National Forests in the Pacific Northwest Region, an old-growth stand is defined as any stand of tress 10 acres or greater generally containing the following characteristics: a) Stands contain mature and overmature trees in the overstory and are well into the mature growth stage (See Handbook of Terminology, Society of American Foresters) b) Stands will usually contain a multilayered canopy and trees of several age classes c) Standing dead trees and down material are present d) Evidence of human activities may be present but may not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand
Open Road	A road, or segment thereof, that is open to use.
Open Road Density	The miles of open road in a specific area of land Commonly miles per section
Opportunity Cost	The value of the benefits given up due to the effect of choosing another management alternative that either reduces existing outputs or shifts resources away from other activities *so they are no longer produced and their benefits are lost*
Output	A good, service, or on-site use that is produced from Forest and rangeland resources Forest and rangeland output definitions, codes and unit measures are contained in the Management Information Handbook (FSH 1309 11). Examples are X06-Softwood Sawtimber Production - MBF, X80-Increased Water Yield - Acre Feet; W01-Primitive Recreation Use - RVDs
Output, Induced	A good, service, or on-site use which is incidental to the objectives of the resource activity An example is the timber harvest activity which produces a primary output of board feet of timber and an induced output of acres of improved wildlife habitat because of the harvest activity.
Output, Market	A good, service, or on-site use that can be purchased at a price
Output, Nonmarket	A good, service, or on-site use not normally exchanged in a market

Output, Primary	A good, service, or on-site use that results from the completion of an activity, project, or program that meets the specific objective of the resource Examples are board feet of timber, recreation visitor days, etc
Oven-Dry Weight	The weight of a substance after it has been dried in an oven at 105 degree Centigrade to equilibrium
Overgrazed Range	A range that has deteriorated and may still be deteriorating from its productive potential due to overgrazing
Overmature	The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth
Overmature Timber	Individual trees or stands of trees that in general are past their maximum rate in terms of the physiological processes, expressed as height, diameter, and volume growth
Overstory	That upper most canopy of the Forest when there is more than one level of vegetation
Overuse	Utilizing an excessive amount of the current year's growth which, if continued, will result in overgrazing and range deterioration Syn , over utilization

P

PAOT	Person-At-One-Time, used to reflect the capacity of developed recreation sites
PAOT-Days	Persons-At-One-Time, times the number of days in the use season
Panoramic	An unobstructed or complete view of a region in every direction, hence a complete and comprehensive view
Partial Retention	See Visual Quality Objectives
Patented Mining Claim	A patent is a document which conveys title to land When patented, a mining claim becomes private property and is land over which the United States has no property rights, except as may be reserved in the patent. After a mining claim is patented, the owner does not have to comply with requirements of the General Mining Law or implementing regulations
Payment in Lieu of Taxes	Payments to local or State governments based on ownership of Federal land and not directly dependent on production of outputs or receipt sharing Specifically, they include payments made under the Payments in Lieu of Taxes Act of 1976 by U S Department of the Interior.
Pedestaled	A condition where the soil has eroded from around individual plants or other objects such as a small rock, leaving them on small pedestals of soil Sometimes the result of frost heaving
Perennial Stream	Streams that flow continuously throughout most of the year
Permittee	One who holds a permit to graze livestock on state, federal, or certain privately-owned lands
Permitted Grazing	Use of a National Forest range allotment under the terms of a grazing permit

Person Year	A person year equals 2,080 hours of work time. A person year may be one person working yearlong or several people filling seasonal positions
Photo Point	An identified point from which photographs are taken at periodic intervals.
Planning Criteria	Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based
Planning Horizon	The overall time period considered in the planning process that spans all activities covered in the analysis or plan, and all future conditions and effects of proposed actions which would influence the planning decisions In the National Forest planning process, this is 150 years
Planned Ignition	A fire started by a scheduled deliberate management action
Planning Period	One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits
Plant Communities	Groups of interrelated plants that occur together more frequently than can be ascribed to chance
Plant Succession	The process of vegetational development whereby an area becomes successively occupied by different plant communities of higher ecological order
Plantation	A forest crop or stand raised artificially, either by seeding or planting of young trees
PNV	See Present Net Value
Poles	Live trees of commercial species at least 6 inches in diameter at breast height but less than 9 inches DBH The term is used to describe the general size class of a timber stand and does not define commercial products as determined by timber utilization standards
Potential Yield	The sustainable output of wood fiber available after the needs of other forest uses have been deducted from the Biological Potential
Practice	See Management Practice
Precommercial Thinning	The selective felling, killing, or removal of trees in a young stand primarily to accelerate diameter increment on the remaining stems, maintain a specific stocking or stand density range, and improve the vigor and quality of the trees that remain
Prescribed Natural Fire	The use of unscheduled natural ignitions to meet management objectives Lightning is the primary cause of natural ignitions
Prescribed Fire	A fire burning under specified conditions which will accomplish planned objectives in strict compliance with an approved plan and the conditions under which the burning takes place, and the expected results are specific, predictable, and measurable.
Prescription	See Management Prescription
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
Present Net Worth	See Present Net Value
Presuppression	Activities required in advance of fire occurrence to ensure effective suppression action. Includes (1) recruiting and training fire forces, (2) planning and organizing attack methods,

