

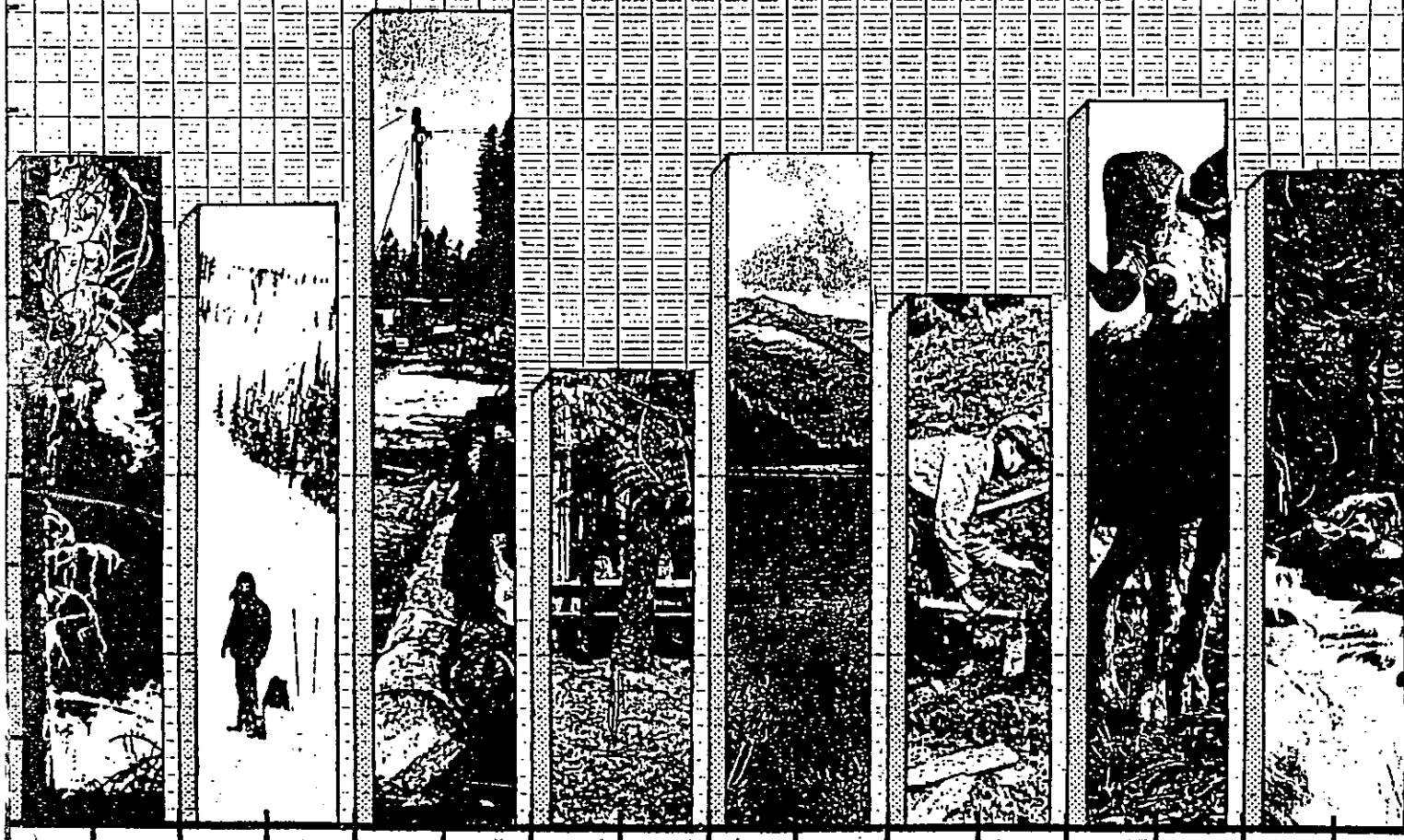
Kootenai National Forest Plan

Final Environmental Impact Statement - Volume 2

United States
Department
of Agriculture



Forest Service
Kootenai
National Forest



FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KOOTENAI NATIONAL FOREST

NORTHERN REGION

FOREST SERVICE

U.S. DEPARTMENT OF AGRICULTURE

1987

VOLUME II

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FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KOOTENAI NATIONAL FOREST PLAN

CHAPTER III

THE AFFECTED ENVIRONMENT

This chapter describes the environment of the Kootenai National Forest that may be changed with implementation of the Forest Plan or any of the alternative plans. Section A describes the physical, biological, social and economic situation in the area. Section B describes the current resource situations on the Forest.

III. Affected Environment

This chapter describes the environment that may be changed by implementing any of the alternatives described in Chapter II. This description is presented in two sections. Section A describes the physical, biological, and socio-economic setting and Section B describes the Forest's current resource situation.

Summary of Changes that occurred between the Draft and Final EIS

More recent information has been added to the sections describing the local socio-economic situation (section A, 4), the timber resource situation (section B, 1), the facilities (roads) section (B, 2, a), mountain pine beetle-infested lodgepole pine (section B, 3, b), special areas (section B, 5, c), wildlife (section B, 6, b), and minerals (section B, 7). The section on the local socio-economic situation more accurately describes the contribution of the surrounding national forests in relation to private timberlands, and the section on the timber resource describes the portion that is "below cost". The section on roads has some updated total existing road mileages, and the section on insect and disease shows more recent information on the status of beetle-infested lodgepole pine. The special areas section provides some information on eligibility for Wild and Scenic Rivers classification for four rivers on the Kootenai Forest. The wildlife section displays a revised list of indicator species, and the mineral section portrays some more recent information about mineral potential in the Star Gulch portion of Pellick Ridge in the Scotchman Peak roadless area.

A. Physical, Biological, Social, and Economic Settings

1. General Setting

No Changes occurred between the Draft and Final EIS

The Kootenai National Forest lies in the extreme northwest corner of Montana, bordered by Idaho to the west and Canada to the North. The Forest is within the Northern Rocky Mountain physiographic province and includes the Cabinet Mountains, the Purcell Mountains, the Whitefish Range, and the Salish Mountains. These mountain ranges generally run north to south.

The Forest is dominated by two major rivers, the Kootenai and Clark Fork, along with their tributaries.

Most of the Kootenai is tree-covered with over 1.8 million acres considered capable for commercial timber harvest. Local economies are resource-based, focused mainly on timber and mining. Towns within the Forest boundary include Libby, Troy, Eureka, Noxon, and Trout Creek. The towns have a combined population of less than 20,000 people.

Outdoor recreation is considered an important aspect of living in the area with hunting, fishing, hiking, and camping being popular activities. The Forest supports huntable populations of elk, moose, bighorn sheep, mountain goats, whitetail and mule deer, black bear, and mountain lion. The Forest's rivers, streams, and lakes support fishable populations of trout, whitefish, salmon and other species.

2. Physical Setting

No Changes occurred between the Draft and Final EIS

a. Geology and Topography

The Purcell and Salish Mountains were overridden by the continental ice mass which covered much of the northeastern half of the Forest. The ice scoured and rounded these mountains and filled many of their valleys with glacial till. The Cabinet and Whitefish ranges projected above the continental ice mass where they were subjected to alpine glaciation. Glacial Lake Kootenai occupied the major valleys of the Kootenai River drainage during a late stage of the glacial epoch, leaving behind thick deposits of glacial silt.

Most of the bedrock exposed in the area belongs to the Belt Series of Pre-Cambrian age, which exceeds 40,000 feet in thickness. A small percentage of the rock is igneous. The geologic structure consists of open, north or northwest trending folds that are cut by many northwesterly trending faults.

The following table shows the slopes on the Kootenai, the amount of acres contained in the slope classes, and the percentage each represents of the Forest.

TABLE III-1			
SLOPE CLASSES			
<u>Slope</u>	<u>Acres</u>	<u>Percentage</u>	
0%	49,000	2	
5-20%	355,000	16	
25-40%	993,000	44	
45-55%	319,000	14	
60-75%	429,000	19	
80%+	100,000	5	
Total	2,245,000	100	

b. Soils

Soils on the Kootenai, for the most part, have been influenced by glaciation and typically have a low inherent fertility when compared, for example, to soils on the west coast. Sediment is the primary contaminant of water quality affecting, among other things, fisheries. Two of the major soil materials on the Forest that are particularly susceptible to erosion and sedimentation are the decomposed granitics and the glacial lakebed sediments. When disturbed, sediment coming from these landforms can increase significantly over natural levels.

The majority of the Forest soils (approximately 60%) are susceptible to machine compaction which can result from improper timber harvesting, slash disposal, and site preparation. Soil compaction can have a long-lasting impact on tree growth and site productivity with some estimates projected as high as a 15% loss in total potential timber volume.

c. Climate

The climate of the Kootenai has been described as "modified pacific maritime" in character, meaning that compared to the remainder of Montana, this area's climate resembles that found along the Pacific Coast. The character becomes "modified" by occasional intrusions of arctic air masses, more commonly found in the remainder of the State. Average temperatures reflect the moderating influence of the pacific air masses. Average annual temperatures range from 44 degrees F. in Trout Creek to 45 degrees F. in Libby and Eureka.

The "wet season" in the Forest usually occurs in fall and early winter. Average annual precipitation ranges from 31" in Trout Creek, 19" in Libby, to 14" in Eureka. Averages can be higher, depending on the elevation. Totals of around 110" in the higher elevations of the Cabinet Mountains have been recorded. Most of the precipitation in the higher elevations is in the form of snow.

d. Visual Setting

About 1,403,000 acres, or 62% of the Forest outside wilderness is adjacent to or readily visible from major highways or roads, recreational routes and use areas, and residential private land. Of this total, about 262,000 acres are foreground viewing areas immediately adjacent to major travel routes or populated areas and thus very sensitive to management activities which disturb the natural landscape. The remaining areas are hidden or background situations where management activities could easily blend in and appear as near natural landscape features.

3. Biological Setting

No Changes occurred between the Draft and Final EIS

a. Vegetation

Most of the Kootenai is tree-covered. Trees native to the area include western red cedar, western hemlock, western white pine, lodgepole pine, ponderosa pine, Douglas-fir, subalpine fir, grand fir, whitebark pine, alpine larch, western larch, mountain hemlock, Engelmann spruce, and juniper. Of the over 2.2 million acres on the Kootenai, about 1.8 million acres are considered capable of producing commercial timber.

Habitat types on the Kootenai are primarily in the Douglas-fir, hemlock and alpine fir series with clintonia and snowberry union as the dominant understory. Ponderosa pine/bitterbrush is found in scattered seral areas. There are also small areas of ponderosa pine habitat type in the Tobacco Plains, the West Kootenai Bench, and on the dry south slopes in the drier sites and exposures. The Troy and Yaak Ranger Districts commonly support cedar/clintonia and hemlock/clintonia habitat types. Hemlock/devil's club and cedar/lady fern are found in moist high water table bottoms on those Districts, and in the foothills of the Cabinet Mountains Wilderness. Alpine fir/menziesia is common on higher moist slopes with alpine fir/beargrass and whortleberry on the drier high-elevation sites.

At present, there are no identified rare or endangered plant species on the Kootenai.

b. Wildlife and Fish

The Kootenai supports huntable populations of elk, moose, bighorn sheep, mountain goats, whitetail and mule deer, black bear, and mountain lion. The Clark Fork elk herd on the Cabinet Ranger District is a herd of Statewide prominence. Many area residents value the presence of wildlife as an asset to a life style which is rural-oriented. Habitats range from high-elevation mountain basins devoid of trees to heavily forested cedar groves to dry, rock canyons which contain cactus and bitterbrush. At present, the Kootenai has identified habitat for three endangered and one threatened species. These are the northern bald eagle, peregrine falcon, northern Rocky Mountain wolf, and the grizzly bear, respectively. Grizzlies are yearlong residents, eagles are predominately winter residents, peregrine falcons are occasional migrants, and wolves are primarily transients from Canada. Reports of caribou have been made in the Ten Lakes area and unverified sitings have been made in the Yaak River valley bordering northern Idaho. At this time, no resident populations of caribou have been identified on the Kootenai.

Nongame species are numerous and include a variety of songbirds, weasel, mink, beaver, otter, flying squirrel, and porcupines. to name but a few.

The rivers, streams, and lakes on the Kootenai support populations of rainbow, westslope cutthroat, bull, and brook trout, and mountain whitefish. A white sturgeon population is located just below Kootenai Falls and a ling fishery exists along portions of the Kootenai and Tobacco Rivers. Lakes on the Forest support populations of rainbow, brook and cutthroat trout; yellow perch; largemouth and smallmouth bass; sun-fish, and kokanee salmon. The numerous high-mountain lakes on the Forest contain rainbow, cutthroat, and brook trout. Because trout are the predominant species on the Forest, they are used as the indicator fish species.

Primary productivity of most of the Forest's streams and lakes is low compared with those waters found in the remainder of the Northern Region. This is due to low alkalinity and low water temperatures that locally prevail.

4. Social/Economic Setting

Summary of Changes between the Draft and Final EIS

A summary of the analysis of the relative contribution of the surrounding National Forests to the total timber supply in the area is presented. In general, the national forests contribution will increase but will probably not make up the total difference that may occur from an anticipated decline on adjacent private timberlands.

a. Economic Situation

In 1981 the manufacturing (mostly lumber) and Federal Government (mostly Forest Service) sectors accounted for 1,969 jobs in Lincoln County. Using an economic base multiplier of 2.41 (Haugen, 1983) indicates that these sectors are linked to 4,745 of the 6,643 total jobs in the County in 1981. Thus it can be said that over 70% of the jobs in Lincoln County directly or indirectly exist because of the wood products industry. Sanders County is in a similar situation.

Local economic dependency on the wood products industry is linked to timber sales on the Kootenai National Forest, whose landownership pattern occupies 73% and 23% of the land areas in Lincoln and Sanders Counties, respectively. (Additional National Forest land from the Lolo National Forest is situated in Sanders County, making the actual percentage of National Forest landownership in Sanders County 58%). Over the past ten years (1976-1985) the National Forests (Kootenai, Lolo, Flathead and Idaho Panhandle) have contributed about 373 MMBF per year from lands in the secondary impact area (Flathead, Lincoln and Sanders Counties in Montana and Bonner and Boundary Counties in Idaho). Private lands contributed about 353 MMBF while State lands contributed about 28 MMBF per year in the five-county area.

Local economic activity is dependent upon how all land owners manage their property. Negative socio-economic impacts can occur if the amount of timber being processed changes rapidly. Of particular concern to the public that commented on the DEIS, was the potential for decreased timber supplies in the area. This topic is addressed elsewhere (Development of Response to Public Comments - Timber Supply Situation, Haugen, July 24, 1986, Planning Records of the Kootenai National Forest) and summarized in Appendix B of this EIS.

The general conclusion of the analysis was that all the National Forests in the area will be contributing more volume (when all volume including posts, poles, pulp and other products is considered) than they have in the past, but that private lands will not be likely to sustain past harvest levels into the future (note letter 72 in Appendix E). If future supplies from private timber lands decline more than 25% below the historical harvest level, there will be a net reduction in total timber supply in the five-county area.

Any declines will not be evenly distributed throughout the area. A county with the largest percentage of private timber harvest (Sanders) can be expected to see proportionately larger declines in total harvest than a county with the largest percentages of National Forest lands (Lincoln). Relative mill efficiencies will become more important as mills surrounding Lincoln county try to offset the haul-cost advantage of mills in Lincoln County.

Solid estimates of harvest from private lands in the future are not available so the actual impacts of these changes are presumptive. In addition the possibility exists that significant new mining activity will occur in the Rock Creek area (Sanders County) in the next several years. These potential scenarios make it safe to describe the future socio-economic structure in the area as "dynamic" rather than "static". This overall changing situation is beyond the scope of the Forest Plan and this EIS, but the above discussion is provided to provide a more vivid description of the type of socio-economic situation that exists and will exist in this area.

While, a recent resurgence in mining activity has contributed to the diversification of the local resource-based economy, the wood products industry still dominates the local economy and that industry is significantly dependent upon the Kootenai National Forest for its supply of raw materials. The important point to note is that the local economies are natural resource-based and this resource base is strongly influenced by National Forest landownership patterns and policies.

b. Social Situation

Recent public opinion surveys taken in Lincoln County reveal that most people live in the area because of the natural environment and the small-town atmosphere (Western Analysis, Socioeconomic Baseline Study - Kootenai River Hydroelectric Project, Volume 1, Social Life, undated - circa 1981). People characterize themselves as independent and self-reliant and admire those traits in others. Outdoor recreation is considered an important aspect of living in the area with hunting, fishing, hiking, and camping being popular activities.

There are four population centers within the Forest. The Libby area is the most prominent and contains 67% of the population in Lincoln County. The other are the Eureka-Fortine, Troy-Yaak-Bull River, and Noxon-Trout Creek areas.

The population of Lincoln County, according to the 1980 census, is 17,752, a -1.7 % change from the 1970 census. Flathead and Sanders Counties have a population of 51,966 and 8,675, respectively. Table III-2 shows the populations of the affected counties and the unemployment rate compared to Statewide figures.

TABLE III-2

POPULATION, EMPLOYMENT AND INCOME
FIVE-COUNTY REGION *

State and County	Population	% Change 1970-1980	Unemployment Rate	Per Capita Income
<u>Montana</u>				
Lincoln	17,752	-1.7	11.3%	\$7806
Sanders	8,675	22.3	10.9%	\$7336
Flathead	51,966	31.7	7.5%	\$9143
Statewide	786,690	13.3	7.0%	\$9544
<u>Idaho</u>				
Bonner	23,499	50.7	10.9%	\$7712
Boundary	7,248	32.2	9.7%	\$7781
Statewide	943,935	32.4	7.3%	\$8937

* Sources: Population - 1980 Census; % Change 1970-1980 derived from 1980 Census; Unemployment - Bureau of Labor Statistics (December 1984); Per Capita Income - Regional Economic Information System, Bureau of Economic Analysis (1982).

The social zone of influence is composed of Lincoln and Sanders Counties, Montana, with portions of Flathead County, Montana, and Bonner and Boundary Counties, Idaho also included. Lincoln and Sanders Counties are characterized as two of the most economically depressed areas in Montana, ranking the highest in unemployment and consistently low in per-capita income and employment growth. Because the economies of the five-county impact area are closely tied to the wood products industry, the high unemployment is generally attributed to the overall dynamics of the national lumber market as well as the seasonal nature of the logging industry.

The social zone of influence is composed of the following subareas:

Libby - Contains 67% of the population of Lincoln County (12,000) and is economically dependent on the woods products industry. Because of the proximity of the Forest and the local dependency, much interest is expressed by the public in Forest activities and management plans.

Troy-Yaak-Bull River Valley - Independent logging and the ASARCO (Troy) mine are the primary occupations in this area. The Bull River Valley is a popular recreation area attracting much use in the summer. Concerns most often expressed deal with availability of timber, the local economy, and recreation.

Eureka-Fortine - This area includes more grazing and farming because of the suitability of the Tobacco Valley for these activities. Timber is also important especially Christmas tree production. Issues most commonly expressed concern timber, recreation, viewing, and wilderness or nonwilderness for the Ten Lakes Montana Wilderness Study Act Area.

Noxon-Trout Creek - Located in Sanders County along the Clark Fork River, this area is largely dependent on the timber industry. Issues most often expressed include timber, wildlife management, water quality and the effect of mining on the wilderness.

The regional zone of influence includes roughly the area between the Forest boundary and the nearest large urban areas, namely Kalispell-Missoula (Flathead & Missoula valleys) and the Sandpoint - Coeur d'Alene, Idaho - Spokane, Washington area (Spokane valley). The primary importance of the Forest to this area is for recreation. Areas such as the Cabinet Mountains Wilderness, Ten Lakes Scenic Area, Koocanusa Reservoir, and the Yaak Valley attract approximately 413,700 RVDs per year which represents over 40% of the total Forest use. Most of the timber from the Kootenai is processed in this immediate regional zone, in Columbia Falls, Montana and Moyie Springs, Idaho.

The national zone of influence is not significantly affected in terms of changes in Forest outputs for levels of management. National interest in the Kootenai revolves largely around wildlife and wilderness values, evidenced by interest group involvement in the planning process.

The Kootenai Forest contains land that is subject to treaty rights for the Flathead/Kootenai-Salish Indian Tribes. These treaty rights provide for hunting and fishing. In addition, certain sites are still in use by Native Americans exercising their rights under the American Indian Religious Freedom Act.

In 1982-83, the Kootenai Forest returned to the U.S. Treasury about \$11,400,000, primarily from harvesting timber (\$11,300,000). The remaining revenues (\$100,000) were derived from grazing and special use fees. Details on Fiscal Year 1985 are presented in the next section.

These returns are of local significance because 25 percent is earmarked for return to the States for distribution to the counties in which the National Forest is located. The more timber that is harvested, the more money is returned to the County. Lincoln County has consistently received the highest share of 25 Percent Payments of any county in Montana. Increased revenues could also occur with the discovery of oil and gas in the future. Fifty percent of these revenues would be returned to the states, in contrast to the 25 percent payment received for timber.

In 1983, the Kootenai Forest's expenditures were approximately \$23,600,600. This includes the appropriated budget costs allotted to the Forest, capital investment expenditures, and "credits" awarded to timber sale purchasers for the construction of roads. Details on 1985 expenditures are provided in the next section.

In Fiscal Year 1986 the Forest employed 342 permanent and as many as 144 temporary employees at one time. "Temporary" includes employees hired during the summer season. In addition, 25 volunteers contributed work.

Budgets are subject to the priorities of Congress and the Administration. Budget also affects the size of the work force. Commitments made in terms of project work, are based on available budgets and work force levels. Adjustments in one or the other may affect the Forest's ability to provide the goods and services projected.

B. Current Resource Situation

This section describes the current condition of the Forest in terms of each of the program elements with which the Forest Service is involved: timber, facilities, protection, recreation, wilderness, wildlife and fish, minerals, land ownership, soil and water, cultural resources, range, energy, human and community development, air quality and visual quality.

Summary of Changes between the Draft and Final EIS

Some additional and more recent information is presented in the sections on Timber, Facilities and Protection. The section on Timber describes the amount of timber that is "below cost". The Facilities (roads) section presents the total existing road mileage as of January 1, 1986, and the section on Protection displays more recent information on the spread of the mountain pine beetle in existing lodgepole pine stands on the Kootenai Forest.

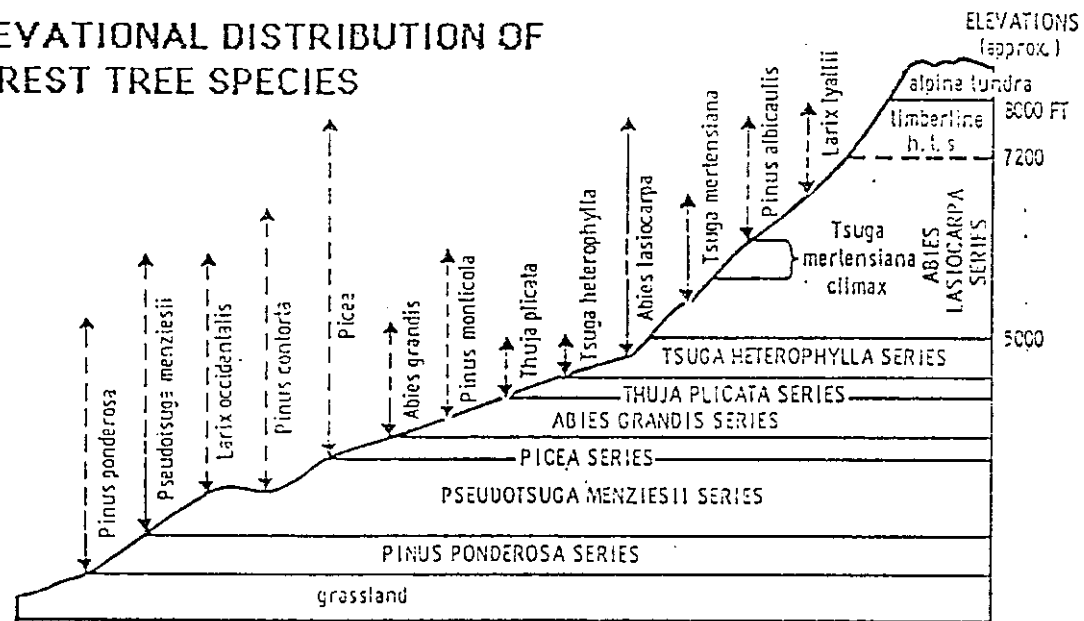
1. Timber

Summary of Changes between the Draft and Final EIS

The costs and receipts for timber sales for 1985 are presented which indicates that costs exceeded revenues.