	(3) procuring and maintaining fire equipment, and (4) maintaining structural improvements necessary for the fire program
Price	The unit value of an output expressed in dollars
Priced Benefits	Benefits which can be assigned a dollar value, whether they are market or nonmarket value Market values include stumpage value of timber Nonmarket value include the user's willingness-to-pay for recreation experiences
Priced Outputs	Resource outputs that have marked or assigned dollar values
Primitive	See Recreation Opportunity Spectrum (ROS).
Problem Area	An area which is difficult to manage because of its shape, size, condition, accessibility or other limiting factors
Production Function	A quantitative description of the relationship between inputs and outputs in an analytical process
Production Potential	The capability of the land or water to produce life-sustaining features (e g , forage, cover, aquatics)
Productivity Class	Productivity is a classification of forest land in terms of capacity for cubic annual growth per acre (culmination of mean annual increment) in fully stocked natural stands It is a measure of fertility and moisture availability
Public Issue	A subject or question of widespread public interest identified through public participation relating to management of National Forest System lands
Public Participation Activities	Meetings, activities, etc , which are designed and held to obtain comments from the general public and specific publics about National Forest System land management planning.
Puddling	See Detrimental Puddling
Pulpwood	Wood not usable as logs and for species in small demand. Tolerance in size and quality of wood used for pulp permits salvaging the wood fiber in thinnings, tops left in logging, and sawmill leftovers The usual minimum diameter at the small end of pulpwood sticks at Eastern mills is 4 in , inside bark. On the West Coast most of the wood is in logs Lengths run from 4 ft at most groundwood and sulfite mills, to 5 ft at most Appalachian mills and west of the Mississippi River in the South, 5 ft , 3 in in the Southeast, 100 in in the Lake States, log size in the Northwest is often 40 ft
Purchaser Credit	The dollar amount allowed in a timber sale contract for construction or reconstruction of specified roads

R

Range	Rangelands and also many forest lands which support an understory or periodic cover of herbaceous or shrubby vegetation amenable to certain range management principles or practices
Range Allotment	A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service

Range Condition	The current productivity of a range relative to what that range is naturally capable of producing
Range Condition Class	One of a series of arbitrary categories used to classify range condition and usually expressed as either excellent, good, fair or poor.
Range Condition Trend	The direction of change in range condition.
Range Management	A distinct discipline founded on ecological principles and dealing with husbandry of rangelands and range resources
Range, Key Winter	See Key Winter Range
Range Resource Management Levels	A - No Livestock Management excludes livestock grazing from designated allotments to protect other values or eliminate conflicts with other uses. The unit of measure is AUMs that could be available for livestock use B - Some Livestock Management controls livestock numbers so that livestock use is within present grazing capacity. Improvements are minimal and constructed only to the extent needed to protect and maintain the range resource The unit of measure is AUMs affected by the level of management. C - Extensive Management seeks full utilization of forage available to livestock Cost-effective management systems and techniques, including fencing and water development, are designed and applied to obtain relatively uniform livestock distribution, use of forage, and maintenance of plant vigor. The unit of measure is AUMs affected by the level of management. D - Intensive Management seeks to optimize production and utilization of forage available for livestock use consistent with maintaining the environment and providing for multiple use of the range Cultural practices such as brush control, type conversion, or seeding may be combined with fencing and water developments to implement complex grazing systems The unit of measure is AUMs affected by level of management. E - Maximum Livestock Production Management seeks to maximize livestock production while maintaining basic soil and water values Cost-effective management systems and techniques are used to achieve this goal. Multiple use is not a constraint The unit of measure is AUMs affected by level of management. X - Exploitative Unsatisfactory level of grazing management which leads to serious depletion of the vegetative and soil resource and degradation of the watershed. The unit of measure is AUMs affected by level of management.
Range, Transitory	See Key Transitory Range
Raptor	A bird of prey
RARE II	See Roadless Area Review and Evaluation II
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)
Real Dollar Value	A monetary value which compensates for the effects of inflation