Montana's forests are both extensive and diverse. Forest covers nearly one-fourth of the state, about 23 million acres (Figure III-2). The northwestern forest region of Montana, which includes the Kootenai National Forest, has an abundance of Pacific Coast forest species that are less common or absent elsewhere in the state. Moist maritime air masses typically funnel through this area on their way inland from the Pacific Coast providing abundant rain and snowfalls and generally humid, cloudy conditions except in mid-summer. These air masses also bring the relatively mild winter temperatures that are necessary for survival of many of the coastal species. Figure III-1 shows a typical elevational distribution of species on the Kootenai National Forest. Additional information on timberland suitability is available in Appendix B.

FIGURE III-1

ELEVATIONAL DISTRIBUTION OF
FOREST TREE SPECIES

Distribution of Forest trees in an area of the Kootenai drainage in north-western Montana. Arrows show the relative elevational range of each species; the solid portion of the arrow indicates where species is potential climax, dashed portions shows where it is seral. (Arno, 1979)

Timber resources on the Forest are located for the most part on moderate to high growth potential sites due to the influence of maritime weather patterns. The stands are grouped into three categories for planning purposes based on habitat-type growth potentials. The majority of acres fall into growth potentials of 50 cubic feet per acre per year or more.

Commercially important tree species on the Forest include ponderosa pine, white pine, Western hemlock, Douglas-fir, lodgepole pine, western larch, Engelmann spruce, grand fir, subalpine fir, and western red cedar. About 83% of the Forest, or 1,872,000 acres, is considered biologically capable of producing commercial timber. Analysis has shown that the most timber that can be produced under long-term sustained yield would be 455 MMBF per year on 1,788,000 acres (see Chapter II, Section B of this EIS). This potential is derived from the Timber Benchmark which maximizes the timber potential while meeting all minimum management requirements such as threatened and endangered species recovery. In comparison, the Current Direction Benchmark allows timber harvesting on 1,426,000 acres with a long-term sustained yield of 334 MMBF. The locations of tentatively suitable timberlands are shown on Figure III-3.

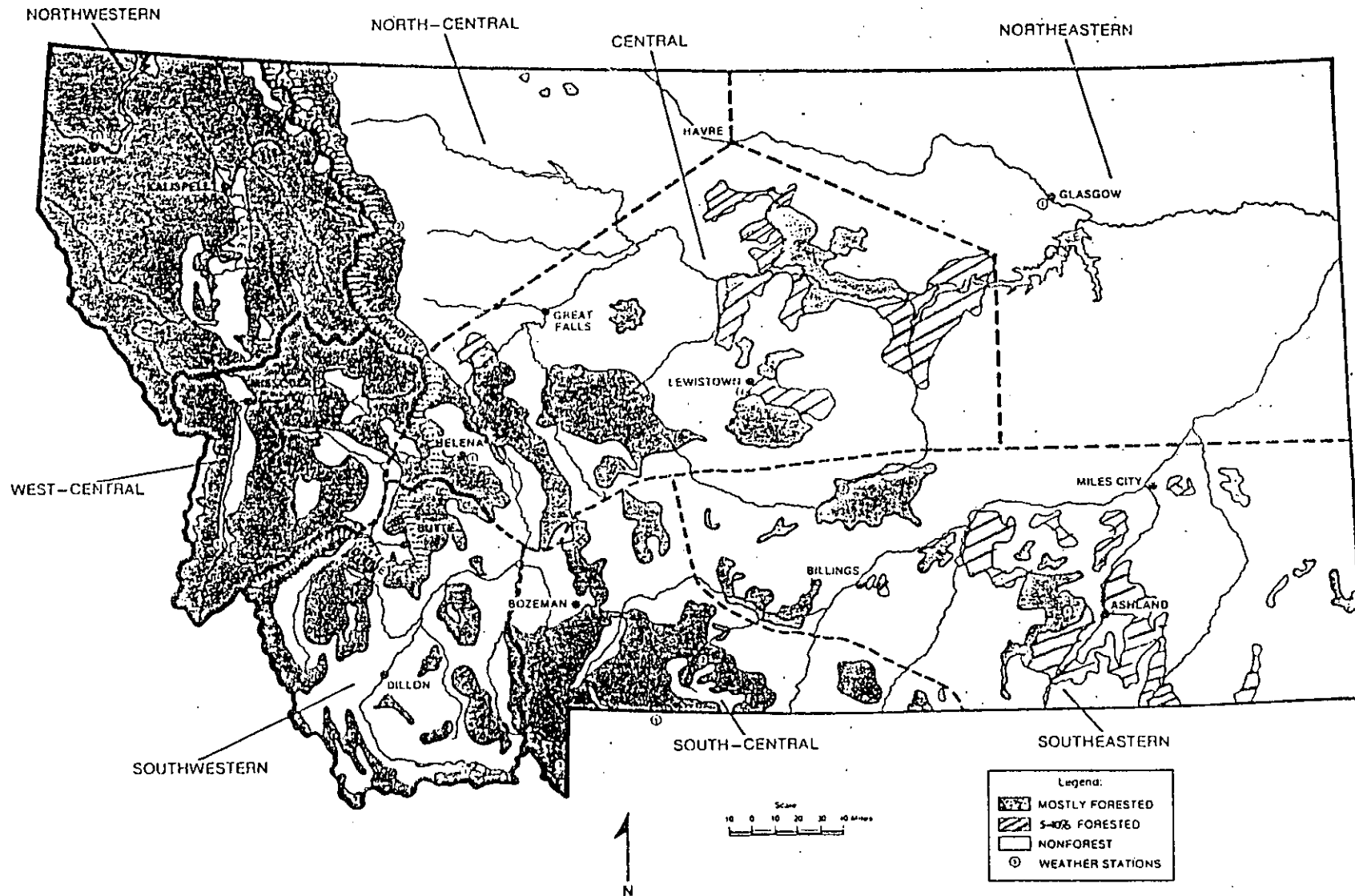
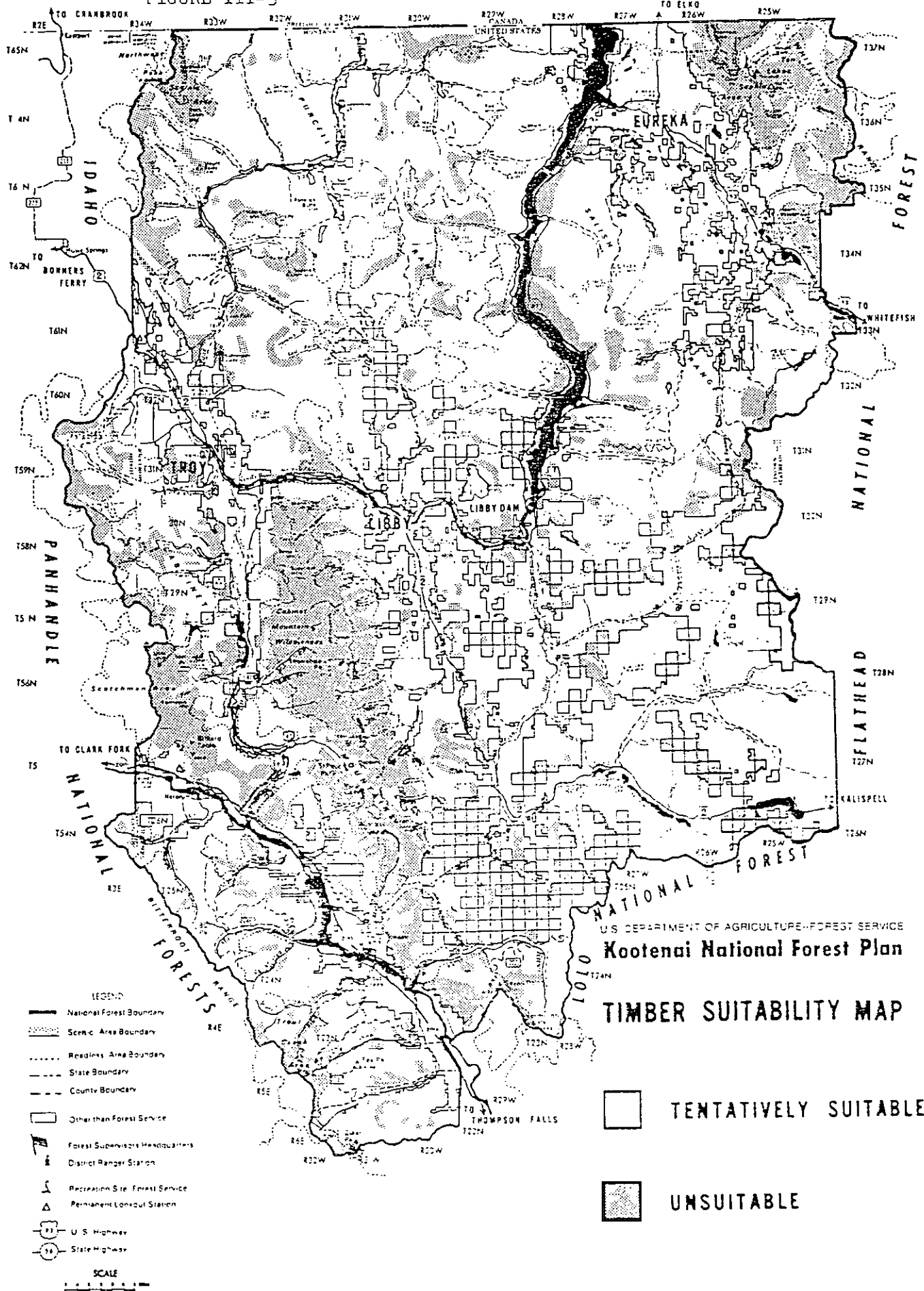


FIGURE III-2

Montana forest regions and forested areas (from Hutchinson and Kemp 1952, Ross and Hunter 1976, composite satellite photo of Montana, GE Space Systems, Beltsville, Md.)



It is important to understand that the timber volumes discussed in this EIS are "regulated" volumes. The timber is considered regulated in the sense that stands of trees are grown and harvested under a specified schedule that is relatively predictable. Only live, green sawtimber is included. Other volume is considered "unregulated" and is not included in these discussions. The unregulated volume may include dead trees, pulp, posts, poles, firewood or any other products which are sold if opportunities exist and the products can be removed in compliance with appropriate management direction.

It is also important to note that the volumes discussed are considered to be sold and cut within the specified decade. In general, this will be true in the long-term but in the short-term (one to several years) fluctuations in the lumber market can cause delays in harvesting timber that has been sold.

An example of a short-term delay is the recent legislation that has allowed certain purchasers to buy out of some Forest Service timber sales. About 236 MMBF which had been sold was returned to U.S. ownership as a result of that legislation. This volume will be reoffered for sale in a timely manner. After the Timber Buy-Back, there was still a total volume of 588 MMBF under contract (9/30/86) which is about 3 1/2 years harvest at the historic level of 173 mmbf/year. Three years of timber sales under contract is considered desirable by the timber industry.

Over the last 10 years (1974-1983) the total timber sell including unregulated volumes was 198 mmbf/year while the total timber harvested was 173 mmbf/year as stated above. This consisted of a regulated sell of 170 MMBF per year average plus 28 mmbf/year unregulated volume. The regulated timber harvest was 148 mmbf/year plus 25 mmbf/year of unregulated volume.

The economic situation and timber dependency is closely tied to the amount of land that is suitable for timber production. On the Kootenai Forest, 1,788,000 acres are tentatively suitable for timber production. These acres are stratified into productivity classes and displayed in Table III-3.

Additional information on the timberland suitability of the Final Plan is located in Appendix B. Also located in Appendix B is additional information on the demand for timber as a result of the Montana Timber Supply analysis, plus additional information on the timber supply in the 3-county area involved with the Kootenai National Forest (Lincoln, Sanders, Flathead counties, Montana, and Boundary and Bonner counties, Idaho).

TABLE III-3

STRATIFICATION OF TENTATIVELY SUITABLE ACRES

Mixed Conifer I (85-150 cubic feet per acre per year)

	<u>Acres</u>
Sawtimber (60 years +)	415,400
Pole Timber (20-60 years)	199,000
Seedlings-Saplings (0-20 years)	37,900
Nonstocked	300
TOTAL	<u>652,600</u>

Mixed Conifer II (20-85 cubic feet per acre per year)

	<u>Acres</u>
Sawtimber	268,000
Pole Timber	315,700
Seedling-Sapling	45,800
Nonstocked	7,000
TOTAL	<u>636,500</u>

Lodgepole

	<u>Acres</u>
High-risk Sawtimber (8"+ DBH; 80 years +)	207,000
Poles and Immature Sawtimber (20-80 years)	118,900
Seedling-Sapling	78,900
Stagnated	94,000
TOTAL	<u>498,800</u>

TOTAL OF ALL ACRES	1,788,000
--------------------	-----------

As indicated above, approximately 50% of the tentatively suitable acres contain stands of mature sawtimber. This includes 207,000 acres of high risk lodgepole stands. Pole timber is present on about 35% of the acres while seedlings, saplings and stagnated lodgepole make up 15%. These figures indicate that harvesting the high risk lodgepole and converting the stagnated stands back into productivity will help achieve balanced age classes.

There are approximately 94,000 acres of stagnated lodgepole pine stands on the Kootenai National Forest. The stagnated lodgepole stands are so overstocked that the trees have literally stopped getting larger - hence the name "stagnated". The stands are usually the result of a fire in which the seedlings came in so profusely that they resemble "dog hair". Thinnings have been tried but the stands do not respond because they have been stagnant too long. The stagnated stands must be completely removed if a commercial stand of timber is to be produced. From a practical standpoint, they can be considered the same as nonstocked stands because they do not contribute to the existing timber harvest levels.

Closely tied to the timber issue is the concern for volume losses in mature lodgepole pine because of the mountain pine beetle. It is expected that all lodgepole pine stands 80 years old and 8 inches or more in diameter (207,000 acres), will be infested in the next ten years. This represents approximately 2,000 MMBF of lodgepole sawtimber. It is estimated that only one half of the volume would be harvestable and would require an average annual harvest of 109 MMBF per year to salvage this anticipated loss. This is because of the location of the stands and the rapid deterioration of the wood after it has become infested. In the 5-year period from 1979-83, an average of 73 MMBF/year of lodgepole pine timber was sold and 50 MMBF/year was harvested.

While timber from the Kootenai Forest is already a significant contributor to the local market, the demand for more timber is expected to increase over time because of projected increased national demand. The RPA demand projections for timber on the Kootenai Forest are 228 MMBF/year in the first decade and increase steadily to 292 MMBF/year and 345 MMBF/year in the third and fifth decades, respectively. Short-term demand has been low because of depressed lumber markets but recent trends appear to be on an increase.

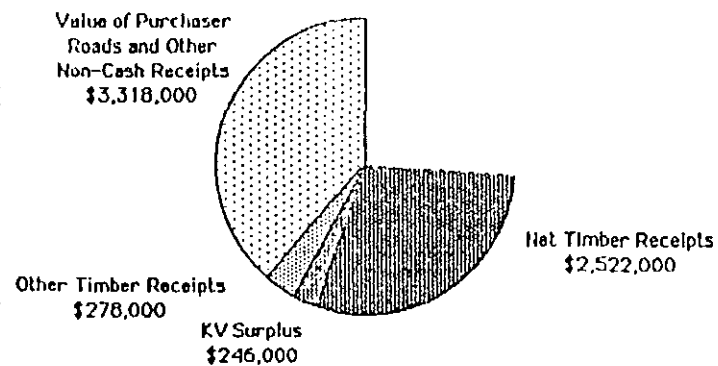
The costs and receipts associated with timber sales were developed and compared for 1985. The details are displayed in the following table and figure:

.....		
:		:
:	Table III-3a	:
:		:
:	Kootenai National Forest	:
:	Timber Program Balance Sheet	:
:	Fiscal Year 1985	:
:		:
:	Receipts	:
:	Value of Purchaser Roads etc.	\$3,318,000
:	Net Timber Receipts	\$2,522,000
:	Other Timber Receipts	\$ 278,000
:	KV Investments (non-timber)	\$ 246,000
:	TOTAL	\$6,364,000
:		:
:	Expenses	:
:	Road Depreciation	\$2,799,000
:	Forestry and Silviculture	\$1,933,000
:	Forest General Administration	\$1,594,000
:	Reforestation	\$1,038,000
:	Stand Improvement	\$ 528,000
:	Other Resource Support	\$ 393,000
:	Road Engineering	\$ 345,000
:	TOTAL	\$8,630,000
:		:
:	Balance	-\$2,266,000
:		:
.....		

FIGURE III-3A

KOOTENAI NATIONAL FOREST TIMBER PROGRAM BALANCE SHEET FISCAL YEAR 1985

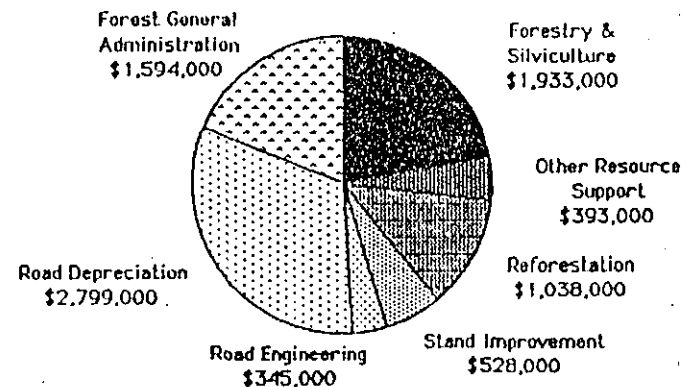
TIMBER PROGRAM RECEIPTS



RECEIPTS

\$6,364,000

TIMBER PROGRAM COSTS



EXPENSES

\$8,630,000



The above information indicates that the total costs of the timber program exceeded the receipts derived from that program. This is true of all Kootenai National Forest programs (wildlife, recreation, livestock etc.). While the financial picture of Forest activities was negative in 1985, it is expected that real price increases for stumpage and the eventual completion of the Forest's transportation system coupled with added consideration for financial consequences of management will reverse the situation in the future. In addition to the financial returns noted above, there are social returns from the timber program as discussed under "Social/Economic Setting", above.

2. Facilities

Summary of Changes between the Draft and Final EIS

Since the DEIS was prepared, some new roads have been built on the Forest. As of January 1986, there were 6,200 miles of road on the Forest. This is 200 miles more than in January 1984 as reported in the DEIS. Of the 6,200 miles of road on the Forest, 993 miles have been closed to motorized vehicles yearlong to protect recreation values, wildlife values and unstable soils as well as to reduce maintenance costs and achieve other goals discussed in the DEIS. In addition 676 miles of road are closed on a seasonal basis for many of the same reasons. Thus 27 percent of the total road system still has some type of use restriction which is similar to the DEIS.

2. Facilities

a. Roads

In January, 1986, there were 6,200 miles of road on the Kootenai Forest; 2,260 miles of collector and arterials, and 3,940 miles of local roads. Forest arterials such as the Forest Development Road on the west side of Lake Koocanusa and the Pipe Creek Road generally have smooth surfaces (asphalt) and two lanes. These roads are designed to provide access to large areas of the forest and funnel traffic to State or Federal highways. Forest collector roads generally have gravel surfaces and may be one or two lanes wide. These roads access smaller areas of the forest and serve to collect traffic from numerous local roads and feed that traffic to the Forest arterials or State and Federal highways. Forest local roads are generally single-lane roads with native (dirt and rock) surfaces. These roads are designed to access small areas of the forest for specific purposes. Most of the local-road mileage on the Kootenai National Forest was developed for access to timber sales.

Road construction for each year since 1977 is displayed in Chapter II of this EIS. Recent experience indicates that the rate of road construction is on the decline as a result of more intense timber sale design to protect water quality and reduce total timber sale costs. Most future road construction will be of the local road type because all of the arterial and most of the collector roads needed are already in place.

Of the 6,200 miles of road on the Kootenai, 993 miles are closed year-long due to recreation and wildlife values or unstable soils, and 676 miles are closed seasonally, largely to provide wildlife protection. This is 27% of the road system.

Major access roads in Lincoln and Sanders Counties affected by the Kootenai Forest include U.S. Highway 2, which parallels the Kootenai River then turns south while running through the towns of Troy and Libby in an east-west direction. State Highway 37 begins in Libby and runs north and east along Koocanusa Reservoir to Eureka, meeting U.S. Highway 93 which traverses the northeast corner of the Forest. State Highway 508 provides access to the Yaak Valley, and State Highway 56 runs through the Bull Lake Valley, connecting U.S. Highway 2 to State Highway 200. State Highway 200 parallels the Clark Fork River in an east-west direction and runs through the communities of Trout Creek and Noxon in the forest's southern portion.

b. Buildings

No Changes occurred Between the Draft and Final EIS

The Kootenai Forest maintains seven Ranger Stations, five work centers, 38 lookouts, 47 housing units, 132 storage and service buildings, and 21 administrative buildings. The Forest also leases buildings for administrative purposes, including a Supervisors Headquarters and Zone Engineering Office.

3. Protection

Summary of Changes between the Draft and Final EIS

More recent information is presented on the status of the mountain pine beetle infestation in lodgepole pine timber stands on the Kootenai Forest.

a. Fire Management

No Changes occurred between the Draft and Final EIS

Fire is a frequent occurrence on the Forest. Major fires occurred here in 1890 and 1910. Since then fire suppression efforts and weather have combined to keep fire size down. Cyclic fires provide a variety of benefits, including seedbed preparation, nutrient cycling, and improving habitat for some species of wildlife. Because of fire; the age classes of trees can vary widely, which reduces their susceptibility to some types of insects and disease attacks. In the course of a fire, heavy fuel loads are reduced. The negative aspects of fire are widely recognized. Wildfires have the potential to destroy human life and property, temporarily damage air quality over large areas, destroy wildlife habitats, damage streams, create situations which increase erosion, and destroy huge volumes of timber.

Fire management encompasses both the protection of the natural resources from wildfire and the use of prescribed fire as a management tool. The Kootenai National Forest protects over 2.4 million acres of Federal, State, and private lands from wildfire. Data compiled for a 15-year period (1970-1984) show a drop in both person-caused and lightning-caused fires.

TABLE III-4			
FIRE CAUSES			
(Annual Average)			
	<u>1970-1974</u>	<u>1975-1979</u>	<u>1980-1984</u>
Lightning-caused	107	65	59
Person-caused	63	53	30

The acreage burned shows a similar decline over time, with two exceptions. In 1979, the person-caused Granite Creek fire burned 3,341 acres on the Forest, more than the amount burned in any other year between 1975 and 1984. In 1984 the Houghton Creek fire burned a total of about 12,800 acres. Only 2,100 acres of that was on Kootenai National Forest land and is included in the data in this section.

.....					
:			:		
:	TABLE III-5		:		
:		ACREAGE BURNED	:		
:		Annual Average	:		
:			:		
:		<u>1970-1974</u>	<u>1975-1979</u>	<u>1980-1984</u>	:
:					:
:	Lightning-caused	911	32	16	:
:	Person-caused	535	788	517	:
:				:

A study of the fire history over the past 20 years shows that serious fire seasons have occurred every six years, most recently in 1967, 1973, and 1979. This trend is similar to that of other Forests in the area, such as the Idaho Panhandle, and reflects the close relationship of fire incidence to general weather patterns. When there is little or no rain over a long period of time, the incidence of fire goes up. As precipitation increases, the risk of fire drops. This trend does not help land managers to predict busy seasons, but it can help to anticipate them. Long-range fire forecasting, like long-range weather forecasting, is an inexact science.

Prescribed burns are fires set deliberately to meet some management objective. Prescribed fire is used to burn underbrush in thinned stands as well as slash from logging operations. Some burning is done to enhance wildlife habitat. Between 1979 and 1983, an average of 11,569 acres were burned annually by prescription. Of that, 2366 acres (or 20%) were burned annually to benefit wildlife. Prescribed fires can result from planned and unplanned ignitions. Planned ignitions, such as those described above, are used to accomplish the goals of a specific land allocation. The only area where planned ignitions are not used is in the Cabinet Mountains Wilderness.

An unplanned ignition, such as one started by lightning, can be treated as a prescribed fire if it serves the purposes of the management area where it is located and if resources adjacent to it are not in danger. Unplanned ignitions are not appropriate in areas with high timber values or in developed recreation areas. Such fires are considered wildfires and are suppressed.

The type of suppression used depends on where the fire is occurring and the burning conditions. Response can vary from confinement (where natural barriers are used and suppression limited to surveillance), to control whereby the fire is surrounded by line, completely checked and extinguished. The appropriateness of the suppression action is based on the Fire Action Plan which, in turn, is developed from land use designation for the area in question.

In the event a fire cannot be checked by initial suppression efforts and the fire "escapes", other strategies are used which take into account the fire situation, costs and damages, and land management objectives.

At present there are two approved fire management areas on the Kootenai Forest, one for the Cabinet Mountains Wilderness and one for the Troy Ranger District. In time, plans will be developed for all Districts. The fire action plan for the Cabinets allows fire to play as near a natural role as possible. Protection of life and property on areas adjacent to the wilderness will be taken into consideration if a fire should come close to the borders.

The Kootenai assumes the primary fire suppression responsibility for most of the Forest, with the State of Montana having primary responsibility in the Fisher River Watershed Fire Protection Area. Cooperative agreements with the State are in effect for other State lands within Kootenai Forest boundaries. The Forest also works closely with local fire-fighting agencies and assists in fighting fires close to towns.

b. Insects and Disease

Summary of Changes between the Draft and Final EIS

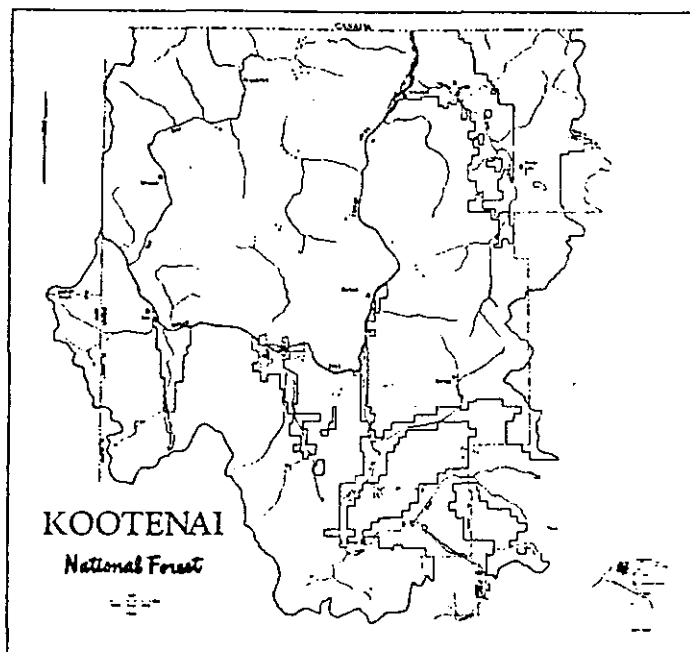
More recent information is presented on the status of the mountain pine beetle infestation on the Kootenai Forest.

The major insect activity on the Kootenai is the mountain pine beetle. The first reported outbreak of Mountain pine Beetle in the Northern Rocky Mountains occurred on the Flathead National Forest in 1909. Between 1911 and 1937, infestations developed, devastated stands, and subsided on the Kootenai, Deerlodge, Lolo, and Bitterroot National Forests. This history of beetle infestation coupled with the history of fire on the Kootenai National Forest have resulted in many lodgepole pine stands which are subject, once again, to beetle attack. Small isolated infestations were reported in 1973. Figure III-4 shows how the infestation has spread each year to 1985. In 1985 mortality was still heavy, but infested acres had declined from 1984. As can be seen on the 1985 map, below, an epidemic is building rapidly on the Fisher River Ranger District near Richards Mountain. The outbreak is decreasing in the Yaak River Area, but will continue to increase in the southeast quarter of the Forest (Tunnock, et al 1986). This, coupled with the large amount of high risk lodgepole pine timber (2,000 MMBF), represents a significant potential for timber volume loss.

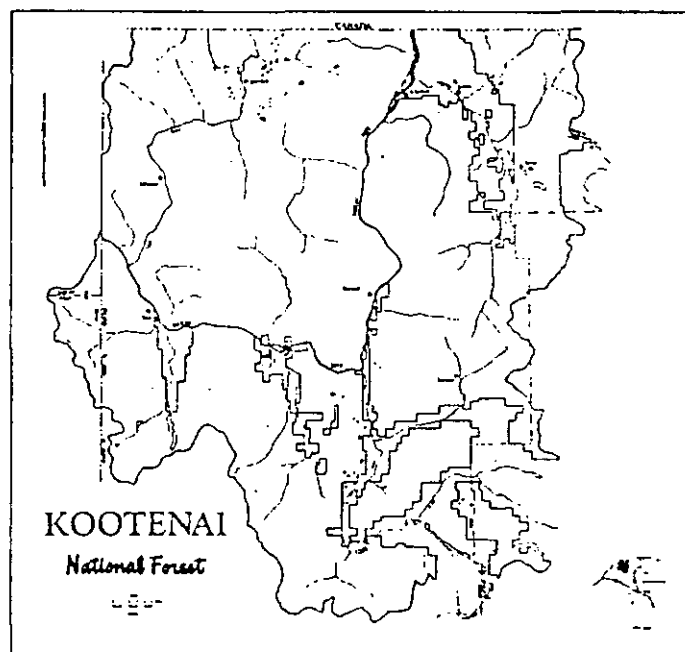
The assumption is that all of this timber will be affected by the mountain pine beetle in the first decade. Approximately one half of this volume will not be salvageable even under the most optimum conditions which is an average of approximately 109 MMBF/year.

The following pages display the general chronologic spread of mountain pine beetle in lodgepole pine stands on the Kootenai National Forest (in dark areas) from 1973 to 1985 (McGregor, M.D. et al, 1983 and Tunnock, S. et al, 1986)

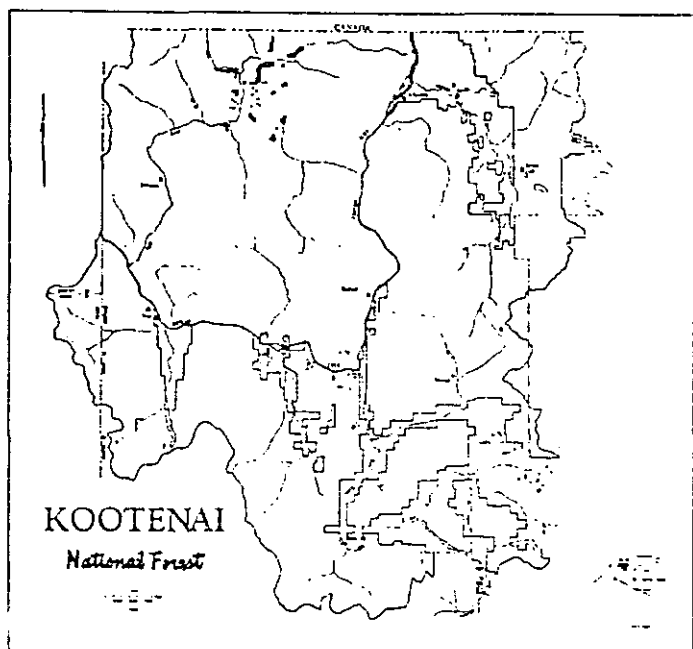
FIGURE III-4



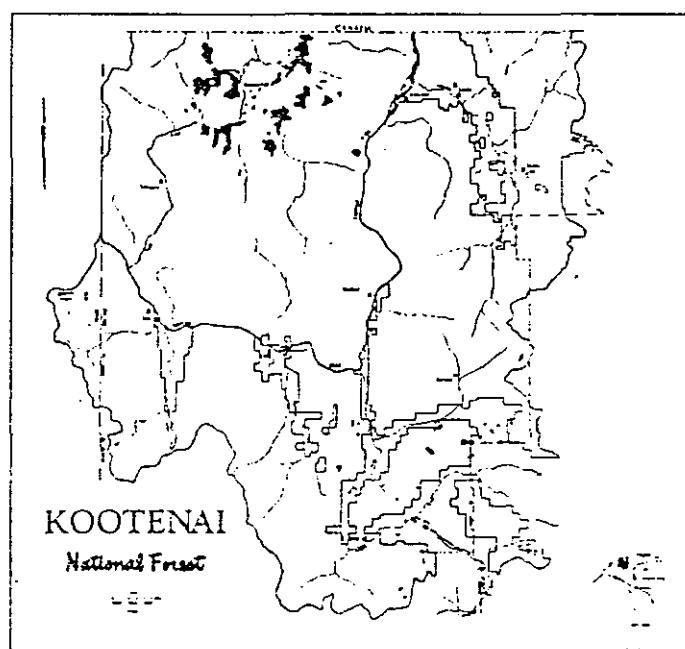
1973



1974



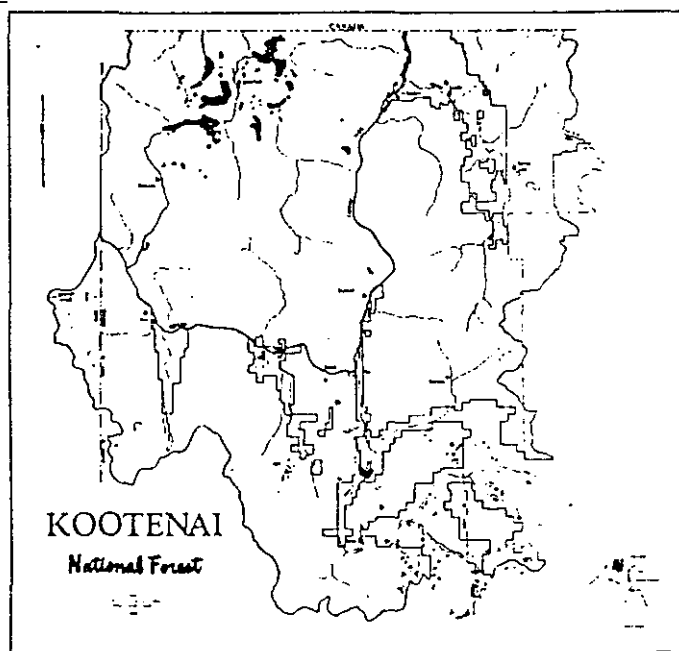
1975



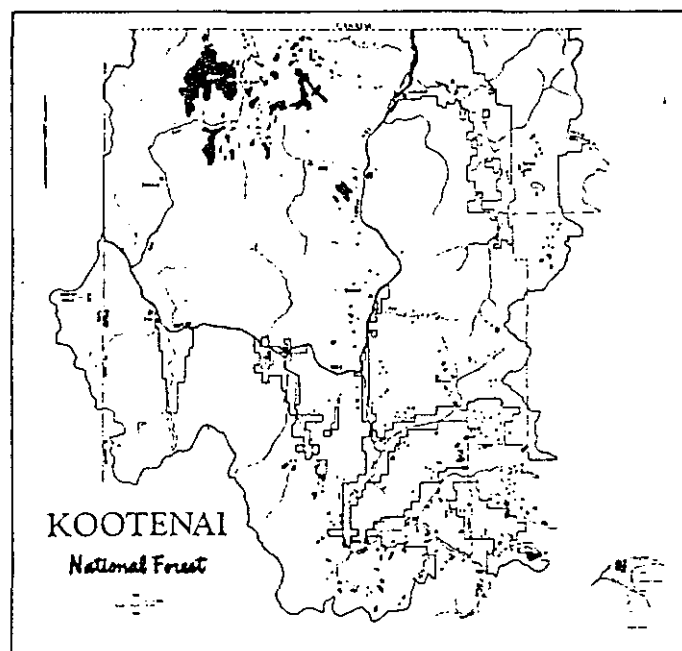
1976

--Chronology of mountain pine beetle infestations, Kootenai National Forest, and adjoining State and private lands, Montana, 1973-1982.

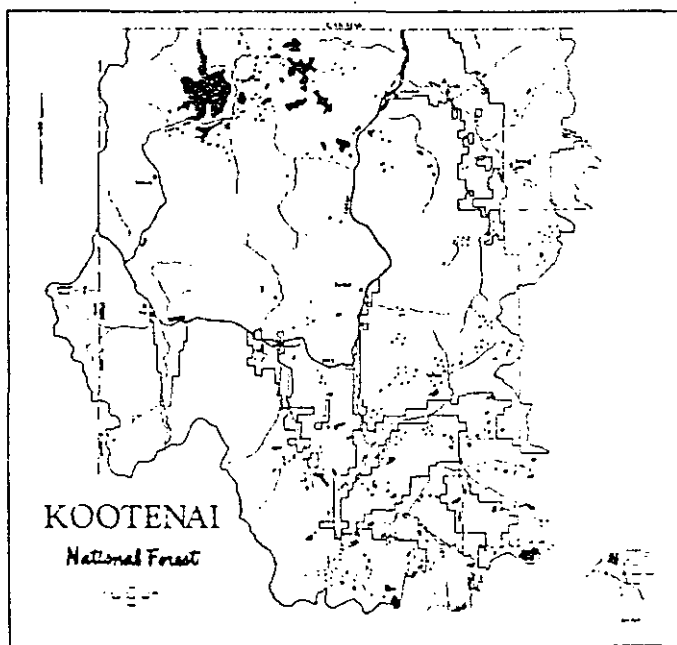
FIGURE III-4 (continued)



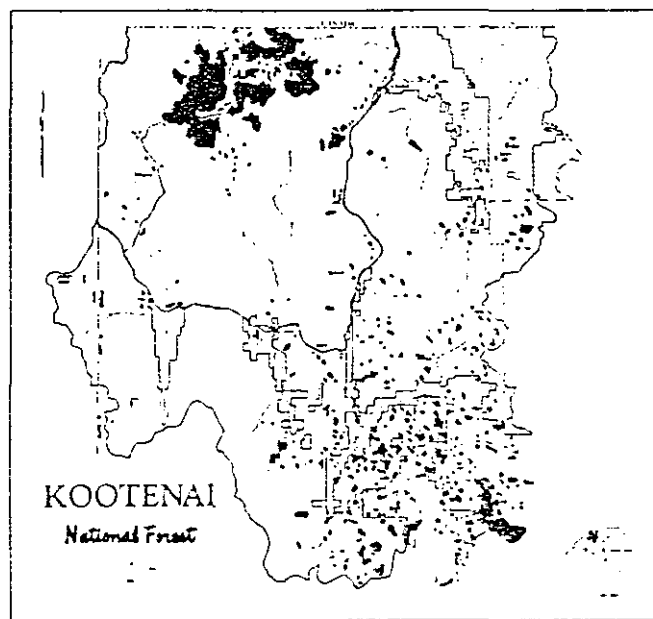
1977



1978



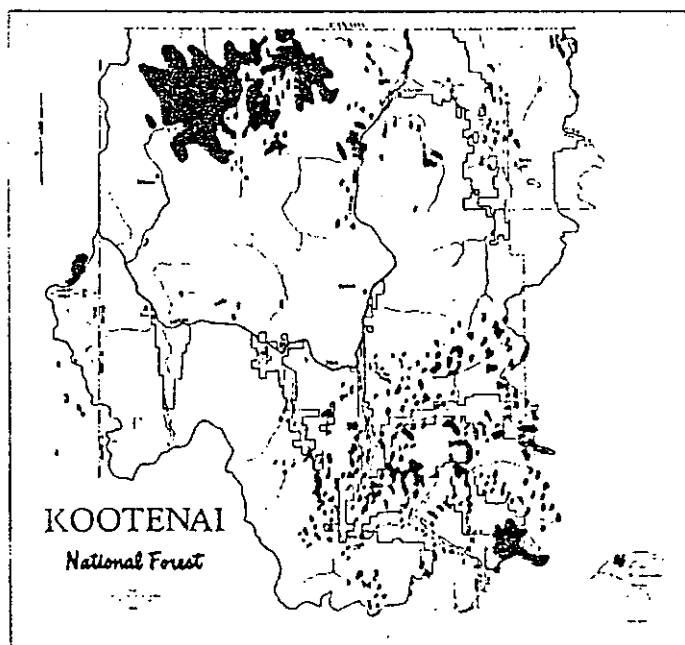
1979



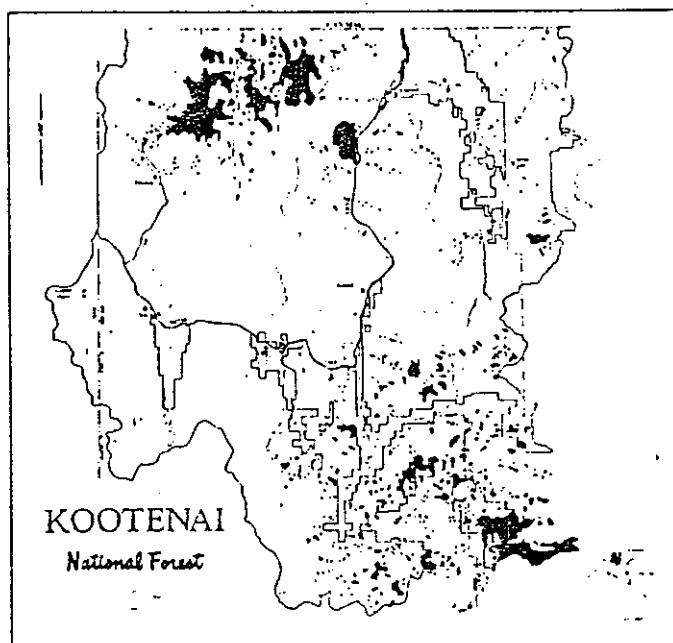
1980

--Chronology of mountain pine beetle infestations, Kootenai National Forest, and adjoining State and private lands, Montana, 1973-1982, continued.

FIGURE III-4 (continued)



1981

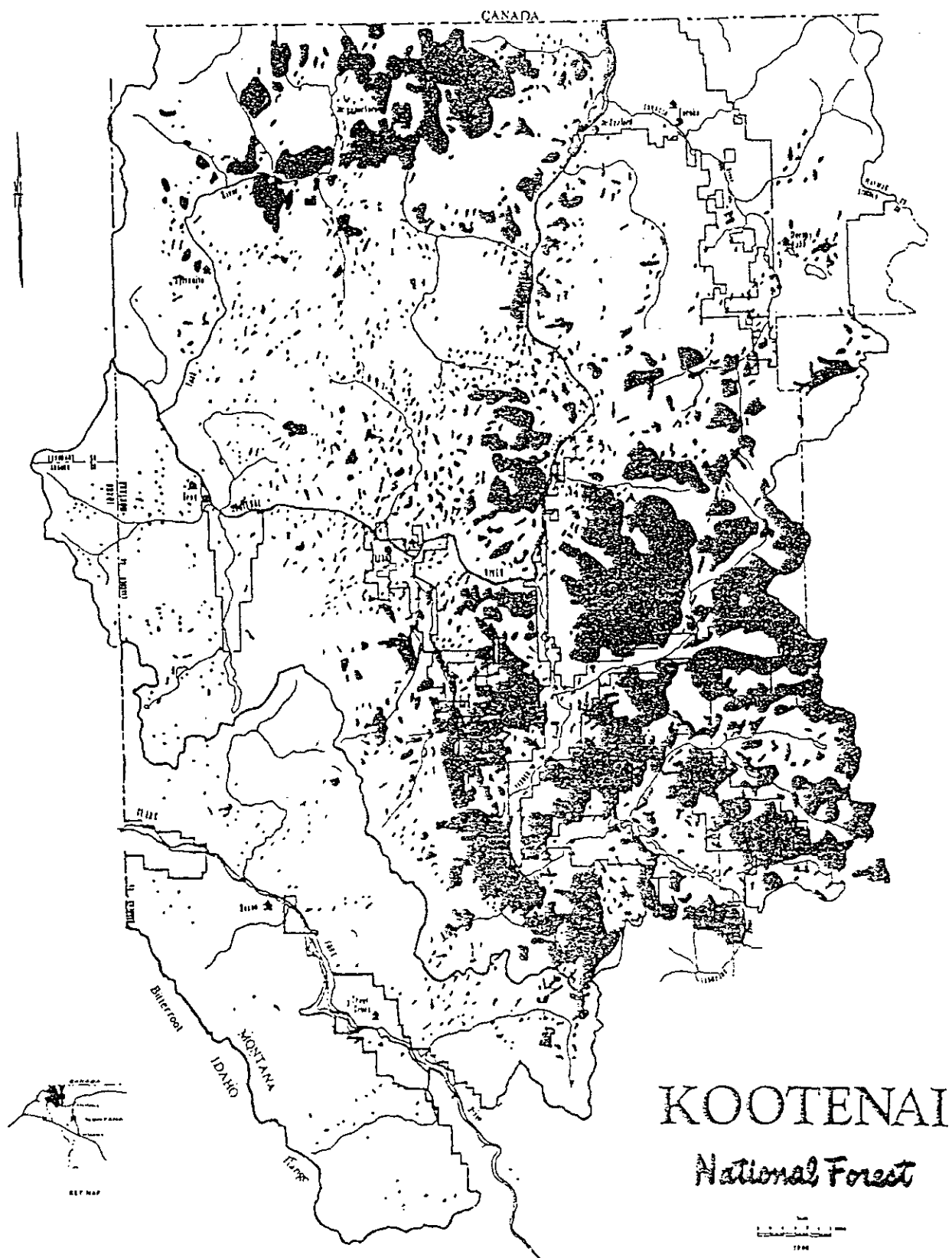


1982

--Chronology of mountain pine beetle infestations, Kootenai National Forest, and adjoining State and private lands, Montana, 1973-1982, continued.

FIGURE III-4 (continued)

Pine stands infested by
the mountain pine beetle, Kootenai
National Forest, Montana, 1985.



4. Recreation

No significant changes occurred between the Draft and Final EIS

Total recreation use on the Forest has been increasing steadily, and responses from the public to the drafts of this Environmental Impact Statement indicate a strong desire for more and varied recreation opportunities in the future. Recreation use on the Kootenai in 1984 is estimated at 873,000 Recreation Visitor-Days (RVDs). Of that, 297,000 RVDs were associated with developed recreation sites. See the glossary for a definition of recreation visitor-day.

Analysis has shown that the Kootenai currently has the capacity to meet expected demands for all forms of recreation for at least 50 years. Without special considerations, demand for motorized recreation in semi-primitive settings could exceed supply as early as the first decade. This occurs because the challenging roads or areas suitable for off-road-vehicle use will either be closed for wildlife or other purposes or further developed for timber or mineral production. In either case; the semi-primitive, motorized, recreation opportunity is removed. Even though recreation capacities forest-wide can be sufficient in the long run, site specific difficulties can be expected in any recreation use category simply because users prefer to recreate in a few desirable areas (Leigh Lake in the Cabinet Mountain Wilderness and McGillivray Campground on Lake Koocanusa are examples). Table II-7 in the preceding chapter shows when recreation demand in each category is expected to exceed supply for each alternative.

a. Roaded Natural Recreation

Roaded dispersed recreation use in 1984 was 435,000 RVDs, and is projected to reach 614,000 in the fifth decade given current user costs (See Table III-6, below). Most users are hunters, wood gatherers, berrypickers, and people who want to sightsee. Increased interest in winter sports on the Forest has also created a demand for more plowed roads and parking areas to provide access and jumping-off points for cross-country skiing, snowmobiling, snowshoeing, and even camping. There are sufficient roads to meet these needs for many years (Table II-7).

.....	
:	:
: TABLE III-6	:
:	:
: PROJECTED DEMAND FOR ROADED NATURAL RECREATION	:
: (RVDs)	:
:	:
: <u>Decade</u>	: <u>Demand</u>
: 1	: 436,000
: 2	: 478,000
: 3	: 521,000
: 4	: 566,000
: 5	: 614,000
.....	

b. Semi-primitive Motorized Recreation

A sub-category of dispersed recreation that doesn't fall into either the roaded or roadless groups by definition is referred to in this document as "semi-primitive motorized recreation". It refers to the use of vehicles, such as trail bikes and four wheel drive vehicles (and motorboats if traveling by water), in locations that are relatively undeveloped. Often these are areas that had been logged years ago. Remnants of the old skid trails, logging roads or mine roads remain, presenting a challenge to the motorcyclist or four-wheeler. Although these roads are still obvious, they may not be part of the Forest road system, and no effort is made to improve or maintain them. (Some change in management might be necessary if a segment of an old road or trail begins to erode and sedimentation enters nearby streams.) Public interest in this form of recreation is displayed in the following table.