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
Recreation Information Management (RIM)	The Forest Service System for recording recreation facility condition and use
Recreation Opportunity Spectrum (ROS)	A system for planning and managing recreation resources Land delineations that identify a variety of recreation experience opportunities categorized into classes on a continuum from primitive to urban Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use The classes are 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 *Semi-Primitive Non-Motorized* 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. *Semi-Primitive 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 may be present but would be subtle Motorized recreation 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 humans 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 5. *Roaded Modified* Area is characterized by a natural environment that has been substantially modified by development of structures and vegetative manipulation Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high Facilities are often provided for special activities Moderate user densities are present away from developed sites Facilities for intensified motorized use and parking are available
Recreation Visitor Day (RVD)	One visitor day equals 12 hours (one person for 12 hours, or 12 people for 1 hour, or any combination thereof).
Reforestation	The renewal of forest cover by seeding, planting, and natural means
Regeneration	The renewal of a tree crop, whether by natural or artificial means This term may also refer to the crop itself

Regeneration Cut	A cut in a particular stand of timber designed to remove the existing volume and start a new crop. To qualify for regeneration cutting, a stand must be (1) at or beyond rotation age, (2) lack an understory of acceptable stocking worthy of management, or (3) have a disease-infected understory which will not develop into a future crop, or (4) have an understory which it is not currently possible to save during felling, skidding, and slash disposal operations
Region	For Regional planning purposes, the standard administrative Region of the Forest Service administered by the responsible official for preparing a Regional plan, the area to be covered by a Regional plan
Regulated	The commercial forest land that is organized for timber production under the principle of sustained yield The harvest of timber from this land is regulated to achieve multiple long-range objectives, such as maintaining setting for recreational activities, rotating forage production areas and wildlife habitat, increasing water production yield, and increasing the growth and utilization of timber for the nation's supply.
Rehabilitation (Visuals)	A short-term management alternative used to return existing visual impacts in the natural landscape to a desired visual quality
Release Cutting	A timber management activity which frees a young stand of desirable trees not past the sapling stage from the competition of undesirable trees that threaten to suppress them A cleaning is a form of release cutting that removes trees the same age as the young stand A liberation cutting is a form of release that removes older, larger trees that overtop a more desirable younger stand
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.
Renewable Resources Program	The program for management and administration of the National Forest System, for Research, for Cooperative State and Private Forest Service program, and for conduct of other Forest Service activities developed in accordance with the Forest and Rangeland Renewable Resources Planning Act
Replacement Old-Growth Stands	Stands which will replace old-growth stands when old-growth stands no longer meet old-growth requirements
Research Natural Area	An area which is as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes
Reservation Principle	The Forest Reserves, now known as National Forests, were reserved from the Public Domain to improve and protect the Forest within the boundaries for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States This is often referred to as the reservation principle
Residual Stand	The trees remaining standing after some form of human or natural occurrence
Residue Profile	A quantifiable description of the size, arrangement, and continuity of the natural and activity fuels within the Forest