: TABLE III-7		
: DEMAND FOR SEMI-PRIMITIVE MOTORIZED RECREATION		
: (RVDs)		
:		
	<u>Decade</u>	<u>Demand</u>
	1	76,000
	2	84,000
	3	91,000
	4	99,000
	5	107,000

c. Semi-primitive Non-motorized Recreation

This form of recreation does not involve any kind of motorized equipment. Hiking trails are important.

There are 1,335 miles of trail on the Kootenai. Five of the trails have been designated National Recreation Trails, indicating that they provide some unique hiking experiences and that additional funds will be available for their maintenance. The five trails are:

1. Trout Creek Loop Trail; 22 miles long, located within the 20,000-acre Trout Creek primitive recreation area. Solitude and elk hunting are key features.
2. Pulpit Mountain Trail; consisting of five miles of open, ridgetop, grasslands with scenic vistas of the Troy area.
3. Skyline Mountain Trail; 23 miles of varied scenery, ranging from old-growth forest, found along stream bottoms, to open ridges. The trail stretches, from a point near Libby, to the Yaak River Valley.
4. Boulder-Vinal Trail; 19 miles of rugged-backcountry trail that traverses the flanks of Mt. Henry and Vinal Creek Canyon.

5. Little North Fork Trail; a short trail, near Koocanusa Reservoir, leading to a scenic waterfall in a shady canyon. The trail is new, built in 1980 by the Youth Conservation Corps (YCC).

Six additional trails are being considered for nomination.

Projected demand for roadless recreation indicates that if this resource stayed at the 1980 level, there would be sufficient opportunities to satisfy demand for more than 200 years. Use in 1984 was 47,000 RVDs. Projected use in the fifth decade (excluding projected wilderness use) is expected to reach 66,000 RVDs. This demand can be met on 132,000 acres of roadless area. If less than that were available, the quality of the experience would be reduced, with use shifting to wilderness areas or to other Forests. Over-used areas are common in this recreation category because users are virtually never evenly dispersed over the entire area. The Kootenai Forest currently has 404,000 acres of inventoried roadless area. Table III-8 displays the demand over time (again, assuming no changes in user cost relationships).

.....		
:		:
:	TABLE III-8	:
:		:
:	DEMAND FOR SEMI-PRIMITIVE NON-MOTORIZED RECREATION	:
:	(RVDs)	:
:		:
:	<u>Decade</u>	<u>Demand</u>
:	1	47,000
:	2	51,000
:	3	56,000
:	4	61,000
:	5	66,000
:		:
.....		

d. Developed Recreation

There are 28 campgrounds, 7 developed picnic grounds, one winter sports area (Turner Mountain Ski Area), and 18 boating sites on the Forest. Figures illustrating demand over a 50-year period are presented in Table III-9.

TABLE III-9
PROJECTED DEMAND FOR DEVELOPED RECREATION
(RVDs)

<u>Decade</u>	<u>Demand</u>
1	296,000
2	325,000
3	354,000
4	385,000
5	417,000

Although the Kootenai Forest has facilities to provide a total of 831,000 recreation visitor days (RVDs) in a given year, maintenance problems at that level would be major. The need for constant garbage removal and law enforcement would detract from the overall recreation experience. For that reason, the Forest's capacity is defined at 75% of that level or what is called "maximum useful capacity" (or 623,000 RVDs per year). People using developed sites can be assured of a pleasant stay and not feel undue stress from the pressures of crowding. Although the number of recreationists visiting the Kootenai Forest facilities is expected to increase steadily, the Forest could satisfy use at a level of 75% of physical capacity without expansion of facilities, for about ten decades, if demand for all sites were the same. Some sites, particularly around Lake Kootenai, have become increasingly attractive and heavily used while other sites are underused. Expansion of certain sites and creation of new ones in the more heavily-used areas, along with closures of lightly-used sites, can effectively satisfy this type of demand.

5. Wilderness, Roadless, and Special Areas

Summary of Changes between the Draft and Final EIS

Information has been added to section c, Special Areas, on eligibility potential for Wild and Scenic River classification for four rivers on the Kootenai Forest.

a. Wilderness

The 94,400-acre Cabinet Mountains Wilderness is located in the center of the Forest and represents about 4% of the total Forest acres. The Cabinets contain a variety of landscape and vegetation, ranging from glaciated cirque basins and alpine lake settings, to cedar groves in the lower streambottoms and wetlands.

Use is primarily day hiking and some horse use. In 1984, the overall use of 18,000 RVDs was within the estimated capacity of 47,000 RVDs. The narrow configuration of the Cabinets (less than a mile wide at its narrowest point) has caused some pressures to occur at some of the more popular destination sites, such as Leigh Lake. The relatively easy access has also resulted in some sites receiving heavy use and visitor impacts. Effects of overuse are discussed in Chapter 4 in the wilderness section.

In addition to the Cabinet Mountains Wilderness is the 34,200 acre Ten Lakes Montana Wilderness Study Act (MWSA) area, located in the northeast corner of the Forest. Ten Lakes is one of an original nine areas designated in P.L. 95-150 for special wilderness evaluation. One other area on the Kootenai designated by the MWSA Bill (Mt. Henry) was evaluated separately in a Regional EIS and was later released from further wilderness study by the recent Metcalf Wilderness Bill (12/84).

b. Roadless Areas

While 4% percent of the Forest is wilderness and 2% is wilderness study, another 18% percent, or 404,000 acres, is "inventoried roadless" and eligible to be considered for wilderness. (See Figure III-5). An additional 60,000 acres (an additional 3% of Kootenai land) are also roadless, but were not counted in the inventory because they did not meet the criteria for inclusion, i.e., parcels had to be 5,000 acres or greater in size, etc. Management of these scattered, smaller parcels, however, is given equal consideration for roadless management by the various alternative plans, even though they do not qualify for consideration for wilderness.

During the 1979 Roadless Area Review and Evaluation (RARE II), approximately 324,300 acres of roadless land outside of the existing Cabinet Mountains Wilderness were inventoried on the Kootenai Forest. As a result of the RARE II process, about 89,000 acres were then recommended to Congress for wilderness (Scotchman Peaks with 72,000 acres and the Cabinet additions totaling 16,000 acres, which included the Cabinet Face West, Cabinet Face East (West), Chippewa Creek, and McKay Creek roadless areas). Congress did not act on the recommendations prior to the Ninth Circuit Court decision that ruled that the RARE II process in California was invalid. This decision required that the process for evaluating roadless areas be redone. The National Forest Management Act (regulation 219.17), revised in September 1983, requires an evaluation for wilderness of all lands that meet the criteria for inventoried roadless.

There are 438,000 acres of potential wilderness areas on the Kootenai that meet the criteria for wilderness evaluation. Of the 438,000 acres, 34,000 acres are contained in the Ten Lakes Montana Wilderness Study Area (MWSA), being studied separately from the Forest Plan process. This leaves roughly 404,000 inventoried roadless acres to be evaluated for wilderness. (See Figure III-5).

(1) Resources

This 404,000 acres of inventoried roadless areas are divided into 32 areas. The following map and chart shows the roadless areas along with selected resource information.

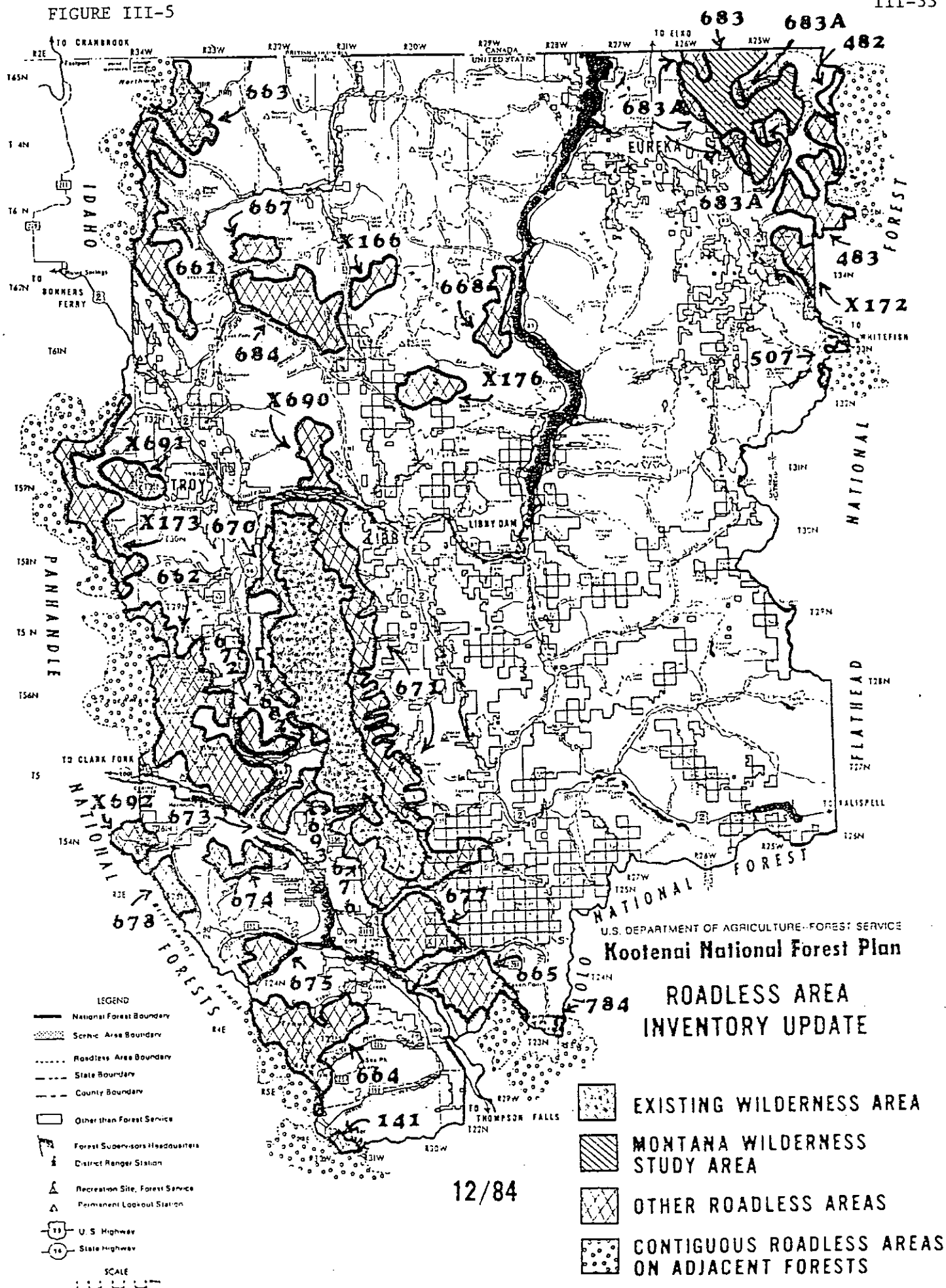


TABLE III-10

INVENTORIED ROADLESS AREAS
SELECTED RESOURCE VALUES

ROADLESS AREA NAME	AREA NO.	NET ACRES	Tent. Suit. Timber Ac.	Big Game W.Rge.Acs	Grizzly Habitat Acres	Mineral Poten- tial
Berray Mtn.	672	8300	3700	4400	8300	low
Buckhorn Ridge	661	31600	15000	1300	31500	mod*
Cabinet Face E.	671	50400	22200	0	50400	high*
Cabinet Face W.	670	10900	6300	400	10900	low
Cataract	665	27600	16700	1900	25200	high*
Chippewa	682	2300	1600	200	2300	low
Cube-Iron	784	(See Lolo National Forest Plan EIS)				
E. Fork Elk Crk	678	5000	3700	300	0	low
Flagstaff Mtn.	X690	9500	6500	4100	9500	low
Galena	677	15500	6000	1600	14000	high*
Gold Hill	668	10700	10000	1900	0	low
Gold Hill (W)	X176	10200	9900	0	1700	low
Government Mtn.	673	8600	5700	2200	8600	mod*
Grizzly Peak	667	6000	5000	2600	6000	low
LeBeau	507	(See Flathead National Forest Plan EIS)				
Lone Cliff Smds	674	6600	4100	2300	0	mod*
Marston Face	X172	6000	900	1400	6000	low
Maple Peak	141	(See Idaho Panhandle National Forest Plan EIS)				
McKay Creek	676	13500	7400	600	13500	high*
McNeeley	675	7700	5400	3200	0	low
Northwest Peaks	663	19100	5600	0	19100	low
Roberts Mtn.	X691	8000	6900	0	6000	low
Rock Creek	X693	400	0	0	400	high
Roderick	684	24800	21200	6000	24800	low
Scotchman Peaks	662	83700	34300	2500	82900	high*
10 Lakes Contig	683a	7100	7100	500	7100	high#
Thompson-Seton	483	71750	18990	0	71750	high#
Trout Creek	664	39700	29900	1900	0	high*
Tuchuck	482	19820	7442	0	19820	high#
W. Fk Elk Crk	X692	4800	4400	1300	0	low
Willard-L. Est	X173	53675	27087	0	33068	high*
Zulu Creek	X166	6400	5600	0	5000	low

* rating pertains to a portion of the area.

Portions of some areas may have different ratings.

rating applies to the oil and gas potential.

Additional information on the resources and the wilderness attributes of each of the individual roadless areas can be found in Appendix C.

(2) Wilderness Attributes

Wilderness attributes used to define wilderness quality include the degree of natural appearance and integrity, opportunities for solitude, opportunities for primitive recreation, and special, unique features associated with the area. Also considered is the boundary of the area and the opportunity for adjustments to enhance the wilderness quality.

Generally, roadless areas on the Kootenai have a high degree of natural integrity and appearance with trails being the most dominant man-made intrusion on an area. Some areas contain lookouts, or remains of lookouts. Some areas contain old cutting units or remains of low-standard roads that could be excluded with boundary adjustments. Old mining remains, adits, tailings, etc., are present in some locations, such as Buckhorn Ridge. Cabinet Face East contains an electronic site.

Opportunities for solitude vary by area and depend largely on the size and configuration of the roadless area. Generally, those areas that face out into a populated valley, such as the Kootenai and Clark Fork River Valleys, tend to have moderate to low opportunities for solitude. In the case of additions to the Cabinet Mountains Wilderness, the solitude factor is measured in terms of how much the area contributes to the solitude of the existing wilderness. (The Cabinet Mountains Wilderness, because of the elongated shape and narrowness, is subject to concentrated use at some locations, diminishing the opportunity for solitude.)

Primitive recreation opportunities are varied and include hiking, hunting, wildlife observation, fishing, skiing, and rock climbing. Most areas contain special features such as unique wildlife habitat (Flagstaff Mountain for bighorn sheep, Cataract for a cutthroat fishery, Cabinet Face West for mountain goats), unique forest ecosystems (Cabinet Face East and Scotchman Peaks), or recreation experiences unique on the Kootenai (Buckhorn Ridge).

Many areas have opportunity for boundary adjustments to correct a difficult-to-manage situation. Some areas, however, because of their configuration would be difficult to adjust without detracting from the wilderness quality. This is particularly true of Buckhorn Ridge. Adjustments are made to improve the manageability of an area, if possible, by placing the boundary on easily-defined features.

Appendix C contains details on the characteristics and values of each roadless area. The following briefly summarizes the wilderness attributes and public interest on each roadless area under consideration for wilderness.

Scotchman Peaks - 662

Wilderness Attributes: This 83,700 acre area rates high in natural integrity, opportunities for solitude, and offers a variety of primitive recreation challenges such as quality roadless hiking and hunting amidst a strongly-glaciated alpine landscape and high, mountain ridges. The area is large enough that recreation use is easily dispersed, contributing to the solitude opportunities. Wildlife include elk, whitetail and mule deer, bighorn sheep, goats, grizzly and black bear.

Public Interest: Scotchman Peaks has received much support for wilderness classification throughout the 1970's. During the RARE II review process, over 6,200 comments were received on this area. Seventy-five percent of those comments expressed support for Wilderness in Scotchman Peaks. Scotchman Peaks was recommended for Wilderness designation in RARE II and a portion (41,000 acres) was recommended in the June, 1984, Montana Wilderness Bill.

Ten Lakes Contiguous Areas - 683a

Wilderness Attributes: This 7,100 acre area contains portions of old logging roads which represent the major nonconforming feature. Likewise, opportunities for solitude are limited in the areas themselves but collectively, they contribute to the opportunities for solitude to be found in the adjacent Ten Lakes Montana Wilderness Study Area (MWSA). The entire area is part of the Northern Continental Divide grizzly bear ecosystem.

Public Interest: Much local and regional interest has been expressed for preserving the roadless character of the Ten Lakes MWSA area. The contiguous area receives light use which is associated with the Ten Lakes MWSA area (683) where most of the recreation use occurs. There is also much concern for protecting the wildlife habitat including grizzly bear and, possibly, caribou. The Ten Lakes Contiguous Area is a newly defined roadless resource and was recommended for Wilderness designation in the June, 1984, Montana Wilderness Bill.

Trout Creek - 664

Wilderness Attributes: This 39,700 acre area contains numerous opportunities for solitude owing to the "bowl" configuration that provides a screen from developments outside the area. The area is also large enough to disperse recreation use and this, along with a lack of destination points that attract use, contribute to the solitude. Wildlife in the area include elk, whitetail and mule deer, black bear, moose, and other numerous nongame species.

Public Interest: During the RARE II process over 6,300 comments were received concerning this area. About 67% of the comments favored Wilderness classification for the area. Opposition to Wilderness designation related to the timber values which are present. Trout Creek was recommended for non-wilderness in RARE II and a portion (13,000 acres) was recommended for Wilderness in the June, 1984, Montana Wilderness Bill.

Cabinet Face West - 670

Wilderness Attributes: This 10,900 acre area borders the western edge of the existing Cabinet Mountains Wilderness and portions of the area were recommended for wilderness in the original RARE II study. Opportunities for solitude vary from good to poor, with the well-vegetated drainages providing the best opportunities for solitude. There are no nonconforming features outside of short segments of trails that traverse the area. Wildlife include mountain goats and bighorn sheep. The area is predominately grizzly habitat.

Public Interest: During the RARE II process, public interest was light, but polarized. Of the 203 comments received about 54 percent opposed Wilderness designation. A portion of Cabinet Face West (8,100 acres) was recommended for Wilderness designation in RARE II and 6,900 acres were recommended for Wilderness in the June, 1984, Montana Wilderness Bill.

Cabinet Face East - 671

Wilderness Attributes: This 50,400 acre area is adjacent to the eastern edge of the existing Cabinet Mountains Wilderness. Overall, the naturalness of the area is high. Opportunities for solitude range from good to moderate, with the better opportunities available in the northern portion of the area. From Leigh Creek south, roads extend along the stream bottoms (outside the roadless area boundary) which diminish the opportunities for solitude. The area provides habitat for grizzly bears, goats, and moose, as well as deer.

Public Interest: The "roadlessness" of this area has historically been a major local concern, primarily because the area is readily viewed from Libby and along Highway 2. The area also provides numerous entrance points into the Cabinet Mountains Wilderness which contributes to the popularity of the area. Public interest in the area was strong, but polarized during the RARE II process. About 56 percent of the 2663 commentors favored Wilderness designation. A small portion of Cabinet Face East (400 acres) was recommended for Wilderness in RARE II and approximately 17,000 acres were recommended for Wilderness designation in the June, 1984, Montana Wilderness Bill.

Government Mountain - 673

Wilderness Attributes: This 8,600 acre area borders the southwestern edge of the existing Cabinet Mountains Wilderness. The naturalness of the area is considered high with no manmade features presenting a nonconforming intrusion. Opportunities for solitude vary from high to moderate with the better opportunities available in the deep drainages within the area. The area contains elk winter range and grizzly habitat.

Public Interest: During the RARE II process 85 percent of the 1,365 commentors opposed Wilderness designation for the area. Government Mountain was recommended for non-wilderness in RARE II.

McKay Creek - 676

Wilderness Attributes: This 13,500 acre area is adjacent to the southern end of the existing Cabinet Mountains Wilderness. The natural integrity is high with trails being the only manmade structures. Opportunities for solitude are many and of a high quality, especially in the Swamp Creek and Rock Creek areas. Primitive recreation opportunities include hunting, hiking, and fishing. Wildlife include mule deer and grizzly bear.

Public Interest: About 58 percent of the 2,537 people who commented during the RARE II process favored Wilderness designation. A portion of McKay Creek was recommended for Wilderness designation in RARE II (6,700 acres) and 5,000 acres were recommended for Wilderness in the June, 1984, Montana Wilderness Bill.

Chippewa Creek - 682

Wilderness Attributes: This 2,300 acre area borders the western edge of the existing Cabinet Mountains Wilderness and portions were recommended for wilderness in the RARE II study. The natural appearance of the area is high with only the Dad Peak trail crossing the area. Opportunities for solitude, however, are moderate because the area generally faces out into the Bull River Valley. The area does contribute to the solitude opportunities in the Cabinet Mountains Wilderness. Primitive recreation opportunities include hunting and hiking. Wildlife include mountain goats, bighorn sheep, mule deer, and grizzly bears.

Public Interest: During the RARE II process, 2,499 people commented on this area. About 58 percent favored Wilderness designation. A portion of Chippewa (400 acres) was recommended for Wilderness designation in RARE II and 1,300 acres were recommended for Wilderness in the June, 1984, Montana Wilderness Bill.

Rock Creek - X693

Wilderness Attributes: This 400 acre area was identified in the 1983 inventory as a potential addition to the Cabinet Mountains Wilderness. Although small in size, the area is high in natural integrity and would contribute to the opportunities for solitude in the existing wilderness. The area contains mountain goat and grizzly bear habitat.

Public Interest: The public has not had any previous opportunity to address this area's wilderness potential.

Roderick - 684

Wilderness Attributes: The natural integrity of this 24,800 acre area is high with trails and remains of two lookouts the only manmade features in the area. Opportunities for solitude are of a high quality owing to the large size of the area and the lack of destination points which lead to concentrations of users that, in turn, diminish solitude. Primitive recreation opportunities include hunting, hiking, big game observation, nontechnical mountain climbing, and fishing. Wildlife habitat includes moose, whitetail deer, and grizzly bears.

Public Interest: The area has been evaluated in both RARE I and RARE II where little support for wilderness classification was expressed. Of the 1,152 people who commented during the RARE II process, 84 percent opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

Galena - 677

Wilderness Attributes: Aside from the trails that traverse the 15,500 acre area, the natural appearance of the area is intact. Solitude opportunities are a high quality, particularly in the Galena and Canyon Creek drainages, and the Silver Butte drainage. Primitive recreation opportunities include unroaded hunting and hiking. Wildlife habitat includes mule deer and grizzly habitat.

Public Interest: The area was evaluated in both RARE I and RARE II. Over 2,400 people commented on this area during RARE II. About 60% favored Wilderness designation. The RARE II recommendation was for non-wilderness.

Cataract - 665

Wilderness Attributes: The natural integrity of this 27,600 acre area is high with only trails and a fire lookout representing manmade intrusions. The configuration of the area, that of a "hanging valley," provides opportunity for solitude. Roadless hunting and fishing in Cataract Creek are the key primitive recreation opportunities available. Wildlife habitat includes grizzly bear and elk.

Public Interest: In the RARE II evaluation about 69 percent of the 2,159 commentors favored Wilderness designation. The RARE II recommendation was for non-wilderness.

Buckhorn Ridge - 661

Wilderness Attributes: The natural integrity of this 31,600 acre area ranges from being intact on the Kootenai side to compromised on the Idaho Panhandle portion where there are many signs of past human activity. Generally the opportunities for solitude are moderate owing to the ridgeline configuration of the area, permitting one to view the developments outside the area. However, most of the sidedraws afford opportunities for solitude. The area provides excellent ridgetop hiking opportunities and roadless hunting. Big game winter and summer range and grizzly bear and moose habitat are also present.

Public Interest: About 89 percent of the 2,131 people commenting on this area during RARE II opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

Northwest Peaks - 663

Wilderness Attributes: This 19,100 acre area rates high in natural integrity and appearance with only a few miles of trail and the old Northwest Peak lookout presenting a nonconforming use. Generally, opportunities for solitude are high throughout the area especially in the upper West Fork Yaak basins. Primitive recreation opportunities include hunting, fishing, hiking, rock climbing, and ski mountaineering. Big-game winter range and summer range are present as is grizzly bear habitat.

Public Interest: Although there have been concerns for maintaining the primitive character of the area, about 87 percent of those commenting during RARE II (1,971 signatures) opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

West Fork Elk Creek - X692

Wilderness Attributes: The natural integrity of this 4,800 acre area is high with no manmade features present to detract from the pristine character of the area. Despite its relatively small size, opportunities for solitude are high owing to the steep canyon walls that generally surround the area. Hunting is the primitive recreation experience most readily available. The area also provides important elk summer range.

Public Interest: Because the area was identified in the 1983 reinventory, the public has not had the opportunity to comment on the wilderness potential of the area.

Gold Hill - 668

Wilderness Attributes: The naturalness of this 10,700 acre area is intact with several miles of trail the only manmade intrusion. Opportunities for solitude range from good to moderate with the better opportunities available in the heavily-vegetated streambottoms of Parsnip Creek. Primitive recreation opportunities include hiking and hunting. Whitetail and mule deer habitat are contained within the area.

Public Interest: During RARE II, 56 percent of the 2,500 commentors favored Wilderness designation. The RARE II recommendation was for non-wilderness.

Gold Hill (West) - X176

Wilderness Attributes: The naturalness of this 10,200 acre area is largely intact with a primitive trail the only manmade feature in the area. The area is covered with dense vegetation providing opportunities for solitude. Primitive recreation opportunities include hiking, hunting, and fishing. Wildlife habitat includes grizzly bear, whitetail and mule deer, and moose.

Public Interest: Gold Hill (west) was evaluated in RARE I and recommended for non-wilderness.

Berray Mountain - 672

Wilderness Attributes: The naturalness of this 8,300 acre area is generally good with the recently de-activated Berray Mountain lookout and several miles of trail the only manmade intrusions. Opportunities for solitude range from good to poor with the best opportunities available in Berray Creek. Primitive recreation experiences include hiking, hunting, and wildlife observation. The area contains bighorn sheep, whitetail and mule deer, and grizzly habitats.

Public Interest: During the RARE II evaluation, 1,340 people commented and about 86 percent opposed a Wilderness designation. The RARE II recommendation was for non-wilderness.

East Fork Elk Creek - 678

Wilderness Attributes: The naturalness of this 4,800 acre area has remained essentially intact since the 1979 RARE II inventory. Despite its relatively small size, opportunities for solitude are considered high, especially in the canyons of Cascade and Butte Creeks. Primitive recreation experiences include quality elk hunting and hiking. The area contains elk winter range habitat.

Public Interest: Of the 1,242 people who commented during the RARE II process, 84 percent opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

Lone Cliff Smeads - 674

Wilderness Attributes: Manmade features are generally lacking, except for a few miles of trail, and thus the natural appearance of this 6,600 acre area is high. Overall, opportunities for solitude are moderate because of the signs of development immediately outside the area. Primitive recreation experiences include hunting and hiking. The area contains big-game summer and winter range.

Public Interest: Of the 1,339 people who commented on this area during the RARE II process, about 86 percent opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

McNeeley - 675

Wilderness Attributes: The natural integrity of this 7,700 acre area is high with no manmade features to detract from the natural appearance. Opportunities for solitude are considered moderate because of the highly visible power corridor bordering the southern edge of the area and the proximity of the Marten Creek road on the northern edge of the area. Hunting is the primary primitive recreation activity in the area. The area contains elk winter range habitat.

Public Interest: About 86 percent of the 1,323 people who commented on this area during the RARE II process opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

Flagstaff Mountain - X690

Wilderness Attributes: The naturalness of this 9,500 acre area is considered fairly well intact with only trails and the remains of the Flagstaff lookout presenting manmade intrusions. Opportunities for solitude range from good to poor with the better opportunities available in the northern portion and around the West Fork Quartz Creek. Primitive recreation opportunities include hunting, hiking, and observing bighorn sheep. Along with bighorn sheep habitat, the area contains whitetail and mule deer summer range and elk and grizzly bear habitat.

Public Interest: The area has never been evaluated for wilderness and thus no previous public comments have been received.

Roberts Mountain - X691

Wilderness Attributes: The natural integrity of this 8,000 acre area is rated as high with no manmade features present to provide an intrusion. Opportunities for solitude are considered moderate because although the area is relatively small, the vegetation provides screening from outside influences. Primitive recreation experiences include hunting and ridgetop hiking. Elk winter range and grizzly habitat are located in the area.

Public Interest: Because the area has never been addressed in a wilderness study, there have been no previous expressions of wilderness or nonwilderness for the area.

Grizzly Peak - 667

Wilderness Attributes: The naturalness of this 6,000 acre area has remained good with only a few miles of trail presenting any evidence of man's activities. The continuous canopy of trees in the area provide many opportunities for solitude, despite the relative small size of the area. Primitive recreation offered is primarily hunting in the fall. The area contains elk winter range and grizzly habitat.

Public Interest: About 85 percent of the 1,359 people who commented on this area during the RARE II process opposed Wilderness designation. The RARE II recommendation was for non-wilderness.

Zulu Creek - X166

Wilderness Attributes: The natural integrity of this 6,400 acre area is high with only a few miles of hiking trails around Pink Mountain providing evidence of man's activities. Opportunities for solitude range from high to moderate with the better opportunities available along the heavily vegetated streambottoms. Roadless hunting and ridgetop hiking are the primitive recreation opportunities offered by the area. The area includes mule deer, moose, and grizzly habitat.

Public Interest: Zulu was evaluated during the RARE I process and recommended for non-wilderness. There has been no recent expressions of support or opposition regarding wilderness classification for the area.

Marston Face - X172

Wilderness Attributes: The natural integrity and appearance has remained high in this 6,000 acre area with trails the only manmade intrusion. Opportunities for solitude are generally high, especially in the Laughing Water Creek drainage and less so along Patrick Ridge which looks into the Tobacco Valley. Primitive recreation opportunities are numerous and include hiking, hunting, crosscountry skiing, wildlife observation, and viewing Glacier Park to the east. The area contains mule deer and elk winter range, and is considered important grizzly habitat.

Public Interest: Marston Face was evaluated during the RARE I process and recommended for non-wilderness. No expressions have been made recently, in support or opposition, regarding a wilderness classification for the area.

Willard-Lake Estelle - X173

Wilderness Attributes: The natural integrity of this 53,600 acre area is high with trails being the only manmade alteration to the natural appearance. Opportunities for solitude are high due to the large size of the area, the topographic relief combined with vegetation, and the remoteness of the area. Primitive recreation experiences available include quality hiking, hunting, camping, and fishing. Wildlife habitat includes whitetail and mule deer, moose, elk, and grizzly.

Public Interest: Willard-Lake Estelle was evaluated during RARE I. The resulting recommendation was for non-wilderness.

Cube-Iron - 784

Wilderness Attributes: This 38,000 acre area is predominantly on the Lolo National Forest who has the major responsibility for the wilderness study of the area. The 2,300 acre Kootenai portion is high in natural integrity with no developments that would detract from the natural appearance. Opportunities for solitude on the Kootenai portion are considered moderate because it faces out into the Vermilion River Valley. Primitive recreation opportunities include ridgetop hiking and big game hunting. The area contains elk and grizzly habitat.

Public Interest: During the RARE II process the public seemed polarized concerning the future treatment of this area. About 52 percent of the 3,157 commentors opposed Wilderness designation. The RARE II recommendation was for non-wilderness. The Governor recommended Wilderness designation for Cube-Iron in May of 1984.

Thompson-Seton - 483

Wilderness Attributes: This 71,700 acre area extends into the Flathead National Forest who has the major responsibility for the wilderness evaluation and recommendation for the area. The 20,100 acre Kootenai portion rates high in natural integrity and appearance with trails being the only manmade feature present. Opportunities for solitude are high because of strong topographic and vegetative screening. Primitive recreation opportunities include hunting, hiking, viewing, and wildlife observation. The area contains big game summer range, grizzly, and wolf habitat.

Public Interest: Over 3,000 people commented on this area during the RARE II process. Their comments were split 50/50 between those preferring a Wilderness designation and those preferring some other use of the area. The RARE II recommendation was for non-wilderness.

Tuchuck - 482

Wilderness Attributes: This 18,800 acre area extends into the Flathead National Forest who has the major responsibility for evaluating the area for wilderness and making recommendations. On the 2,300 acre Kootenai portion the natural integrity and appearance is high with the trail to Tuchuck Mountain the only manmade alteration to the area. Opportunities for solitude are high due to the terrain and the remoteness of the area. Primitive recreation opportunities include hunting, hiking, and wildlife viewing, including grizzlies. The area contains elk, grizzly, and wolf habitat.

Public Interest: Over 3,000 people commented on this area during the RARE II process. Their comments were split 50/50 between those preferring a Wilderness designation and those preferring some other use of the area. The RARE II recommendation was for non-wilderness. The Governor's recommendation in May 1984 and the Montana Wilderness Bill of June, 1984, both recommended Wilderness designation for the area.

Maple Peak - 141

Wilderness Attributes: This 16,300 acre area extends predominantly onto the Lolo and the Idaho Panhandle National Forests. The Idaho Panhandle Forest has the major responsibility for evaluating the area for wilderness and making recommendations. The 1,400 acre Kootenai portion of the area rates high in natural integrity and appearance with no manmade features as detractors. Opportunities for solitude are high owing to the topographic relief and remoteness of the area. Primitive recreation opportunities include hiking, camping, and hunting. Wildlife habitat present includes elk summer range.

Public Interest: Of the 1,936 people who commented on this area during RARE II about 89 percent were opposed to Wilderness designation. The RARE II recommendation was for non-wilderness.

Le Beau - 507

Wilderness Attributes: The 6,100 acre area extends into the Flathead National Forest who has the major responsibility to evaluate the area for wilderness and to make recommendations. The 700 acre Kootenai portion is high in natural integrity and appearance, there being no manmade features present. Opportunities for solitude are moderate as most of the area faces out into developed areas west of Ketowke Mountain. Primitive recreation opportunities include hiking and hunting. The area contains grizzly habitat.

Public Interest: During the RARE II process 1,560 people commented on this area. About 85 percent of those people were opposed to Wilderness designation. The RARE II recommendation was for non-wilderness.

c. Special Areas

Summary of Changes between the Draft and Final EIS

Eligibility potential for classification as a Wild and Scenic River has been added for four rivers on the Kootenai Forest (Yaak, Kootenai, Bull and Vermilion rivers).

(1) Scenic Areas

There are three designated Scenic Areas on the Kootenai. They are the Ten Lakes Scenic Area (contained within the Ten Lakes MWSA area), 6,500 acres; the Northwest Peaks Scenic Area, 6,500 acres (4,800 on the Kootenai); and Ross Creek Scenic Cedar Grove, 100 acres.'

(2) Research Natural Areas

There are six proposed Research Natural Areas (RNAs) in the Proposed Action and Final Plan, and one (Ulm Peak) in the Current Direction alternative. The six areas are as follows:

Ulm Peak: 670 acres

Habitat Type 680, TSME/MEFE, Minor representative

Habitat Type 840, TSME/LUHI, Minor representative

Norman Mountain/Parmenter: 1275 acres

Habitat Type 320, PSME/CARU, Major representative (Norman Mountain portion)

Cottonwood, Major representative (Parmenter portion)

Wolf/Weigel: 240 acres

Representing waterfalls as an aquatic type

Big Creek: 200 acres

Habitat Type 250, PSME/VACA Major representative

Hoskins Lake: 370 acres

Habitat Type 420, PIEN/CLUN Representing a high production potential lake with fish.

Lower Ross Creek: 840 acres

Habitat Type 530, THPL/CLUN, Major representative

Habitat Type 550, THPL/OPHO, Minor representative

Habitat Type 570, TSHE/CLUN, Major representative

There are four areas in the existing Cabinet Mountains Wilderness which represent aquatic types noted in the Regional Goals. These areas would not technically be managed as RNAs, but would be available for research consistent with Wilderness management goals. These areas are:

Falls Creek: 100 acres, Type 3 stream
Snowshoe Lake: 15 acres, Low production potential lake
Wanless Lake: 115 acres, Average production potential lake
Bramlet Lake: 10 acres, Lake without fish

In addition a special interest area at Pete Creek Meadows (100 acres) is proposed as a representative of a Type 1 stream.

(For details on habitat-types refer to Pfister et al, 1977.)

(3) Wild and Scenic Rivers

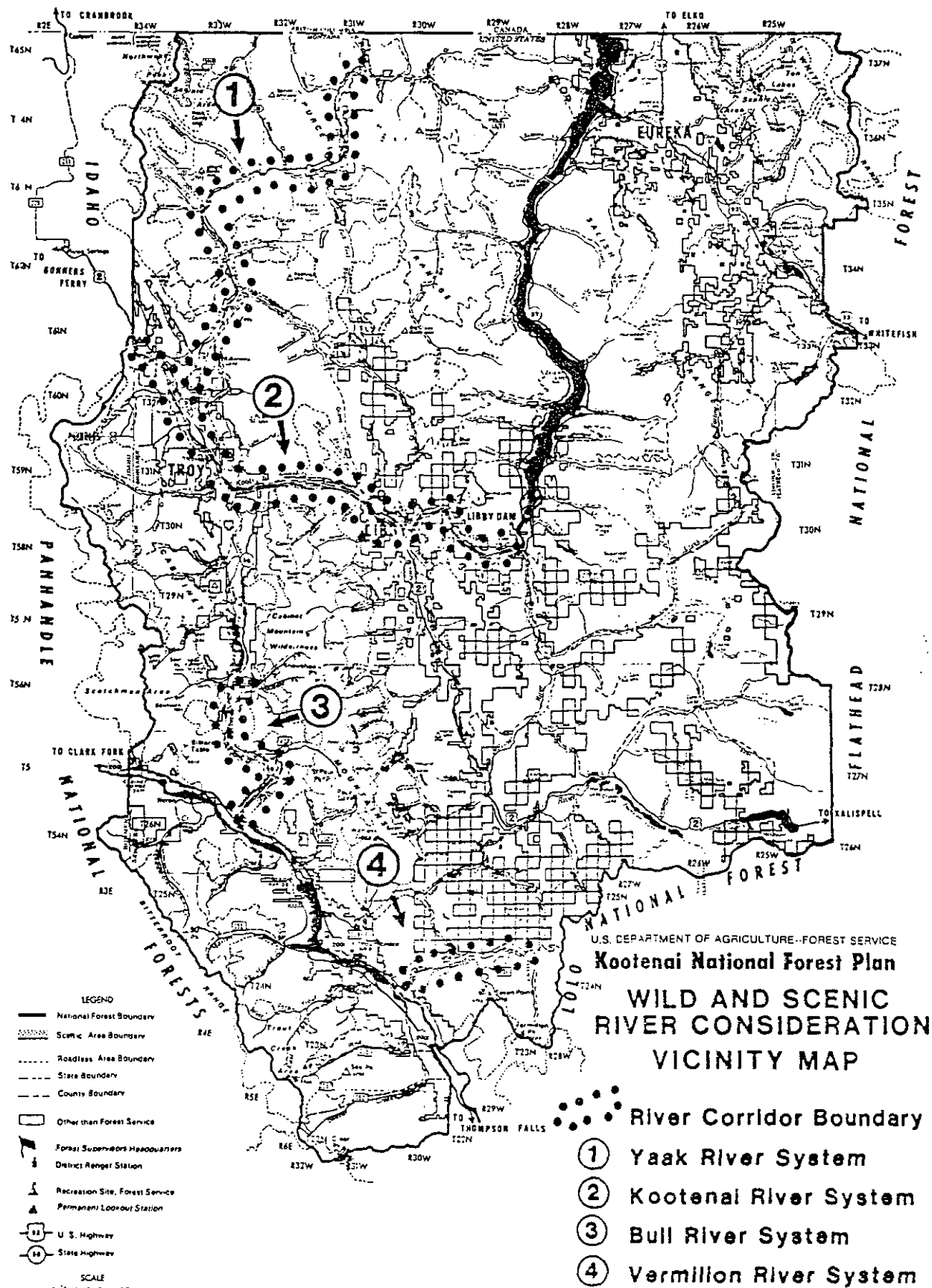
Summary of Changes between the Draft and Final EIS

This section is new information since the Draft EIS and displays eligibility for potential classification of four rivers on the Kootenai Forest.

Currently there are no Wild and Scenic Rivers on the Kootenai Forest. Four rivers appear to be eligible for consideration and they are discussed in this section for future reference. The rivers are the Yaak, Kootenai, Bull, and Vermilion. Final designation as a Wild and Scenic River is done by Congress after thorough study and public involvement. The four rivers discussed in this section will be formally studied and recommended for or against inclusion in the Wild and Scenic River system at a later date. In the interim, their river values will be protected on the Kootenai Forest land involved within the identified river corridor.

Background: The purpose and authority for study of wild and scenic rivers is established in the Wild and Scenic Rivers Act of October 1, 1968, as amended. Under the authority of the Act, the Kootenai Forest is charged with the identification of potential additions to the Wild and Scenic Rivers System. As a result, rivers on the Forest were analyzed for their eligibility and potential classification in the System.

River Eligibility and Potential Classification: To be eligible for consideration for addition to the System a river must be free-flowing and with its adjacent land area possess one or more "outstandingly remarkable" values. Scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values are examples of the considerations. The eligible river systems are assigned a potential classification of wild, scenic or recreational. A river can have all three classifications in different segments or sections.



The characteristics of these three classifications are:

Wild River - Rivers or sections of rivers that are generally accessible only by trail, with the watershed or shoreline essentially primitive and undeveloped.

Scenic River - Rivers or sections of river with shorelines and watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.

Recreation River - Rivers or sections of rivers that are readily accessible by roads, have some development along their shoreline and may have some history of impoundment or diversion.

By application of the above criteria the following rivers were identified as eligible for further consideration as potential additions to the Wild and Scenic Rivers System.

YAAK RIVER SYSTEM

Introduction

The Yaak River drains the northwest portion of the Kootenai Forest and merges with the Kootenai River 6 miles downstream from the town of Troy, Montana. The Yaak is 45 miles long with 57% of the river mileage in National Forest ownership. 16,000 acres are included within a 1/2 mile-wide corridor. The qualities that contribute to its eligibility are the scenic values along the entire length, as well as the historical values that are related to the gold-mining days. The natural topographic features along with the landownership pattern readily yield four different segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the East and West Fork, downstream for 17 miles to Pete Creek. This segment meanders through valley-bottom land in a rural wetland setting that is primarily private ownership (67%). The historical community of Yaak, Montana and a major portion of the Yaak River Road are located within the corridor. Also included is the Upper Ford work center (Yaak Ranger District).

Segment 2 - Recreation river potential for 9 miles from Pete Creek to Meadow Creek. This segment flows at an increased rate through a heavily forested setting that is primarily National Forest ownership (90%). The Pete Creek and Whitetail Creek campgrounds, as well as the Yaak River Road are located within the corridor.

Segment 3 - Recreation river potential for 12 miles from Meadow Creek to the Yaak Falls. This segment flows at a still faster rate through a forested, narrow, valley-bottom setting that is primarily National Forest land (68%). The Red Top Campground, historical mining community of Sylvanite and the Yaak River Road are located within the corridor. Also included is the Sylvanite Ranger Station.

Segment 4 - Wild river potential begins at the Yaak Falls and cascades downstream for 8 miles through a deep canyon setting and ends at the Bonneville Power Administration (BPA) electric transmission corridor paralleling U.S. Highway 2 adjacent to the mouth of the Yaak River. This rugged segment is almost entirely National Forest land (97%) and includes the Yaak Falls Campground.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1, 2, 3, and 4). This would produce a 45-mile river system with 16,000 acres, of which 64% would be National Forest land. 37 miles would be in a Recreation River status and 8 miles would be in a Wild River status. This alternative would involve the largest amount of private land (5,710 acres).

Alternative B: The lower 2/3 of the river corridor (river segments 2, 3 and 4). This would produce a 29-mile river system with 10,300 acres, of which 82% would be National Forest land. 21 miles would be in a Recreation River status, and 8 miles would be in a Wild River status similar to Alt. A. This alternative would effect 1,850 acres of private land.

Alternative C: A significant portion (42%) of the lower river corridor (river segments 3 and 4). This would produce a 19-mile river system with 6,800 acres, of which 78% would be National Forest land. 11 miles would be in a Recreation River status, and 8 miles would be in a Wild River status similar to Alts. A and B. This alternative would effect 1,500 acres of private land.

Alternative D: The lower portion of the river corridor (river segment 4). This would produce an 8-mile Wild River system that would be 93% National Forest land and have the least effect on private land (180 acres). This alternative could be extended to include the lower portion of the Kootenai River. See river segment 5 in the Kootenai River discussion.

Interim Management Considerations

The Final Forest Plan (Alternative JF) has land designations within the identified river corridor that will protect the Yaak River qualities for future consideration as a potential addition to the Wild and Scenic River System.

Yaak River System

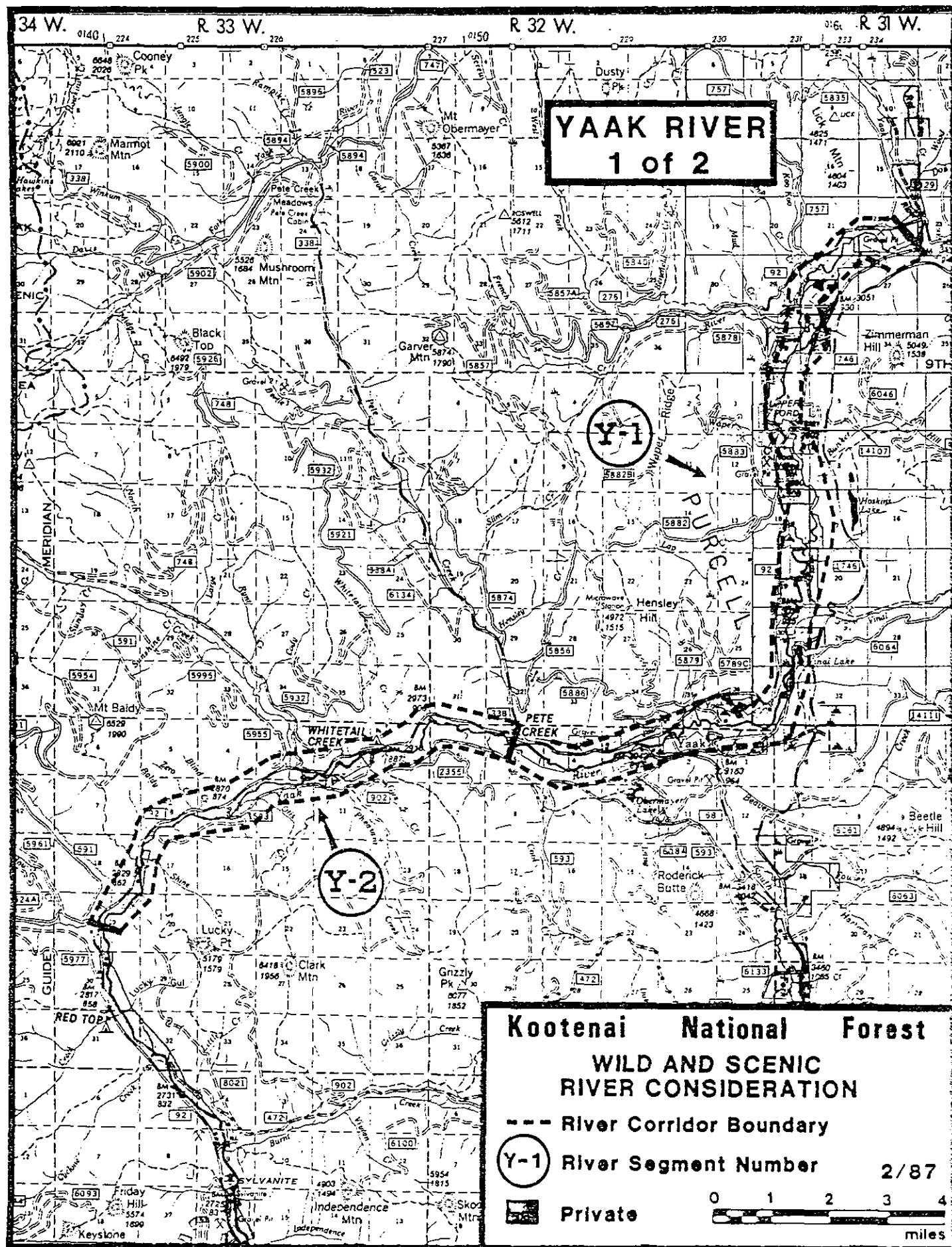
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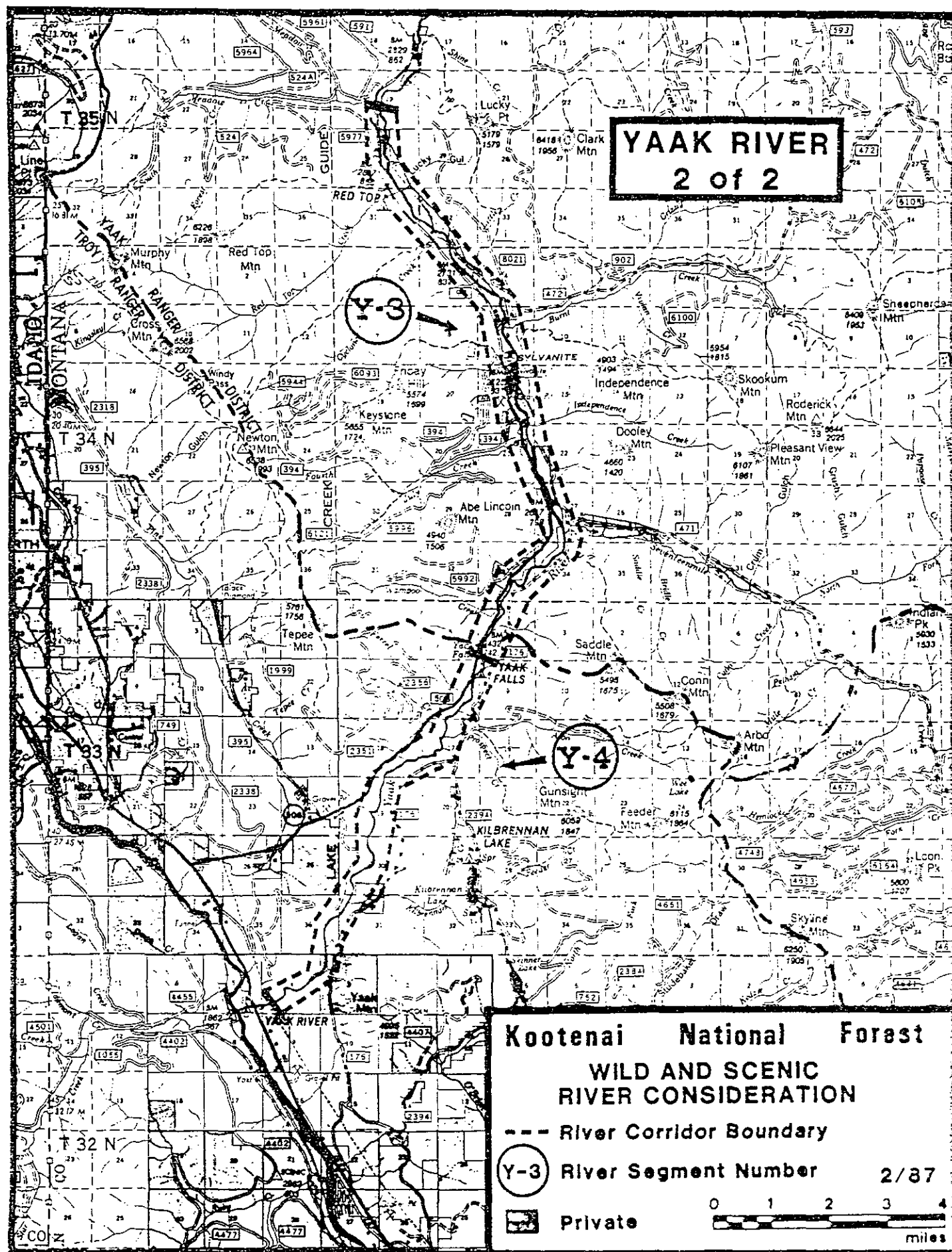
Table III-13