Resource Value Rating	The value of the vegetation present of a site for a particular use or benefit e g , cattle forage condition
Resources Value Trend	Trend in resource value rating, when compared to management objectives, refers to the change in utility of vegetation at a particular location for a specific use The trend of a particular resource value may be up, for another use the trend may be down, and not apparent for still another The direction of trend is based on whether the changes in vegetation and soil conditions are desirable or undesirable for specific management objectives Because of the dual interpretation of trend, the type of trend must be specified, either ecological status or resource value for a specific use or both
Retention (VQO)	See Visual Quality Objectives
Rilling	Removal of soil by water cutting numerous small conspicuous water channels or rivulets by concentrated surface runoff.
RIM	See Recreation Information Management.
Riparian Areas	Areas with distinctive resource values and characteristics that are comprised of an aquatic ecosystem and adjacent upland areas that have direct relationships with the aquatic system This includes floodplains, wetlands, and all areas within a horizontal distance of approximately 100 feet from the normal high water line of a stream channel, or from the shoreline of a standing body of water
Ripping	The mechanical penetration and shearing of soils to depths of 8 to 18 inches for the purpose of breaking up compacted soil to facilitate penetration of plant roots, water, organic matter, and nutrients
Road Density	The measure of the degree to which the length of road miles occupies a given land area, i e , 1 mi/sq mi is 1 mile of road within a given square mile
Roaded Natural	A classification of the Recreation Opportunity Spectrum characterized by a predominantly natural environment with moderate permanent evidence of humans
Roadless Area	A National Forest area which (1) is larger than 5,000 acres or, if smaller than 5,000 acres, contiguous to a designated wilderness or primitive area, (2) contains no roads, and (3) has been inventoried by the Forest Service for possible inclusion in the Wilderness Preservation System
Roadless Area Review and Evaluation II (RARE II)	A comprehensive process directed by the Secretary of Agriculture to identify roadless and undeveloped land areas in the National Forest system and to determine their uses for either wilderness or other resource management and development and to determine areas that would require further planning to make such a decision This was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979
Road Credits	Credits timber purchasers receive applied toward the sale price of timber in exchange for building the roads needed for access See Purchaser Credits
Rotation	The planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage of maturity
RPA	See Forest and Rangeland Renewable Resources Planning Act of 1974.
RPA Program	The recommended direction for long-range management of renewable resources of National Forest System lands This direction serves as the basis for the Regional targets assigned to the Forest The development of this direction is required by the Forest and Rangeland Renewable Resources Planning Act

Runoff	The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.
RVD	See Recreation Visitor Day.

S

S&PF	State and Private Forestry Assistance Program.
Sale Schedule	The quantity of timber planned for sale by time period from an 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
Salmonids	All species of fish from the family Salmonidae, i e , salmon, trout. (see also anadromous fish)
Salvage Harvest	The harvest of trees that are dead, dying or deteriorating (e,g., because overmature or materially damaged by fire, wind, insects, fungi or other injurious agencies) before they lose their commercial value as sawtimber
Sanitation Harvest (Salvage)	The removal of dead, damaged, or susceptible trees primarily, essentially to prevent the spread of pests or pathogens and promote forest hygiene.
Sapling	See Seedling/Sapling
Satisfactory Cattle Forage Condition	Forage species composition and production are at acceptable levels or trend in forage species composition and production is acceptable
Satisfactory Livestock Forage Condition	*A fair forage condition rating or better with static or upward trend.*
Sawtimber	Trees suitable in size and quality for producing logs that can be processed into lumber.
Scenic Area	An area which has been designated by the Forest Service as containing outstanding natural beauty that requires special management to preserve this beauty.
Scoping Process	An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to the proposed action. Identifying the significant environmental issues deserving of study and de-emphasizing insignificant issues, narrowing the scope of the environmental impact statement accordingly (CEQ regulations, 40 CFR 1501.7)
SCORP	Statewide Comprehensive Outdoor Recreation Plan
Scree	*A steep mass of detritus on the side of a mountain.*
Sediment	Solid material, both mineral and organic, that is in suspension, being transported, or has been moved from its site of origin by air, water, gravity, or ice.
Sedimentation	The action or process of forming or depositing sediment
Seedlings/Sapling	*A size category for forest stands in which trees less than five inches in diameter are the* predominant vegetation

Seen Area	Total area observed May be measured in terms of foreground, middleground, and background.
Selection Cutting	The annual or periodic removal of trees as part of an uneven-age silvicultural system. Cutting can involve individual trees or small groups of trees to meet a predetermined goal of size and species composition in the remaining stand.
Sensitivity Analysis	A determination of the consequences of varying the level of one or several factors while holding other factors constant
Sensitivity Level	A measure of people's concern for the scenic qualities of the landscape
Sensitive Species	Those species which (1) have appeared in the Federal Register as proposals for classification and are under consideration for official listing as Endangered or Threatened Species, (2) are on an official State list, or (3) are recognized by the Regional Forester to need special management in order to prevent the need for their placement on Federal or State lists
Seral Vegetation	The vegetation that occupies a site following disturbance. This vegetation will not reproduce itself without a continued disturbance
Severely Burned	The top layer of mineral soil has been significantly changed in color, usually to red, and the next one-half inch blackened from organic matter charring by heat conducted through the top layer
Site Productivity	Production capability of specific areas of land
Shrubland	Any land on which shrubs dominate the vegetation
Silvicultural System	A management process whereby Forests are tended, harvested, and replaced, resulting in a forest of distinctive form It includes all cultural management practices performed during the life of the stand such as regeneration cutting, fertilization thinning, improvement cutting, and use of genetically improved tree seeds and seedlings to achieve multiple resource benefits. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration according to the type of forest they produce
Site Index	1 A numerical evaluation of the quality of land for plant productivity, especially used in forest land where it is determined by the rate of growth in height on one or more of the tree species 2 A particular measure of site class, based on the height of the dominant trees in a stand at an arbitrarily chosen age
Slash	The residue left on the ground after felling and other silvicultural operations and/or accumulating there as a result of storm, fire, girdling, or poisoning of trees
Small Game	Birds and small mammals normally hunted or trapped
Snag	A standing dead tree usually greater than 6 feet in height and 4 inches in diameter at breast height
Social Analysis	A phase in the planning process which (1) identifies groups (whether formally organized or not) who may be affected by or have an interest in planning decisions, (2) gathers and quantifies (objectively when possible) both the preferences of these groups and possible consequences of proposed alternatives on these groups, (3) evaluates the role of social group preferences and consequences in resource allocation decisions, and (4) determines