YAAK RIVER SYSTEM

River Segments

	1	2	3	4	
	E. & W. Fork to Pete Cr. (Recr.)	Pete Cr. to Mdw. Creek (Recr.)	Mdw. Cr. to Yaak Falls (Recr.)	Yk. Falls to BPA Trans.Line (Wild)	River Corridor Totals
<u>River Miles</u>					
on Private land:	12.6	2.3	4.2	0.2	19.3
(% Priv.)	75	24	36	3	43
on National Forest:	4.1	7.1	7.4	7.5	26.1
(% KNF)	25	76	64	97	57
Total Miles in Segment:	16.7	9.4	11.6	7.7	45.4
(% of Total River)	37	21	26	17	100
<u>Landownership (acres)</u>					
on Private land:	3,860	350	1,320	180	5,710
(% Priv.)	67	10	32	7	36
on National Forest:	1,870	3,200	2,830	2,420	10,320
(% KNF)	33	90	68	93	64
Total Acres in Segment:	5,730	3,550	4,150	2,600	16,030
(% of Total Acres)	36	22	26	16	100
<u>Road Miles</u>					
on Private land:	12.3	1.0	7.7	0.0	21.0
(% Priv.)	69	6	38	0	33
on National Forest:	5.6	15.9	12.7	7.8	42.0
(% KNF)	31	94	62	100	67
Total Road Miles in Segment:	17.9	16.9	20.4	7.8	63.0
(% of Total Road Miles)	28	27	32	12	100





KOOTENAI RIVER SYSTEM

Introduction

The Kootenai River drains the northern portion of the Kootenai Forest from Libby Dam downstream to the Montana-Idaho State line. The Kootenai is 47 miles long with 71% of the river mileage in non-National Forest landownership. 18,500 acres are situated within a 1/2 mile-wide corridor including 3,500 acres of water surface. The qualities that contribute to its eligibility are the scenic values along the entire length including Kootenai Falls, the fishery values, as well as the historic and pre-historic values that are related to the early days of northwest exploration and settlement. Natural topographic features along with the landownership pattern readily yield five different segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the Fisher River (3 miles below Libby Dam), downstream for 10 miles to Tub Gulch approximately 4 miles upstream from the town of Libby, Montana. This segment flows through a wide-bottom canyon in a rural setting that is mostly non-National Forest ownership (86%). The historical site of Jennings, Montana and Jennings Rapids are located within the corridor. Also included are State Highway 37, the Burlington Northern Railroad, the W.R. Grace Mine mill and loading facility, the Canoe Gulch Ranger Station and a potential hydro-electric site (Libby Re-Regulating Dam).

Segment 2 - Recreation river potential for 10 miles from Tub Gulch to Quartz Creek. This segment flows through a wider valley-setting that is more developed than Segment 1 although open hayfields border the river in many places. Landownership is primarily non-National Forest (81%). A portion of the town of Libby, Montana, a major portion of State Highway 37, 4 miles of U.S. Highway 2, and the Burlington Northern Railroad are all located within the corridor.

Segment 3 - Recreation river potential for 8 miles from Quartz Creek to Surprise Gulch, 2 miles below Kootenai Falls. This segment flows at a faster rate through a forested, narrow, valley-bottom and canyon setting that is primarily National Forest land (63%). China Rapids, Kootenai Falls, the Lions picnic ground and vista point, the unique 'swinging footbridge' as well as the historic David Thompson portage trail and Kootenai Falls Cultural Resource District are located within the corridor. U.S. Highway 2, the Burlington Northern Railroad, and the Pacificorp electric transmission line are also included as well as the Kootenai Falls hydro-electric site (Northern Lights REA).

Segment 4 - Recreation river potential for 10 miles from Surprise Gulch to a mile below Kootenai Vista Estates. This segment flows through a valley-bottom setting and includes a portion of the town of Troy, Montana, U.S. Highway 2, the Burlington Northern Railroad and a Bonneville Power Administration (BPA) Substation. Landownership is 95% non-National Forest.

Segment 5 - Recreation river potential for 8 miles to the Montana-Idaho State line and the Kootenai Forest boundary. (Another 5 miles of recreation river continues into Idaho with a significant portion of National Forest land located within the Idaho Panhandle National Forest.) This segment flows through a forested, wide canyon-bottom and includes the mouth of the historic Yaak River (which could be a natural continuation under one alternative). Landownership is 84% National Forest land. U.S. Highway 2, and the Burlington Northern Railroad are also located within the corridor.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1, 2, 3, 4 and 5). This would produce a 47-mile Recreation River system with 18,500 acres of land and water surface, of which 33% would be National Forest ownership. The largest amount of private land (12,350 acres) would be affected as well as two towns (Libby and Troy, Montana) and two potential hydro-electric sites (Libby Re-reg. and Kootenai Falls).

Alternative B: The lower 2/3 of the Recreation River corridor (river segments 2, 3, 4 and 5). This would produce a 37 mile river system with 14,500 acres of land and water surface, of which 39% would be National Forest land. 8,800 acres of non-national Forest ownership would be affected as well as the two towns of Libby and Troy, Montana, and the Kootenai Falls hydro-electric site.

Alternative C: The lower half of the Recreation River corridor (river segments 3, 4 and 5). This would produce a 26 mile river system with 10,200 acres, of which 47% would be National Forest land. This alternative would effect 5,400 acres of private land including a portion of the town of Troy, Montana, and the Kootenai Falls hydro-electric site.

Alternative D: The lower portion of the river corridor (river segment 4 and 5). This would produce a 19-mile Recreation River system that would be 39% National Forest land. 4,200 acres of private land would be affected including a portion of the town of Troy, Montana.

Alternative E: The lowest portion of the river corridor (river segment 5). This would produce an 8-mile Recreation River system that would be 84% National Forest land. This river portion could be joined with the lower portion of the Yaak River as another alternative. See the description of river segment 4 in the writeup on the Yaak River system.

Kootenai River System

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Interim Management Considerations

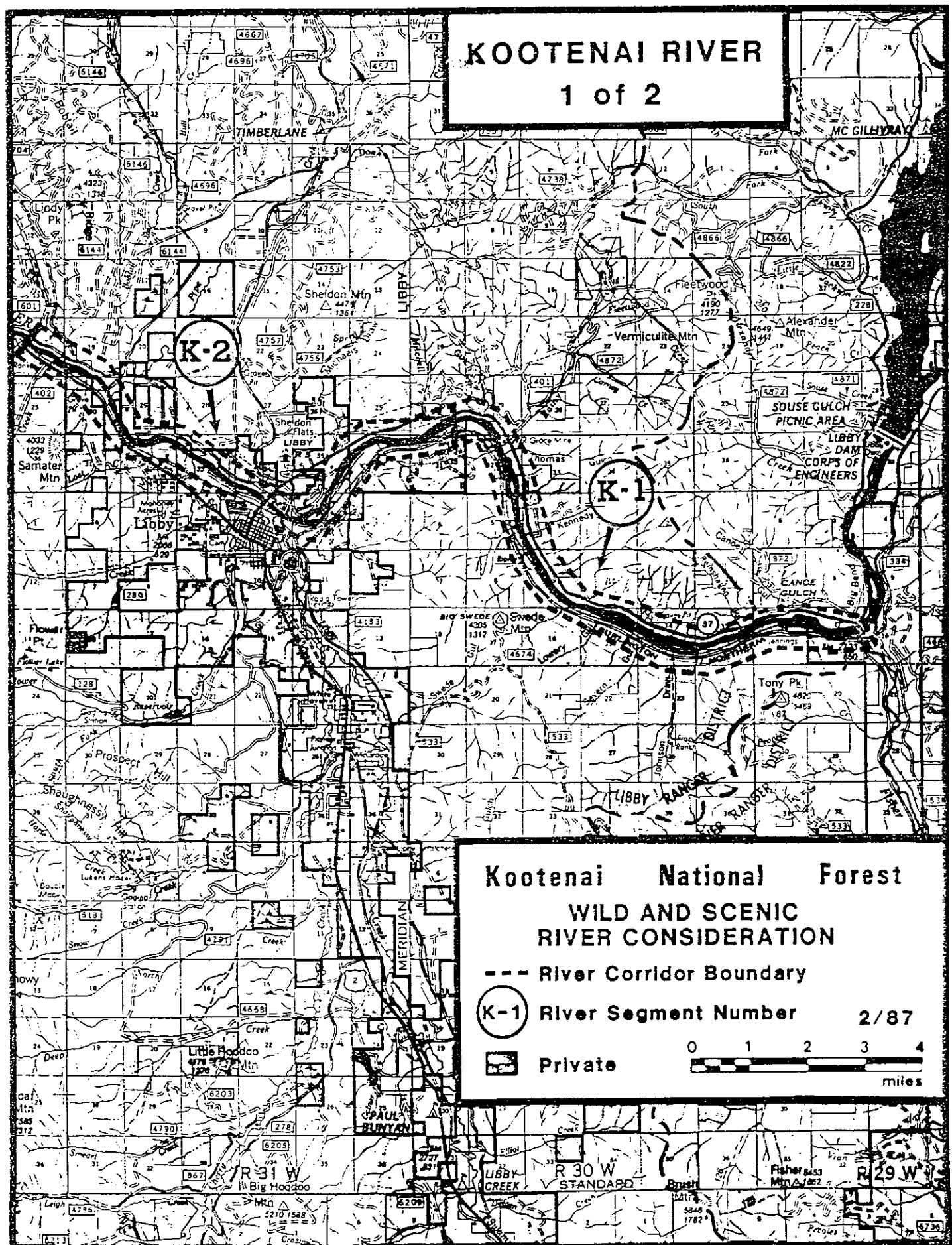
The Final Forest Plan (Alternative JF) has land designations within the identified river corridor that will protect the Kootenai River qualities for future consideration as a potential addition to the Wild and Scenic River System.

Table III-14

KOOTENAI RIVER SYSTEM

River Segments

	1	2	3	4	5	
	Fisher River to Tub Gulch (Recr.)	Tub Gl. to Quartz Cr. (Recr.)	Quartz Cr. to Surpr. Cr. (Recr.)	Surpr. Cr. to Koot. Vista (Recr.)	Koot. Vista Est. to Idaho Line (Recr.)	River Corridor Totals
<u>River Miles</u>						
on Private land:	7.8	8.4	4.6	9.1	3.2	33.1
(% Priv.)	79	81	60	89	38	71
on National Forest:	2.1	2.0	3.1	1.1	5.3	13.6
(% KNF)	21	19	40	11	62	29
Total Miles in Segment:	9.9	10.4	7.7	10.2	8.5	46.7
(% of Total River	21	22	16	22	18	100
<u>Landownership (acres)</u>						
on Private land:	3,500	3,410	1,230	3,720	490	12,050
(% Priv.)	86	81	37	95	16	67
on National Forest:	580	810	2,090	200	2,510	6,190
(% KNF)	14	19	63	5	84	33
Total Acres in Segment:	4,080	4,220	3,320	3,920	3,000	18,540
(% of Total Acres)	22	23	18	21	16	100
<u>Road Miles</u>						
on Private land:	19.2	19.9	5.7	18.8	2.3	65.9
(% Priv.)	80	86	50	85	26	74
on National Forest:	4.7	3.2	5.7	3.4	6.5	23.5
(% KNF)	20	14	50	15	74	26
Total Road Miles in Seg:	23.9	23.1	11.4	22.2	8.8	89.4
(% of Total Road Miles)	27	26	13	25	109	100



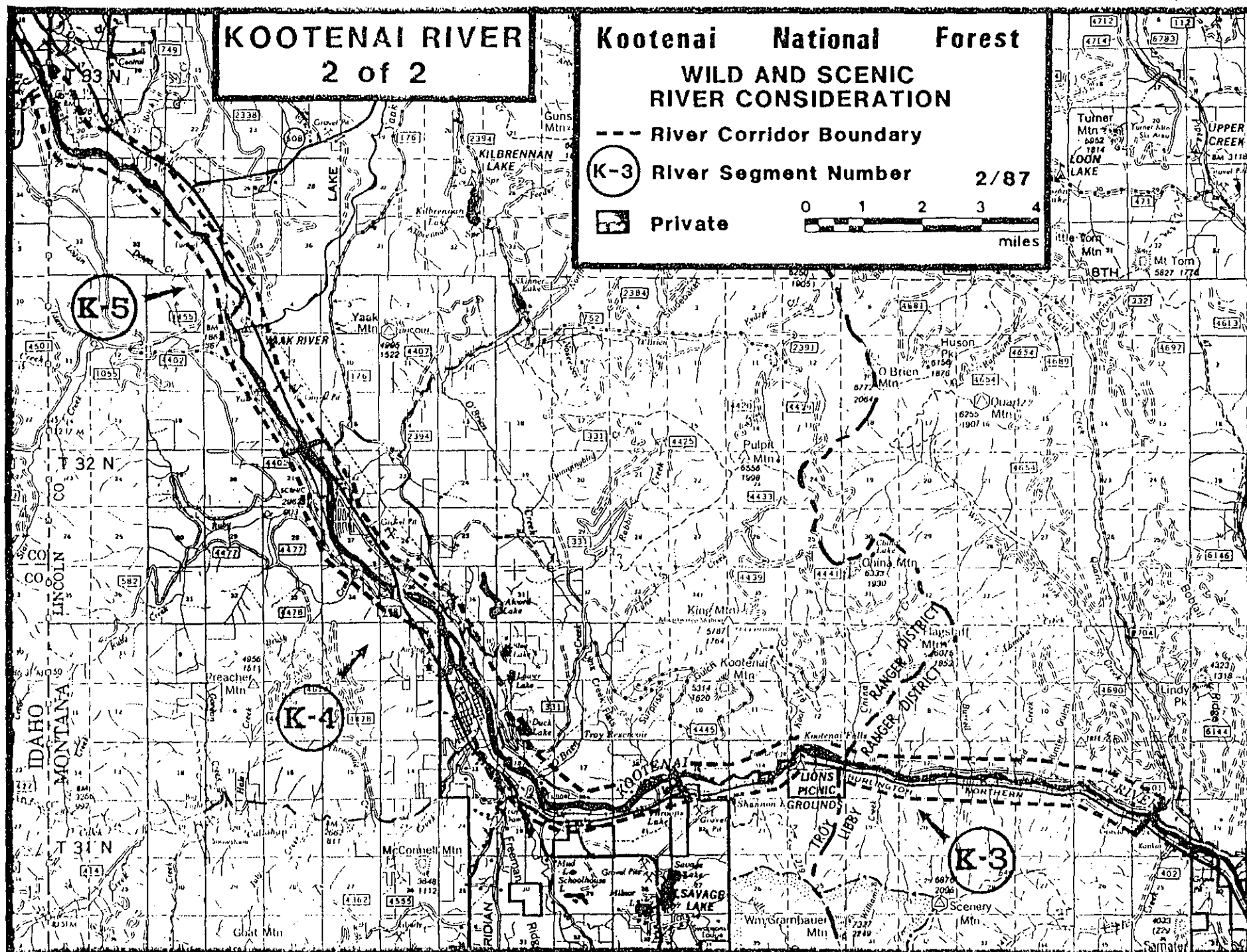


FIGURE III - 5e

BULL RIVER SYSTEM

Introduction

The Bull River drains the southwestern corner of the Kootenai Forest and merges with the Cabinet Gorge Reservoir 4 miles northwest of the town of Noxon, Montana. The Bull is 21 miles long with 81% of the river mileage in private landownership. 5,850 acres are included within a 1/2 mile-wide corridor with 60% in private ownership. The qualities that contribute to its eligibility are the scenic values along the entire length.

The natural topographic features along with the landownership pattern readily yield two different river segments that can be assessed independently. They are:

Segment 1 - Recreation river potential from the junction of the North and South Forks, downstream for 12 miles to the junction of the East Fork. The river meanders through the upper Bull river valley which is primarily rural wetlands and important riparian areas. Landownership is 79% private. The Bull River Highway and Cabinet Mountain Vista Point are included within the corridor.

Segment 2 - Recreation river for 9 miles from the junction of the East Fork to the Cabinet Gorge Reservoir. This segment flows at a faster rate through a narrow valley-bottom canyon setting that is 54% National Forest ownership. A major portion of the Bull River Highway and the historical Bull River Guard Station are included within the corridor.

Alternatives for Future Study

(The following alternatives are presented as possibilities for consideration and are not meant to be limiting for any future study.)

Alternative A: The entire river corridor (river segments 1 and 2). This would produce a 21-mile Recreation River system with 3,500 acres of private land (60%) affected.

Alternative B: The lower portion of the river corridor (river segment 2). This would produce a 9-mile Recreation River system that would be 54% National Forest land and affect the least amount of private land (1,500 acres).

Interim Management Considerations

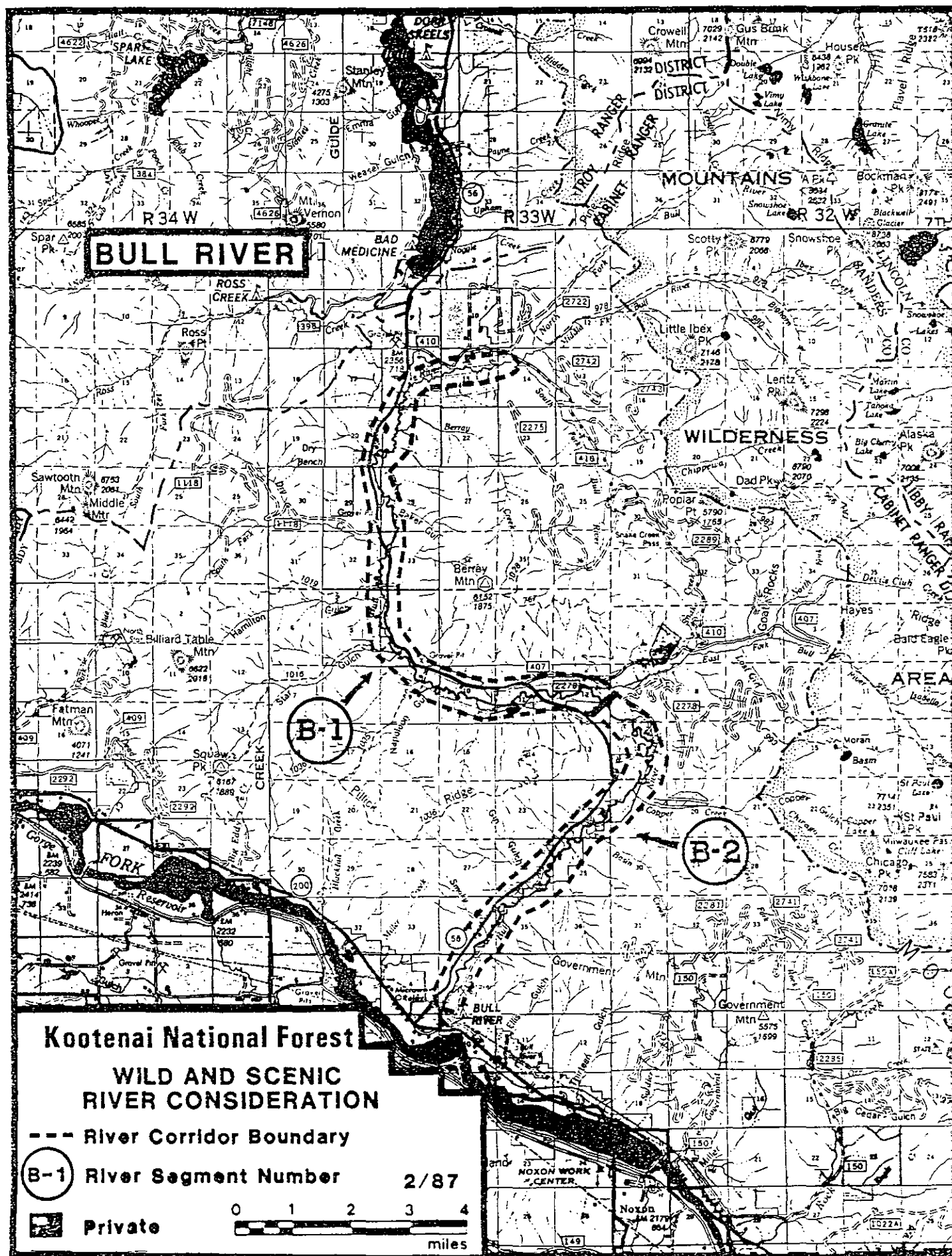
The Final Forest Plan (Alternative JF) has land designations within the identified river corridor that will protect the Bull River qualities for future consideration as a potential addition to the Wild and Scenic River System.