	how a given plan should be formulated (or adjusted) so as to respond to these evaluations and generally define social equity criteria
Social Stability	The maintenance of existing interactions between local groups which are affected by the continuity of social and economic values within a community.
Social Variable	A variable that measures the social impact of Forest Service management alternatives. Examples include population statistics, types of institutions, and personal opinion as reflected in attitudes or as demonstrated by behavior.
Soil Compaction	See Detrimental Compaction.
Soil Erosion	See Erosion
Soil Bulk Density	The weight of oven dry solid per unit volume Commonly expressed in terms of grams per cubic centimeter (g/cc)
Soil Productivity	The capacity of a soil to produce a specific crop such as fiber and forage under defined levels of management It is generally dependent on available soil moisture and nutrients and length of growing season
Special Interest Area	An area managed to make recreation opportunities available for the understanding of the earth and its geological, historical, archaeological, botanical, and memorable features
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.
Stand	A community of trees or other vegetative growth occupying a specific area and sufficiently uniform in composition (species), age, spatial arrangement, and conditions as to be distinguishable from the other growth on adjoining lands, so forming a silvicultural or management entity
Stream Order	A measure of the position of a stream in the hierarchy of tributaries (Stream as referenced here refers to perennial streams.) a. First-order streams are unbranched streams, that is, they have no tributaries b Second-order streams are formed by the confluence of two or more first-order streams They are considered second-order until they join another second-order or larger stream. c Third-order streams are formed by the confluence of two or more second-order streams They are considered third-order until they join another third order or larger stream
Stocking	A measure of timber stand density as it reaches to the optimum or desired density to achieve a given management objective
Stream Reach	A stream segment of varying length with similar characteristics.
Streamside Management Unit	The stream and an adjacent area of varying width where practices that might affect water quality, fish, and other aquatic resources are modified to meet water quality goals for each class of stream
Subclimax	A stage in succession short of the climax community in which further development is inhibited by the influence of some factors other than climatic factors
Submarginal Land	Land that is either physically or economically incapable of sustaining indefinitely a certain use.

Succession	An orderly process of biotic community development that involves changes in specific structure and community processes over time
Successional Stage	A phase in the gradual supplanting of one community of plants by another
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
Suitable Forest Land	Forest land (as defined in CFR 219 3) for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions, for which there is reasonable assurance that such lands can be adequately restocked (as provided in CFR 219.14), and for which there is management direction that indicates that timber production is an appropriate use of that area
Suitable Range	That area which produces, or has the inherent capability to produce, 50 pounds or more of palatable forage per acre, can be grazed on a sustained-yield basis without damage to the vegetative and soil resources, and is or can feasibly be made accessible for use. Range with low forage rating is classed as suitable when vegetation can be improved by management Suitability is independent of past range-use effects The delineation of primary or secondary range is not a requirement
Suitable Range - Cattle	Land that is accessible or that can become accessible to cattle, that produces forage or has inherent forage - producing capability, and that can be grazed by cattle on a sustained yield basis under management goals
Summer Range	Range that is grazed primarily during the summer growing season
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
Suppression (Fire Suppression	Any act taken to slow, stop, or extinguish a fire Examples of suppression activities include fireline construction, backfiring, and application of water or chemical fire retardants
Surface Erosion	The detachment and transport of individual soil particles by wind, water, or gravity.
Surface Restoration	The filling in of open pits, grading of the mined area, reduction of high walls, replacement of top soil, planting, revegetation and such other work as is necessary to restore an area of land affected by surface mining operations
	The process of reconverting mined land to other forms of productive uses
Surface Rights	The rights of the operator or responsible agency to use or manage renewable surface resources On National Forest System lands the Forest Service manages surface resources without having jurisdiction over subsurface development
Sustained Yield	The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairing the productivity of the land

T

Talus	Coarse-textured colluvial deposits, or talus slopes, are formed by fragments of rocks detached from the precipitous outcrops and carried down the slope by gravity Cliff debris, rock falls, and avalanches are typical examples of rough and droughty talus soils. From the silvicultural standpoint such soils may differ but little from the rock outcrops
Temporary Road	Those roads needed only for the purchaser's or permittee's use. The Forest Service and the purchaser or permittee must agree to location and clearing widths Temporary roads are used for a single, short-term use, e g., to haul timber from landings to Forest development roads, access to build water developments, etc.
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 5 years after final harvest; and (d) adequate information is available to project responses to timber management activities
Term License or Permit	A document which authorizes grazing on public lands for a stated number of years as contrasted with as annual or temporary license or permit
Thematic Group (Cultural Resources)	A finite group of resources related to one another in a clearly distinguishable way They may be related to a single historical person, event, or developmental force; of one building, type or use, or designed by a single architect, of a single form of archaeological site, or related to a particular set of archaeological research problems.
Thermal Cover	Cover used by animals to ameliorate effects of weather, for elk satisfactory thermal cover is a stand of coniferous trees 40 feet or more tall with an average crown closure of 70 percent or more, for deer, cover may include saplings, shrubs, or trees at least 5 feet tall with 75 percent crown closure. Marginal thermal cover includes coniferous stands of trees of 10 feet or more in height with a 40-69 percent crown closure
Thinning	Cutting made in an immature crop or stand, primarily to accelerate the diameter increment (annual growth) of the residual trees, also by suitable selection to improve the average form of the trees that remain
Threatened and Endangered Species (T&E)	A species or subspecies of animal or plant whose prospects of survival and reproduction is in immediate jeopardy or likely to become so within the foreseeable future Threatened species are identified by the Secretary of Interior in accordance with the 1973 Endangered Species Act.
Through Road	A road that begins at one road and ends at another road
Tie-Through Road	See Through Road
Tiering	Tiering refers to the elimination of repetitive discussions of the same issue by incorporating by reference the general discussion in an environmental impact statement of broader scope For example, a project environmental assessment could be tiered to the Forest Plan EIS.
Timber Base	The lands within the Forest available and suitable for timber production.
Timber Classification	Forested land is classified under each of the land management alternatives according to how it is related to the management of the timber resource The following are definitions of timber classifications used for this purpose

1. *Nonforest*–Land that has never supported forest and land formerly forested where use for timber production is precluded by development or other uses

2 *Forest*–Land at least 10 percent stocked (based on crown cover) by forest trees of any size, or formerly having had such tree cover and not currently developed for nonforest use.

3. *Suitable*–Commercial forest land identified as appropriate for timber production in the Forest planning process

4. *Unsuitable*–Forest land withdrawn from timber utilization by statute or administrative regulation (for example, wilderness) or identified as not appropriate for timber production in the Forest planning process

5 *Commercial Forest*– Forest land tentatively suitable for the production of continuous crops of timber that has not been withdrawn

Timber Harvest Schedule — See Sale Schedule

Timber Production — The purposeful growing, tending, harvesting, and regeneration of regulated crops of industrial wood Industrial wood includes logs, bolts, or other round sections cut from trees for industrial or consumer use, except fuelwood

Timber Sale Program Quantity — The volume of timber planned for sale during each decade of the planning horizon It includes the allowable sale quantity (chargeable volume) and any additional material (nonchargeable volume) planned for sale The timber sale program quantity is expressed as an annual average for each decade

Timber Stand Improvement (TSI) — All noncommercial intermediate cuttings and other treatments to improve composition, condition, and volume growth of a timber stand

Trailhead — The parking, signing, and other facilities available at the terminus of a trail

Transitory Range — Land that is suitable for grazing use for a period of time For example, on particular disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage

Total Resource Information System — Integrated resource data base management system used in the Pacific Northwest

Two-Step Shelterwood — An even-aged silvicultural system in which the old crop (shelterwood) is removed in two successive cuttings in order to provide a source of seed and/or protection for regeneration