Table III-15

BULL RIVER SYSTEM

River Segments

	1	2	
	N. & S. Fork to East Fk. (Recr.)	East Fk. to Cab. Gorge Res. (Recr)	River Corridor Totals
<u>River Miles</u>			
on Private land:	11.1	6.0	17.1
(% Priv.)	90	69	81
on National Forest:	1.3	2.7	4.0
(% KNF)	10	31	19
Total Miles in Segment	12.4	8.7	21.1
(% of Total River	59	41	100
<u>Landownership (acres)</u>			
on Private land:	2,020	1,500	3,520
(% Priv.)	79	46	60
on National Forest:	550	1,780	2,330
(% KNF)	21	54	40
Total Acres in Segment:	2,570	3,280	5,850
(% of Total Acres)	44	56	100
<u>Road Miles</u>			
on Private land:	7.8	2.0	9.8
(% Priv.)	60	29	50
on National Forest:	5.1	4.8	9.9
(% KNF)	40	71	50
Total Road Miles in Segment:	12.9	6.8	19.7
(% of Total Road Miles)	65	35	100



VERMILION RIVER SYSTEM

Introduction

The Vermilion River drains a southern portion of the Kootenai Forest and merges with the Noxon Reservoir 3 miles southeast from the town of Trout Creek, Montana. The Vermilion is 12 miles long with 85% of the river mileage in National Forest ownership. 4,150 acres are included within a 1/2 mile-wide corridor with 87% in National Forest ownership. The qualities that contribute to its eligibility are the scenic values along the entire length, including Vermilion Falls, as well as the historical values that are related to the gold-mining days.

The natural topographic features along with the landownership pattern readily yield a continuous Recreation river segment from the junction of Willow Creek, downstream to Noxon Reservoir. The river cascades over the Vermilion Falls located near the upper end of the river segment, and down through a narrow, timber-covered canyon. The seasonal, unpaved Vermilion River road parallels the river for the entire length within the study corridor. 530 acres of private land would be effected.

Alternatives for Future Study

It appears that the entire 12-mile segment can be analyzed in its entirety because of the short length.

Interim Management Considerations

The Final Forest Plan (Alternative JF) has land designations within the identified river corridor that will protect the Vermilion River qualities for future consideration as a potential addition to the Wild and Scenic River System.

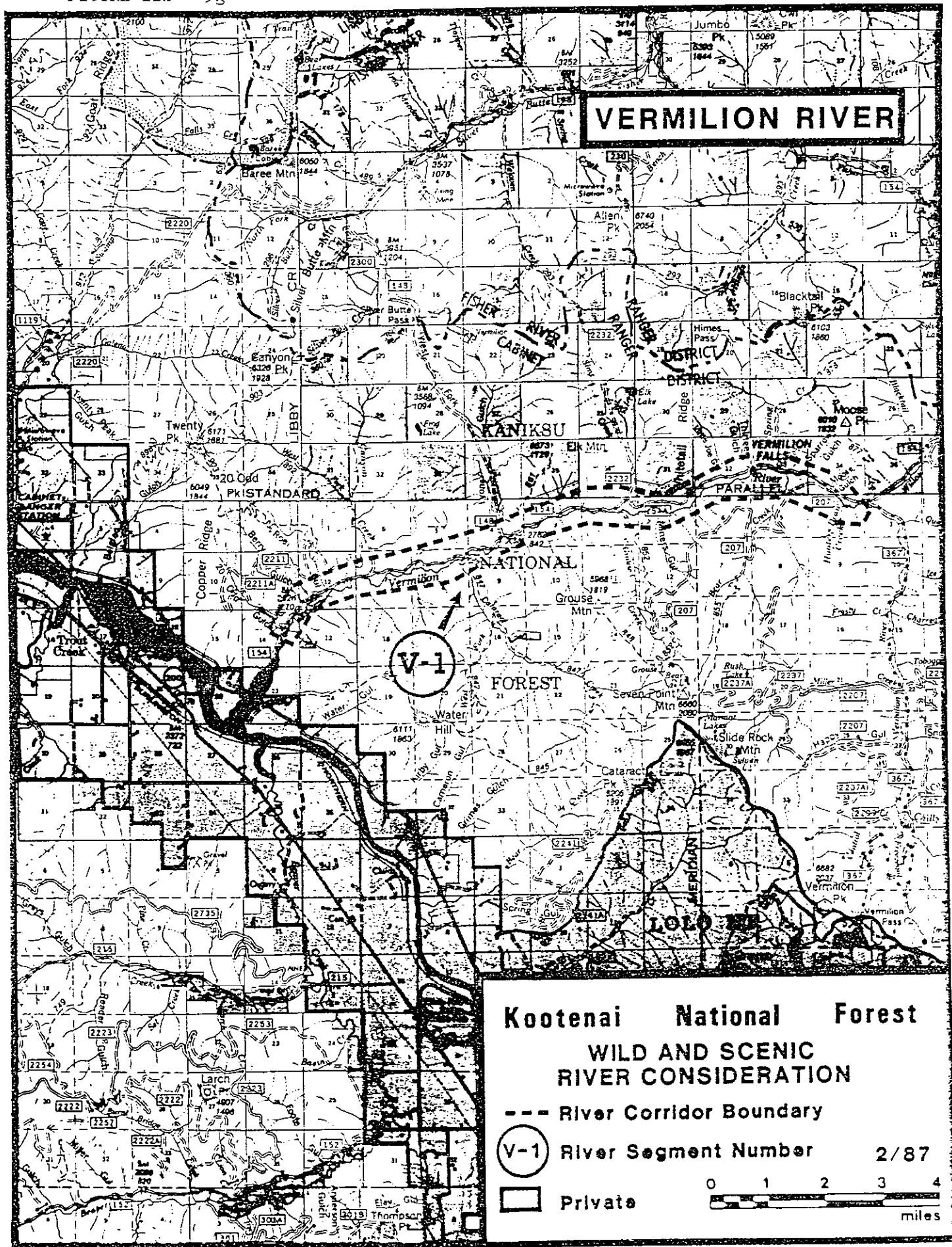
Table III-16

VERMILION RIVER SYSTEM

Item	River Segment	

	1	

	Willow Cr. to Noxon Reservoir (Recr.)	River Corridor Totals
	-----	-----
<u>River Miles</u>		
on Private land:	1.8	1.8
(% Priv.)	15%	15%
on National Forest:	9.9	9.9
(% KNF)	85%	85%
Total Miles in Segment:	11.7	11.7
(% of Total River)	100%	100%
 <u>Landownership (acres)</u>		
on Private land:	530	530
(% Priv.)	13%	13%
on National Forest:	3,620	3,620
(% KNF)	87%	87%
Total Acres in Segment:	4,150	4,150
(% of Total Acres)	100%	100%
 <u>Road Miles</u>		
on Private land:	2.4	2.4
(% Priv.)	17%	17%
on National Forest:	11.9	11.9
(% KNF)	83%	83%
Total Rd. Miles in Seg.	14.3	14.3
(% of Total Road Miles)	100%	100%



6. Wildlife and Fish

Summary of Changes between the Draft and Final EIS

A revised list of wildlife indicator species is presented in section b.

a. Big Game Habitat

No Changes occurred between the Draft and Final EIS

The Kootenai National Forest supports huntable populations of nine of the ten major big-game species in Montana. They include; elk, moose, mule and whitetail deer, black bear, mountain lion, bighorn sheep and mountain goats. (The one species not included is antelope). On the northeast portion of the Forest, grizzly bears may also be legally hunted.

The Kootenai is a heavily forested environment and has been a primary producer of timber in Montana for many years. In the forested environments, timber management can create conflicts in managing habitat for big game. Moose, elk, black bear, grizzly bear, mule deer and whitetail deer are those species predominantly affected by timber activities; the other species occupy areas that are either too rugged or lack substantial timber. This is not always the case, but for planning purposes the modeling and development of alternatives were focused on species which rely heavily on timber habitats.

Traditionally, emphasis on big game habitat management was placed on winter ranges. Beginning in the late 1960s, however, it became recognized that summer ranges had to be sensitively managed to ensure the continuing welfare of big game. Thus, in this planning activity, an effort has been made to account for management on both summer and winter ranges.

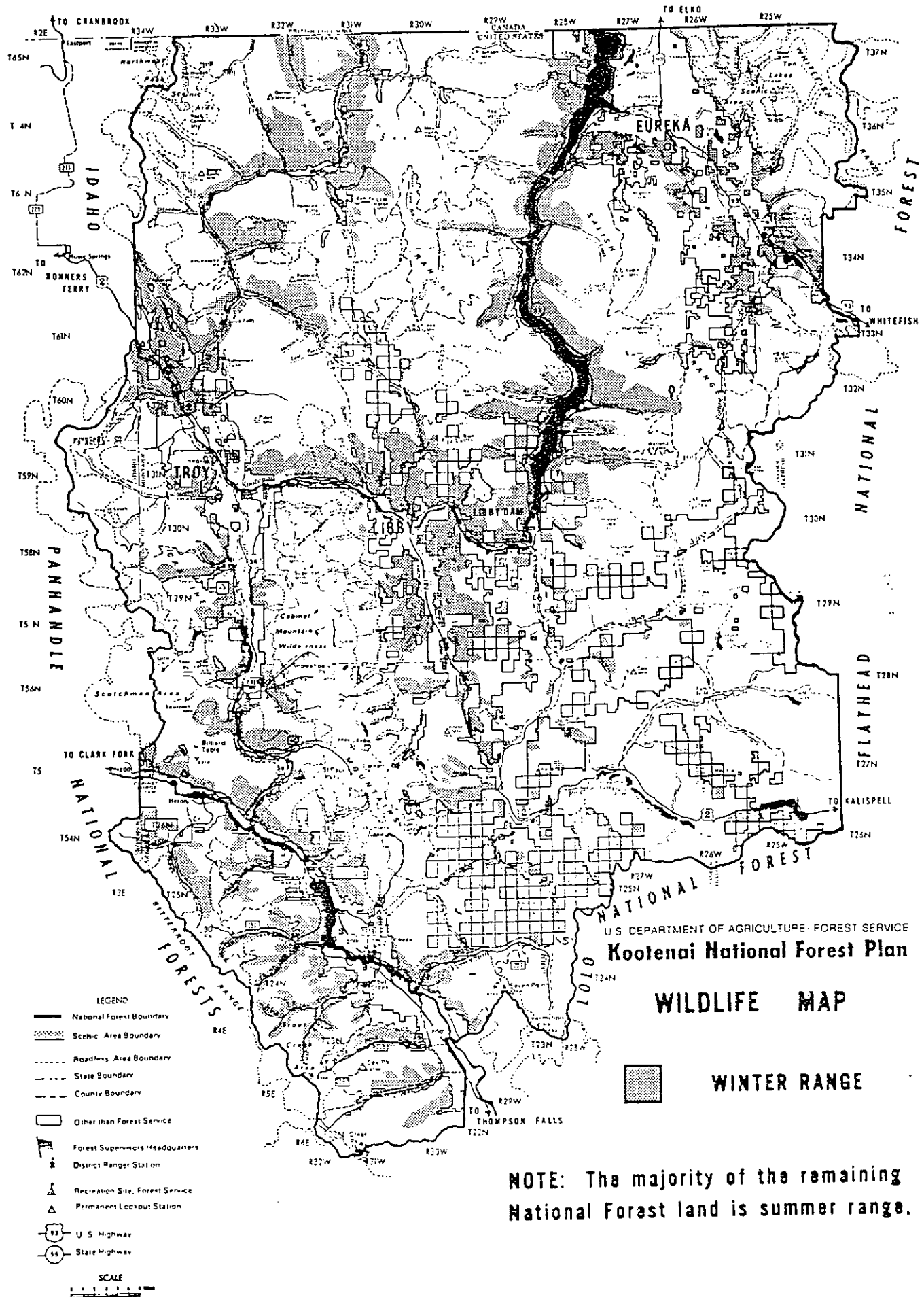
Elk are an extremely important big game species in Montana and adjacent western states. They were chosen early in the planning process to be indicators or barometers of change to which other species with similar habitat needs could be compared. Prescriptions were developed to provide direction for management of elk habitat so that effects of various kinds of management could be charted. The prescriptions written for summer and winter range offer the latitude, however, to emphasize the particular species that is key to a specific site. For example, a specific summer range may contain very important moose habitat so the prescription is flexible enough to allow emphasis to shift to moose rather than elk.

Elk summer ranges are characterized by relatively gentle terrain, abundant vegetation and moisture, elevations and aspects which promote cooler temperatures during the heat of the summer, and a relative lack of disturbance from human activities.

Approximately 1.3 million acres on the Kootenai meet at least minimal physical criteria as potential summer range. This is not surprising as animals disperse across the entire Forest when they are free of the confinement of winter snows. It was recognized, however, that within the identified summer range there are several levels of quality and that the capacity to support elk (or other big-game species) varied from high to

low. Physical descriptions of these various levels were developed and coefficients were assigned to each level. The capacity for summer range to gain or lose in its ability to support elk is related primarily to the vegetative condition and the degree of seclusion. If sufficient cover, food, and security exist, the ability to support elk is high. But if cover, food or seclusion is lacking, the area has a reduced capacity to support elk.

The major factor influencing summer range on the Kootenai is timber harvest. As new access roads are built, the seclusion and security of summer range are reduced because it becomes possible or easier for people to get into an area and big game animals are then displaced. For this reason, road closures, both seasonal and year-long, are initiated for big game security and to maintain adequate habitat potential. The road management section of this chapter discusses this subject further.



Big game rely on the fat reserves that they develop during the summer to get them through the winter. In addition, females need to develop fat reserves to ensure successful reproduction that results in healthy offspring. Proper timber harvest can result in increased feeding opportunities in some areas while still maintaining adequate cover. However, the advantages of increased feeding opportunities can only be used if vehicle access to the sites is controlled. Therefore, the quality of summer range is sensitive to how timber is harvested and how the new access is developed and managed. Because summer range is so broadly distributed across the Forest and because timber harvest activities have accelerated in summer ranges in the past 20 years, it was concluded that the management of summer ranges would be the key to the future of elk on the Kootenai. In a sense, summer range management will be the factor which most strongly influences elk numbers over time.

This conclusion does not mean that attention to proper management of winter ranges can be ignored, but rather that both summer and winter ranges must be managed to ensure the future welfare of elk and other big game species. Currently, these habitats support an estimated population of about 5,500 elk, (1983) but may have the potential to support a population of about 10,000 elk (maximum wildlife benchmark).

An approach similar to summer range was taken for winter range, which has been identified on 361,000 acres of the Forest. Again, specific prescriptions were developed to guide the land manager, with enough latitude built into them to allow for management of big-game species most dependent on a specific site or with habitat needs different from elk.

Winter ranges are usually located at lower elevations, are positioned on slopes which catch more solar energy and are vegetated with shrubs and grasses as a primary food source. Because elk were chosen as indicators, the winter range definition most accurately portrays their requirements. However, winter ranges specific to bighorn sheep, mountain goats, moose and whitetail deer have been delineated and are included in the Forest Plan.

The capacity of a winter range to support big game is determined by the availability of forage. Cover is also important and must be present for thermal protection in cold weather, but the quantity and quality of food will generally dictate the carrying capacity of a winter range. Since big game are forced into a small percentage of their overall range during the winter months, the ability of the range to provide a lot of food on a relatively small acreage is important. The primary foods on big game winter ranges are grasses and shrubs. These plants respond very rapidly to manipulation and many are already present due to past vegetative manipulation (timber harvest) or wildfire. Availability of forage can be deliberately increased by timber harvest and prescribed fire, with the animal carrying capacity increasing significantly.

Because the amount and carrying capacity of winter ranges can be significantly modified by weather and varying management practices, it is difficult to base a population figure on the winter range situation. In the Kootenai Plan, elk population numbers were therefore calculated on the basis of summer range acres and the density of elk that can occur. On

summer ranges, factors other than weather or food availability (most importantly, cover and security) dictate the carrying capacity and are therefore more indicative of population. After this number was arrived at, the amount of winter range acres and the potential forage that could be produced were examined to determine if sufficient winter range was available to support the population that could be raised on the summer range. It proved to be adequate. Moreover, a significant amount of winter habitat is known to exist on adjoining private lands, particularly in the Fisher River Drainage.

In summary, both winter and summer ranges are important to big game. The potential elk population on the Kootenai was calculated on the basis of identified summer range and how forest management would influence the carrying capacity for elk. Elk are identified as an indicator species to be tracked and monitored throughout the life of the Forest Plan. As an indicator species, elk will represent responses for some other big game species, but both winter and summer range prescriptions will contain the latitude to feature management for species important to a given site or situation.

b. Indicator Species

Summary of Changes between the Draft and Final EIS

The criteria for selection of indicator species was revised between the Proposed and Final Plan. Two key criteria for selecting indicator species have been identified as: (1) the species can be easily monitored and (2) the species is susceptible to changes resulting from management activities. The original list included some species (e.g. flying squirrel) that would be difficult and expensive to monitor and others (e.g. pika) that are minimally affected by National Forest management activities.

About 280 different species of wildlife occupy the Kootenai National Forest. Addressing the habitat needs of these species individually is a monumental task, but grouping these species into groups with similar habitat preferences provides a workable approach. Species were placed in one of ten groups, depending on their habitat preferences for feeding and reproduction. This is a similar approach to that explained in Agricultural Handbook 553 (1979). For each of these groups a particular species was identified as an indicator species, to act as a "barometer of change" in that particular habitat. In most cases, a bird and a mammal were identified to increase the chances for accurate monitoring.

Selecting an indicator species is difficult. The potential candidates should be selective in their habitat needs, capable of being monitored, and numerous enough so they can be monitored in sufficient quantity. Ideally, they should be species about which a great deal is known, but such information may not be available. Indicator species will be monitored as barometers of habitat change and as experience is gained in monitoring it may be necessary to add or modify indicator species to get the best perspective on habitat change.

The revised list of indicator species which follows was developed by deleting fifteen species and adding three to the original list. The species which were deleted were either difficult and expensive to monitor, not significantly affected by National Forest management activities or duplicative of other indicator species.

The three species added to the list are the following:

Peregrine falcon - An endangered species which is a probable migrant and potential resident of this Forest. A species list provided by the U.S. Fish and Wildlife Service identifies the peregrine falcon as a species which should be addressed in our biological evaluations. The bird can be monitored by systematic surveys of cliff habitat used for nesting and through reports of sightings.

Whitetail deer - The Forest Plan identifies elk as a big game indicator species with summer habitat as a limiting factor. Winter habitat is probably the limiting factor for whitetail deer. Thus, elk can be monitored in terms of summer habitat while deer can be monitored in terms of winter habitat. Whitetail winter range has a high potential to be affected by management activities. The habitat can be monitored through timber stand records while populations can be monitored with pellet group transects or other methods.

Mountain goat - Mountain goats are a good indicator of alpine/subalpine habitats. These areas have the potential to be impacted by mining, road access and similar activities. Goats are relatively easy to monitor with aerial surveys in cooperation with the State.

The revised indicator species follows:

Threatened & Endangered

Habitat Dependency

Grizzly Bear
Grey Wolf
Bald Eagle
Peregrine Falcon

general forest
general forest
rivers & lakes
cliffs

Species Hunted, Fished and Trapped

Elk
Whitetail Deer
Mountain Goat

general forest
general forest
alpine

Other Species

Pileated Woodpecker

snags & old-growth timber

c. Threatened and Endangered Species

No Changes occurred between the Draft and Final EIS in the resource situation. Some editorial changes have occurred in the guidelines for the recovery of the grizzly bear (section 4). The "Yellowstone Guidelines" are now known as the "Inter-Agency Guidelines."

The Endangered Species Act (ESA) was passed in 1973 and has gone through subsequent amendments, each time gaining clarity and strength. Because it speaks specifically to federal agencies and their activities, the Forest Service must accommodate the ESA in its management.

A threatened species is one which is not as reduced in numbers and range as an endangered species. A species listed as endangered is basically one step away from extinction. There are currently four species listed as threatened or endangered which are associated with the Kootenai: the Northern bald eagle, the peregrine falcon, the Rocky Mountain gray wolf, and the grizzly bear. Northern bald eagles, peregrine falcons, and Rocky Mountain gray wolves are listed as endangered and grizzly bears as threatened. These species either occupy habitat year-round, occur as breeders or migrants, or occur as transients from adjacent areas.

Mountain caribou, listed as an endangered species in adjacent Idaho, are recognized as a sensitive species on the Kootenai. Basically, "sensitive status" means that care will be taken not to degrade habitat or do anything that would further degrade the status of the species. On the Kootenai, caribou are listed so that their status can be protected as more information is being gathered about their abundance, frequency of occurrence, and distribution on the Forest.

The intent of the ESA is recovery of the threatened or endangered species. Inclusion of a species on the list means, in effect, that programs and mechanisms will be set in motion aimed at helping those species recover to viable populations. The goal of these programs is the eventual removal of that species from the list, a process sometimes referred to as "delisting". Several important steps have been taken on the Kootenai with regard to reaching the goal of delisting the species found on the Forest. Initially, habitat upon which the species depends is identified so that knowledgeable decisions can be made regarding activities occurring in the area. Management guidelines are then developed, which provide specific advice on how, when, and under what circumstances activities may occur. Guidelines may be as simple as requiring that a particular road be closed, or as complex as writing in special contract stipulations for any logging or site prep work. When the activity is scheduled to occur is usually critical.

Because of the special protection afforded to listed species, a special analysis is made which examines the potential effects of an activity on the species and its habitat. These analyses are called biological evaluations, and provide a format for determining if an activity will further degrade a listed species' habitat or directly affect that species in other ways. These evaluations are also a vehicle for communicating with the Fish and Wildlife Service (F&WS) which, under the ESA, is charged

with the task of making sure that federal agencies comply with stipulations of the Act. If a federal agency determines in a biological evaluation that a project may affect the habitat of a listed species or may directly affect that species, it sends the biological evaluation to the F&WS for consultation. The F&WS examines the evaluation and any other pertinent information and then issues an opinion. The opinion judges whether the activity will or will not affect the species and its habitat and may include management direction on how the activity could be modified so that it would not be a problem.

Federal agencies are bound by law to comply with the opinion that is issued. There are courses of action to take to obtain an exemption from such requirements, but they occur very rarely and, historically, only for very large and complex projects. The Kootenai has routinely consulted with the F&WS during the past five years and has found the consultation process extremely helpful in resolving difficult land management decisions that involve habitat of a listed species.

Following is an account of the status and management of listed species on the Kootenai National Forest.

(1) Northern Bald Eagles

Following their listing in early 1978, the Kootenai and other Forests in Region 1 developed special maps which delineated habitat for bald eagles that was considered either occupied or suitable for occupation and essential for their welfare. This essential habitat mapping encompassed about 100,000 acres on the Kootenai and remains virtually unchanged at this time. The habitat includes the major river systems and reservoirs on the Kootenai, including the Kootenai River, Koocanusa Reservoir, and the Clark Fork River.

Bald eagles occur predominantly during the winter months (November to April) as wintering transients. Several studies of bald eagles on the Kootenai have determined that individual birds come and go throughout the winter but that at any given time there may be about 20-30 eagles wintering in various locations. During this period eagles require a food source and roost sites that are secure from disturbance. During daylight hours they spend a great deal of time in strategic perch trees looking for food that often includes waterfowl and fish. Monitoring during winter months has also shown that road-killed wildlife, predominantly deer, make up a very important component of their diet when available. As many as five bald eagles have been observed sharing a deer carcass. Routine observations of golden eagles eating from deer carcasses have also been made.

During the night, bald eagles seek out roost trees which, because of foliage or local topographical features, offer protection from moisture and cold. These roost sites have been difficult to locate because eagles seem to move to them right at dusk, spending essentially every daylight hour looking for food. Consequently, only a few roost sites have been located and these do not appear to be large communal roosts, but rather are used by only one or two eagles. Important roost and perch trees are located along the major waterways on the Forest. Road

kills of big game often occur in the vicinity of these major waterways because of the proximity of winter range to these valleys where human settlements and roads are found.

Management of habitat for wintering bald eagles consists of recognizing and protecting important roost and perch sites from destruction or disturbance during the season of use. These occur almost exclusively along major waterways and conflicts regarding development or activity have been minimal. Some major perch trees occur within the city limits of Libby, indicating a certain degree of tolerance of human activity by bald eagles during winter periods. Data have been gathered during the winters of 1981 through 1984 which identify perch and roost trees and the frequency of use. These data are used in coordinating any activities which occur near identified sites.

Special guidelines for managing habitat adjacent to bald eagle nests have been developed by other Forests in both Regions 1 and 6. These guidelines are used on the Kootenai for coordination. When the Montana Bald Eagle Management Plan is completed, it will provide additional, specific direction. Currently, there are two known active bald eagle nest sites on the Kootenai and each has successfully fledged eagles for at least the past four years (1981 - 1984). Neither nest has recently been affected by development activities and both nests occur in proximity to major bodies of water. One nest is on private corporate timberland and data regarding the nest has been shared with the company.