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

Uneven-Aged Management — The 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. Individual Tree Selection Cutting - Involves the removal of selected trees of all size classes on an individual basis Group Selection Cutting - Involves the removal of selected trees of all size classes in groups of a fraction of an acre up to 2 or 3 acres in size.
Unpatented Mining Claim	A claim made by a qualified person for possession of locatable minerals on public domain land (e.g., National Forests), a properly recorded claim and exclusive right to extract and sell valuable minerals from the claim Unpatented mining claims may be occupied and used solely for mining and related activity.
Unplanned Ignition	A fire stared at random by either natural or human causes, or a deliberate incendiary fire
Unproductive Forest Land	Forest land of such low site quality that it is generally not capable of producing 20 cubic feet per acre per year of industrial wood products, synonymous with noncommercial forest land
Unregulated Harvest	This harvest is not charged against the allowable sale quantity It includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products It also includes all volume removed from unsuitable areas Harvests from unsuitable areas will be programmed as needed to meet multiple-use objectives other than timber production and for improvement of administration sites
Unsuitable Range	An area which may have value for wildlife but has no value for, or should not be used by, livestock because of steep topography, barrenness, dense timber, lack of forage or unstable soils.
Unsuitable Range - Cattle	Land that should not be grazed by cattle because of unstable soils, steep topography, or inherent low potential for forage production
Unsuitable Timber Land	Lands not selected for timber production in Step II and III of the suitability analysis during the development of the Forest Plan due to (1) the multiple-use objectives for the alternative preclude timber production, (2) other management objectives for the alternative limit timber-production activities to the point where Management Requirements set forth in 36 CFR 219 27 cannot be met, and (3) the lands are not cost efficient over the planning horizon in meeting Forest objectives that include timber production Land not appropriate for timber production shall be designated as unsuitable in the Forest Plan
Utility Corridor	See Corridor.
Utilization Standards	Standards guiding the use and removal of timber They are measured in terms of diameter at breast height (DBH) and top of the tree inside the bark (top diameter inside bark) and the percentage of "soundness" of the wood.

V

Value, Market	The unit price of an output normally exchanged in a market after at least one stage of production, expressed in terms of what people are willing to pay as evidenced by market transactions.

Value, Nonmarket	The unit price of nonmarket output not normally exchanged in a market at any stage before consumption, and thus must be imputed from other economic information
Variable Costs	A cost that varies with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered. Variable costs include investment, operational, and variable general administration.
Variety Class	A particular level of visual variety or diversity of landscape character.
Vertical Diversity	The diversity in a stand that results from the complexity of the above-ground structure of the vegetation; the more levels of vegetation or the more diverse the species makeup (or both), the higher the degree of vertical diversity
Viable Population	A wildlife or fish population consisting of a number of individuals adequately distributed throughout their range, necessary to perpetuate their existence in natural, genetically stable, self-sustaining populations.
Viewshed	The total landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body.
Viewshed Condition	A summary stating the overall impression a visitor would have of the visual appearance of the lands seen in a total viewshed.
Visitor	Temporary inhabiter of an area Recreation visitor–one who is in an area temporarily for refreshment in body and/or mind. Usually has a significant conscious or subconscious interest in the scenic qualities of an area
Visual Absorption Capability (VAC)	A measure of the land's capability to absorb the visual impacts of management activities
Visual Condition	The visual appearance of a landscape described in terms of the degree of alteration from the natural-appearing landscape
Visual Distance Zones	Areas of landscapes denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape characteristics or activities of humans The three zones are foreground, middleground, and background
Visual Quality Objectives (VQOs)	A desired level of management based on physical and sociological characteristics of an area Refers to the degree of acceptable alteration of the characteristic landscape. (a) Preservation - Allows only ecological changes Management activities, except for very low visual impact recreation facilities, are prohibited This objective applies to specially classified areas, including wilderness. (b) Retention - Provides for management activities that are not visually evident. Management activities are permitted, but the results of those activities on the natural landscape must not be evident to the average viewer. (c) Partial Retention - Management activities may be evident to the viewer but must remain visually subordinate to the surrounding landscape. (d) Modification - Management activities may visually dominate the natural surrounding landscape but must borrow from naturally established form, line, color, and texture. (e) Maximum Modification - Land management activities can dominate the natural landscape to greater extent than in the modification objective, except as viewed from background when visual characteristics must be those of natural occurrences within the surrounding area.

Visual Resource	The composite of 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
VQO	See Visual Quality Objectives

W

Wallow	See Elk Wallow.
Water Bar	A structure constructed across roads and skid trails to divert the surface runoff of water
Water Yield	The measured output of the Forest's stream.
Water Yield Increase	Additional water released to streams as a result of Forest management activities.
Watershed	The total area above a given point on a stream that contribute water to the flow at that point.
Watershed Condition	A description of the health of a watershed or portion thereof, in terms of the factors which affect hydrologic function and soil productivity.
Watershed Improvement Needs (WIN) Inventory	An interdisciplinary inventory of areas that need improvement.
Watershed Protection	Watershed protection involves a combination of complementary practices of land treatment and structural works to maintain or improve total yield, quality, stability of flow of surface and subsurface water and prevention of damage and loss due to excessive and uncontrolled runoff, flooding, salination, and siltation
Wet Areas	Sites, often occurring at the heads of drainages, such as wet sedge meadows, bogs, or seeps. They are often referred to as "moist sites" and are very important components of elk summer range Sites near water are important because the forage they produce is highly nutritious and heavily utilized by elk
Wet Meadow	A meadow where the surface remains wet or moist throughout the summer, usually characterized by sedges and rushes.
Wetlands	Those areas that are inundated by surface or ground water with a frequency sufficient, under normal circumstances, to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction Wetlands include marshes, bogs, sloughs, potholes, river overflows, mud flats, wet meadows, seeps, and springs.
Wilderness	Federal land retaining its primeval character and influence without permanent improvements or human habitation, as defined under the 1964 Wilderness Act It is protected and managed to preserve its natural conditions which (1) generally appear to have been affected primarily by forces of nature with the imprint of human activity substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is of sufficient size to make practical its preservation, enjoyment, and use in an unimpaired condition; and (4) may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

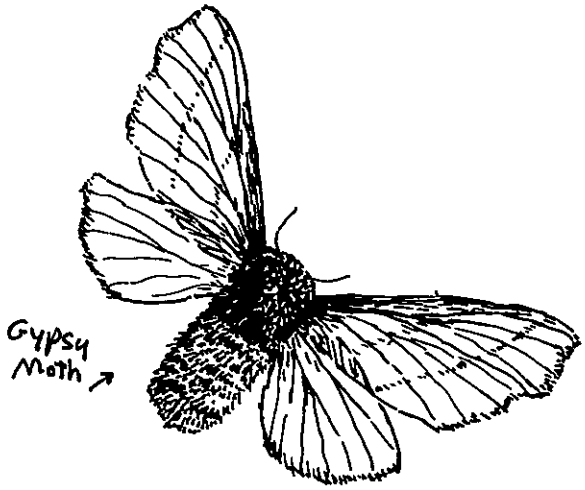
Wilderness Recreation Opportunity Spectrum (WROS)	A further refinement of the primitive portion of the ROS The following terms deal only with officially designated wilderness *Primitive Trailless.* The most remote, generally the core area which is least accessible Terrain, vegetative, trail density, and reasonable travel methods provide an area generally large enough to allow at least two days of cross-country travel without crossing a constructed trail A most outstanding opportunity exists for isolation and solitude free from evidence of past human activity *Primitive Trailed* The sights, sounds, and smells relating to human activities outside the wilderness are essentially non-existent The same factors relating to human activities within the wilderness are minimized An extremely high opportunity exists for exploring and experiencing considerable isolation, tranquility and self-reliance *Semi-Primitive Trailed* The least remote; generally those areas nearest trailheads and major access points or the Wilderness periphery where the sights, smells, and sounds of human activities both within and outside the Wilderness are affecting the Wilderness visitor Opportunities for a wilderness-related experience are only moderate
Wildfire	Any wildland fire not designated and managed as a prescribed fire within an approved prescription.
Wildlife Habitat	The sum total of environmental conditions of specific place occupied by a wildlife species or a population of such species
WIN Inventory	See Watershed Improvement Needs (WIN) Inventory.
Winter Range	The area, usually at lower elevations, occupied by migratory deer and elk during the winter months
Withdrawal	An order removing specific land areas from availability for certain uses
Working Group	Comprises those parts of a forest that have generally the same silvicultural management and rotation
Work-Year Equivalents	This is 2,080 working hours May be accomplished by one person working yearlong or several people filling seasonal positions
WROS	See Wilderness Recreation Opportunity Spectrum

Y

Yarding	The operation of hauling timber from the stump to a collection point.
Yum Yarding	The skidding of unmerchantable material to a landing or collection point.

Z

Zone of Influence	A delineated geographic area within which the present and proposed actions exert an important influence on residents and visitors


Gypsy
Moth

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