Management of nesting areas revolves around protection of nest site characteristics and elimination of close, disturbing activities during sensitive periods of courtship, egg laying, incubation, and fledging. This has not been a problem on the Kootenai due primarily to the fact that only two known nest sites occur and the locations have thus far been protected.

At least once a year since 1979, a relatively thorough survey of wintering bald eagles has been conducted on the Kootenai in cooperation with the National Wildlife Federation. In addition, special counts associated with studies in Glacier National Park have been conducted. Surveys show that the bald eagle population wintering on the Kootenai has been steady or slightly up in recent years. Nationwide the trend is positive.

No special prescriptions were developed in the Forest Plan for bald eagle habitat because the existing types of activities and the management applied to essential eagle habitat have not demonstrated a need for special prescriptions. Protecting nest sites and accommodating winter habitat needs can be accomplished within the framework of the proposed Plan using existing guidelines. The Kootenai has formally consulted with the F&WS regarding bald eagles and has held a few informal discussions with that agency concerning this species.

(2) Gray Wolves

The gray wolf was among the first species listed when the Endangered Species Act (ESA) was passed in 1973. However, it wasn't until 1980 that the Forest Service published maps which delineated essential habitat, an omission due primarily to lack of information about wolves in Montana and the feeling that the only wolves occurring here were those that wandered south from Canada.

The bases for delineation of essential habitat were primarily old historical records and reports of sightings and signs in the various areas. Shortly after the Region published essential-habitat maps, the delineation was changed on the Kootenai. Areas were dropped on the basis of new information and perspectives and the currently identified essential habitat has remained unchanged since. About 114,000 acres in the Whitefish Mountains north and east of Highway 93 are delineated as essential habitat on the Kootenai.

To date, no recovery plan has been finalized for wolves, so management consists of recognizing and accommodating wolf habitat needs in all activities in their essential habitat.

The gray wolf is an extremely mobile and far-ranging predator which depends on the availability of prey for survival. While little local data are available, it is felt that wolves depend heavily on the resident ungulate (deer family) population for their primary source of prey. Beavers, snowshoe hares, mice, grouse, and various other small mammals and birds are taken as the opportunity arises. Management has consisted of maintaining essential wolf habitat with high populations of prey, particularly deer, elk and moose.

Although no wolves reside in the delineated habitat, evidence points to a transient population that passes through the area routinely. Tracks have been observed at most seasons of the year. All of the essential wolf habitat is also "Management Situation 1" grizzly habitat, and it is felt that management for the two species is highly compatible. Both species prefer limited development activity and do best when not in close or frequent contact with man. These conditions are also reflected in prescriptions for grizzly which call for limited road access. These prescriptions and the situation they create provide habitat suitable for both the grizzly and the wolf, giving management the option of responding positively if wolves, in fact, do take up residency.

Management of wolf habitat on the Kootenai has not been controversial or complicated. Formal consultations were conducted with the Fish & Wildlife Service in conjunction with the issuance of the November 1982 Draft EIS.

(3) Peregrine Falcons

This endangered raptor only infrequently passes through the Kootenai on flights from breeding areas to the North to wintering areas in the South. Historical data are very limited regarding peregrines in the

Kootenai area and current observations are limited to one or two per year during the spring and fall migration period. There are no records of historical aerie sites although a few locations on the Forest do appear to provide suitable habitat.

Formal consultations were conducted with the U.S. Fish and Wildlife Service regarding peregrines in conjunction with the November 1982 Forest Plan EIS, but were not a major concern.

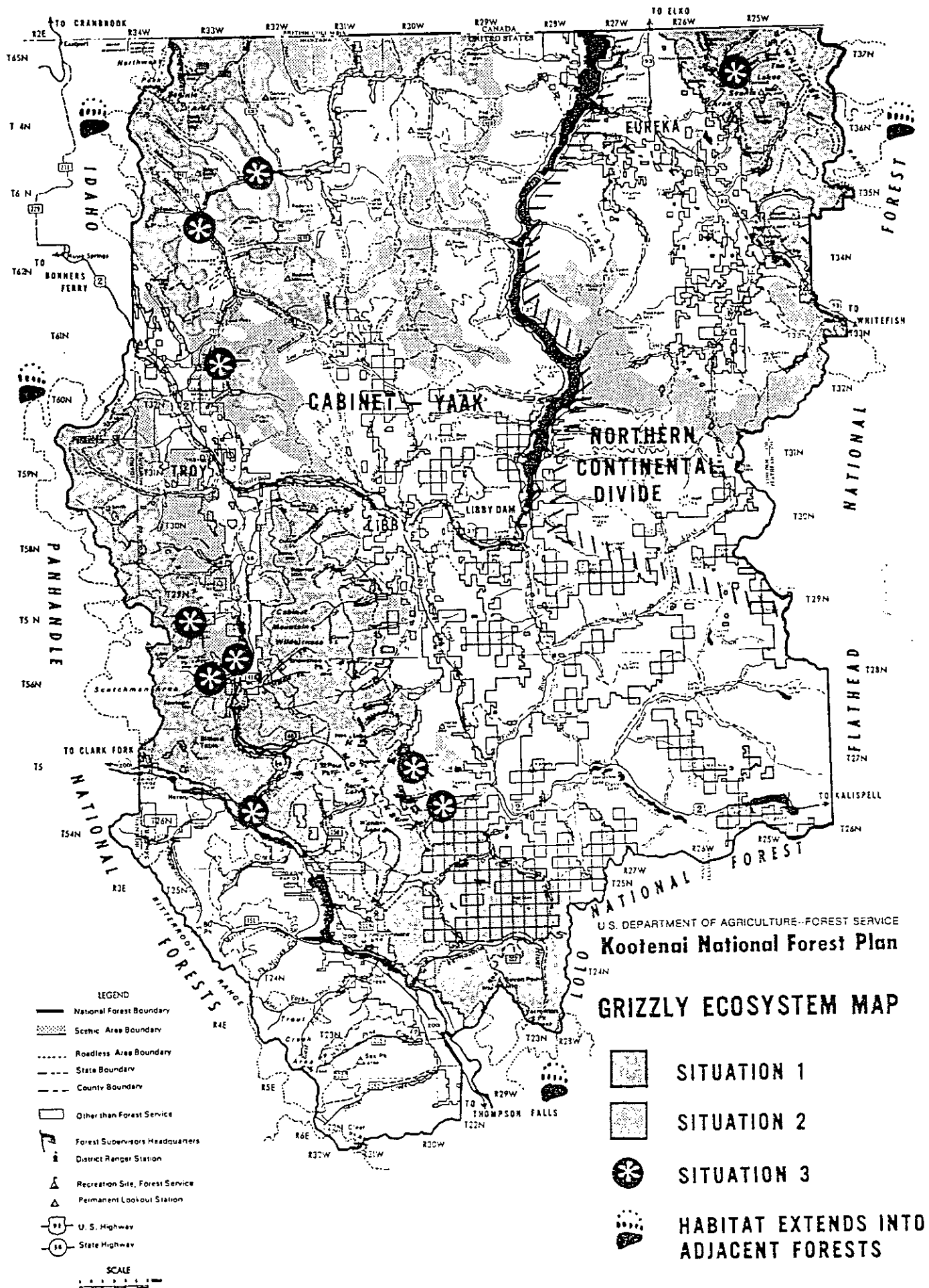
(4) Grizzly Bears

No Changes occurred between the Draft and Final EIS except some editorial changes in the name of the grizzly bear recovery guidelines. The "Yellowstone Guidelines" are now known as the "Inter-Agency Guidelines." In addition, the U.S. Fish and Wildlife Service determined that the Proposed Action was not likely to jeopardize the recovery of the grizzly bear. (For details refer to letter #1 in Appendix E of this EIS.) Continued consultation between the Forest Service and the Fish and Wildlife Service has led to the determination that the Final Forest Plan will not jeopardize recovery of the grizzly bear population.

Appendix D contains a detailed discussion of the grizzly bear situation on the Kootenai including the current situation, ecosystem descriptions, and the grizzly bear management guidelines now in use on the Forest. Figure III-7, displays the locations of the various grizzly bear situations.

It has been estimated that at one time grizzly bears numbered about 100,000 and that their range extended west from the Missouri River and from Canada south to Mexico. In 1975, the grizzly bear was listed as a threatened species, reduced in number to less than 1,000 and found only in the last vestiges of high mountain wilderness and National Parks. Since the Endangered Species Act (ESA) was so new and the funding and mechanisms not immediately in place to implement the law, it was not until 1977 that specific habitat for grizzly bears was delineated. At that time, Forests in Region 1, including the Kootenai, delineated grizzly situation descriptions, a term applied to geographic areas needing special management consideration for grizzly bears.

Two major grizzly ecosystems are found on the Kootenai Forest: The Cabinet-Yaak (CYE) and the Northern Continental Divide (NCDE). The Kootenai is a small shareholder in the NCDE, contributing roughly 3 percent to the total acreage of 5,700,000 acres. Grizzly bears in this ecosystem are felt to be more stable in number than in any other area and a limited amount of hunting is allowed. In the last five years two grizzlies have been shot on lands in this ecosystem managed by the Kootenai.



Conversely, 70% of the 1.2 million acre CYE is on the Kootenai National Forest (the rest is on the Lolo and Idaho Panhandle National Forests). Bears have not been hunted in this area since 1974, and the population is the lowest of the three primary ecosystems identified in the grizzly bear recovery plan.

The grizzly bear recovery plan calls for a population of 58 grizzly bears on the Kootenai National Forest; 45 within the CYE and 13 within the NCDE, as disaggregated by the Northern Regional Guide. No accurate figure exists for the current population, but experience gained in component mapping during the last four years and through the grizzly study the past two years suggests the habitat is capable of supporting a recovered population (see the Inter-Agency Guidelines in Appendix D, Part B).

Relatively little was known about grizzly behavior, habitat needs, and responses to man-related activities until the advent of radio collars which could be attached to individual animals. As information from radio-collared bears became more abundant, it was used to direct management activities and the consultation process. During the late 1970s, as recognition of the status of the grizzly bear became widely appreciated and as new information about habitat became known, the subject of grizzly recovery came into focus.

The major causes for decline in grizzly numbers have been man-caused mortality and destruction of habitat. Recent known mortality of native bears within the CYE is very low, consisting of one bear since 1980. However, because grizzly bears have an extremely low reproductive rate, recovery will take many years. Supplementing the native population, known as "augmentation", can theoretically speed recovery by many years and offers the benefit of introducing new genetic material. The introduction of new bears to an area differs from efforts to relocate nuisance bears in that the bears must be of a certain age and sex and have certain behavioral traits to maximize chances for successful reproduction.

Since the goal of listing a threatened or endangered species is recovery, techniques such as augmentation which shorten the period to recovery are consistent with the spirit and intent of the ESA. As proven in other areas with other species, the "delisting" of a species also reduces constraints on other activities and can even result in the controlled harvest of some species.

Efforts to date on behalf of grizzly bears on the Kootenai consist of extensive habitat component mapping and development of a cumulative effects analysis process, a procedure that assesses the cumulative effect of many different activities on grizzly bear habitat, allowing managers to view the "big picture" when making land management decisions. The Kootenai has also developed special prescriptions and management guidelines, based on the "Inter-Agency Guidelines". The guidelines identify many important ways to reduce man's impact in grizzly bear habitat, including when and how land management activities will take place. For example, several special timber sale contract clauses and a special prescription were written which direct land

managers in how to accomplish timber harvest in grizzly habitat without major conflicts. The Forest has also developed a relocation policy and has begun investigation into increasing the bear population through augmentation.

The Kootenai has consulted formally with the Fish and Wildlife Service on numerous occasions and routinely consults informally on grizzly bears.

5. Caribou

Caribou historically occupied much of western Montana. This area appears to be on the southern fringe of their range and caribou were apparently never numerous. Repeated, sporadic sightings of caribou or their tracks occur on the Kootenai and, beginning in 1981, the Forest investigated potential winter habitats and initiated aerial surveys with the Montana Department of Fish, Wildlife, and Parks (MDFW&P). Since that time, attention has focused on the Whitefish Range where habitat conditions and recent wintertime observations of tracks indicate the occasional presence of caribou, at least seasonally, on a very infrequent basis.

Caribou are currently listed as an endangered species in Idaho, but not in Montana. However, in order to recognize the need for care as more is learned about caribou presence in the Whitefish Range, the Kootenai now recognizes caribou as a sensitive species. This special status dictates that caribou and their habitat needs will receive special consideration as more information is gathered, thus not reducing future options for management. Meanwhile, winter caribou surveys will continue in cooperation with MDFW&P and further refinement in habitat identification will occur during the field season. Consultations for caribou with the Fish and Wildlife Service have been conducted in conjunction with the November 1982 Draft Forest Plan EIS and caribou have been mentioned in several of the more complex biological evaluations.

d. Special Habitats

Special habitats considered during the development of the Plan include riparian areas, snag (cavity) dependent species habitat, and old-growth timber.

(i) Riparian Habitat

Riparian habitat, basically the interface between land and water, is an extremely productive and important habitat for wildlife. At one time or another, virtually all species of wildlife on the Kootenai come into contact or seek out riparian habitat. In addition, many other values are found in riparian zones such as high recreational values, forage and water for livestock, and high timber values. Because of this, a special prescription was developed for riparian areas. Many wildlife values, such as summer range for big game, old growth and winter range, cut

across or contain elements of riparian habitat. Thus, riparian habitat receives special treatment in all alternatives.

(2) Cavity (snag) Habitat

On the Kootenai there are approximately 32 species of wildlife wholly or partly dependent on snags. A conflict has developed between firewood needs/preferences and optimum snag habitat, both of which depend on large, standing, dead larch trees. The policy of the Kootenai Forest is to provide cavity habitat to meet wildlife needs while satisfying human needs for safety, fuel, fiber, and esthetics. An updated policy statement, "Cavity Habitat Management Guidelines", was published by the Kootenai in 1984. It provides standards and guidelines for coordinating cavity habitat needs with all other resource management activities, such as timber harvest, road building, and firewood gathering. Cutting prescriptions and contract language will reflect this concern.

(3) Old-Growth Timber Habitat

Summary of Changes between the Draft and Final EIS

The Final Plan reflects a strong public concern about old-growth timber habitat management. In the Draft EIS a portion of the Forest was described as being managed to produce old-growth characteristics. This management (MA 13) consisted of early thinning and harvest rotations of 250 years. In the Final Plan these areas will be managed without thinning or timber harvest. Old-growth characteristics will be allowed to develop naturally and these lands (MA 13) are removed from the suitable timber base. In addition, the designated old-growth (MA 13) along with old-growth stands which exist in other management areas, not included in the suitable timber base, make up the total old-growth component of the Forest. The Proposed Action aimed at retaining 8 percent of the Forest's acreage, below 5,500 feet in elevation, in an old-growth timber condition. The Final Plan raises this to 10 percent primarily with the addition of more MA 13 areas. See the Final Forest Plan Map for the location of MA 13 areas.

Currently, the Kootenai National Forest supports a relatively healthy number of old-growth-related species. Pileated woodpeckers, flying squirrels, barred owls, goshawks, and marten are all related to old-age timber stands and all are relatively abundant on the Kootenai. Approximately 25 percent of all the wildlife species on the Forest find preferred habitats in old growth and some may be entirely dependent on such habitat.

Old growth is, simply stated, an old stand of mature timber, often in excess of 200 years. It possesses physical characteristics that provide habitat for wildlife and that can only be developed over time. Animals are not attracted by the age of the stand but by the characteristics that develop with age. Dense canopies, large, dead, standing and down trees, large-diameter live trees, and a degree of decadence in the stand are universal characteristics of old growth.

Many of the species which use old-growth habitat are not traditionally recognized game species. Most, in fact, are relatively unknown to many people. They do, however, play key roles in the forest wildlife community and many are important in maintaining a dynamic balance with destructive forest insects. Some are active predators, such as the hawks, owls, and weasels, while others are primary excavators which create nesting holes that are subsequently used by many other species.

Current old growth has evolved without any interference or assistance from man. It represents an essentially undisturbed, natural habitat. Management, therefore, consists mostly of recognizing old-growth stands and avoiding practices or activities which change the physical structure of the stand or which create disturbance sufficient to displace dependent species. Long-term management, on the other hand, includes recognition of existing old growth, but also includes designation of future old growth and management practices which promote old-growth conditions.

The Kootenai is managing for two kinds of old growth. Undesignated old growth consists of existing old-growth stands which are located in the nondevelopmental Management Areas such as wilderness, primitive recreation, etc. These stands will go through natural changes with the possible exception of protection from fire. Some of these stands may not change character for the next 100 years, but will go through gradual, internal changes which maintain overall stand integrity over time. It is, however, very important to know where these stands are located and approximately how large they are. This information is needed because old growth, in order to be effective, should be well distributed, representative of the habitat types found in an area, and of sufficient size to meet territorial and behavioral needs of dependent wildlife. Knowledge regarding location and extent assists in identifying whether sufficient old growth is present in an area.

Undesignated old growth will be complemented, in this regard, by designated old growth to ensure that distribution and abundance are sufficient to meet the needs of dependent species. Designated old growth consists of existing old growth and some mature stands that will be protected to insure sufficient amount and distribution for old growth timber dependent species. A minimum of 10 percent of the Forest acreage below 5,500 feet elevation will provide old-growth habitat at any given time in a combination of undesignated and designated old growth in well distributed and sufficiently large stands.

The Kootenai has conducted an inventory of all existing old growth, and has made designations for old growth (Management Area 13) on the basis of location and amount as indicated by the inventory.

Efforts have been made to field check many of the old growth stands. As field checks expand and inventory procedures improve, the specific locations of identified old growth may fluctuate, but the maintenance of at least 10 percent of existing old growth will remain necessary for viable populations of dependent species to exist. Table III-11 and the accompanying Forest map locate where old growth timber is deficient (less than 8%) and explain the reasons for its limited supply.

FIGURE III-8

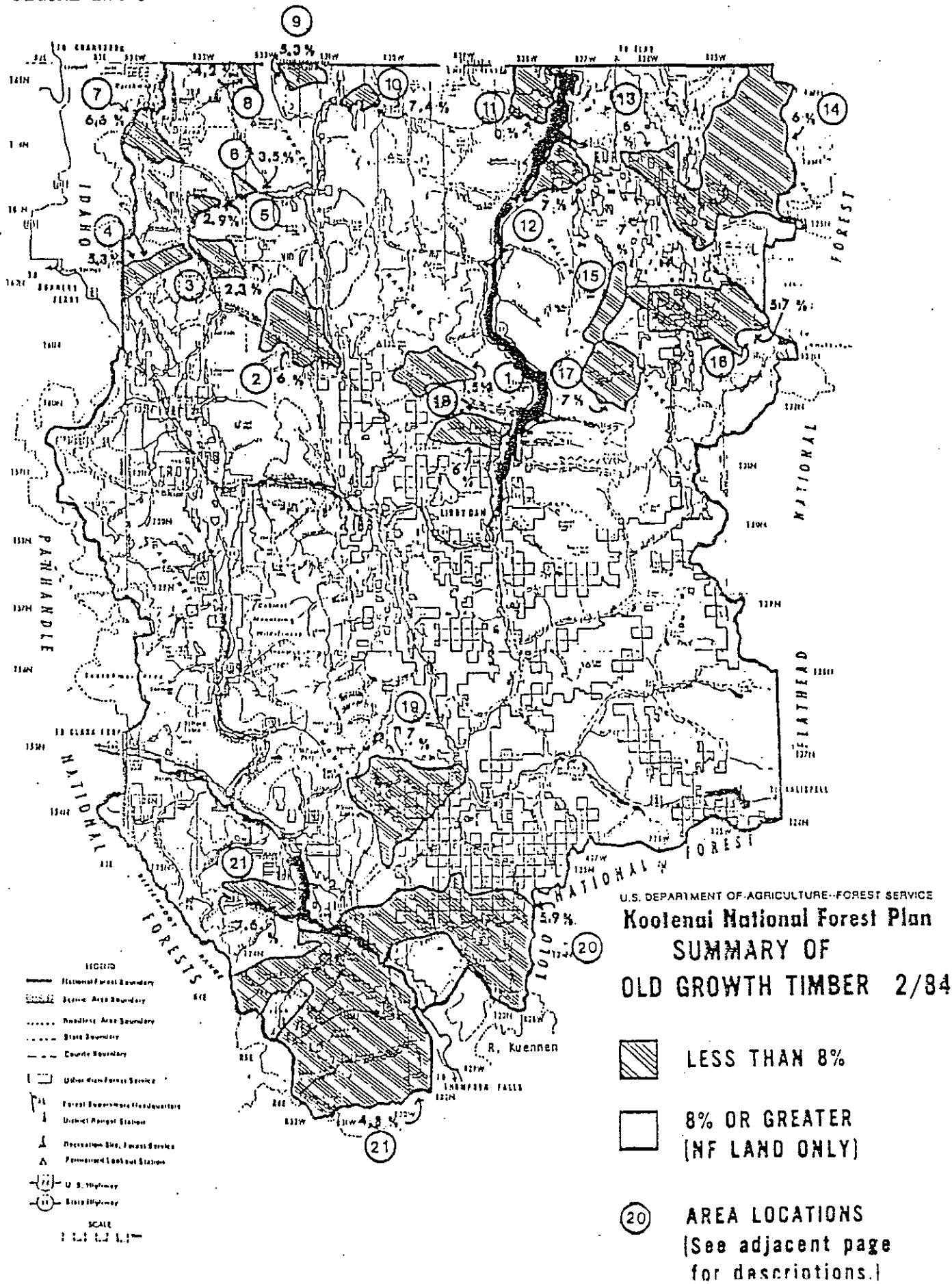


Table III-11

AREAS DEFICIENT IN OLD GROWTH TIMBER (LESS THAN 8%)
(See Old Growth Timber Map for Area Locations)

AREAS	DESCRIPTIONS	% OLD GROWTH
1	1910 fire	1.5%
2	1910 & 1925 fires	W.1/2=5.0%, E.1/2=6.0%
3	1910 fire	2.3%
4	Some high elevation, poorly stocked ground; small fires in the upper end in 1925, 1952, 1967 and some area burned by the 1910 fire on the east side	5.8%
5	1917, 1925, and 1940 fires	2.9%
6	1919 and 1940 fires in small areas plus logged-over	3.5%
7	1918, 1931, and 1940 fires plus some non-stocked ground and past logging	6.6%
8	1931 and 1973 fires and past logging	4.2%
9	1920, 1921, 1924, 1926, 1928, 1931, and 1973 fires	5.3%
10	1910, 1919, and 1920 fires	7.4%
11	Lots of intermingled private ground; past logging	0%
12	Non-stocked, rocky ground along the reservoir	7%
13	Intermingled private ground and past harvest	6%
14	Lots of ground above 5500', some non-stocked ground, logging at lower elevations, small burn areas	6%
15	Long history of harvest: a few fires in 1919, 1921, 1936	7%
16	Long history of harvest, a few fires in 1910, 1921, 1922, 1926, 1934, 1936	5.7%
17	Major fire in 1889 and inclusions of the 1910 fire, past harvest	7%
18	Past harvest; some non-stocked ground	4.6%
19	Lots of rocky ground, heavy harvest at low elevation; 1910 fire	7%
20	1910 and subsequent fires; heavy harvest in accessible areas	5.9%
21	1910 and subsequent fires, heavy harvest in accessible areas	S.end=4.8% N.end=7.6%

e. Fish

On the Kootenai, fisheries habitat includes about 3,030 miles of viable fishing streams and 37,000 acres of lakes and reservoirs supporting an estimated 1,016,000 catchable size trout (6"+). The rivers, streams, lakes and reservoirs on the Forest support populations of rainbow, westslope cutthroat, brown, bull, and brook trout, and mountain whitefish. A white sturgeon population is located just below Kootenai Falls on the Kootenai River, and a ling fishery exists along portions of both the Kootenai and Tobacco Rivers. The lower-elevation lakes on the Forest support populations of lake, brook, rainbow, and cutthroat trout, yellow perch, largemouth bass, pumpkinseed sunfish, kokanee salmon, northern pike, and bullhead catfish. The numerous high-elevation mountain lakes on the Forest contain rainbow, cutthroat, and brook trout. In all, the Kootenai Forest has 16 species of game fish, of which six species are trout. The most popular to fishermen are the westslope cutthroat and rainbow. The fishery resource is one of the highest used resources by the public on the Forest.

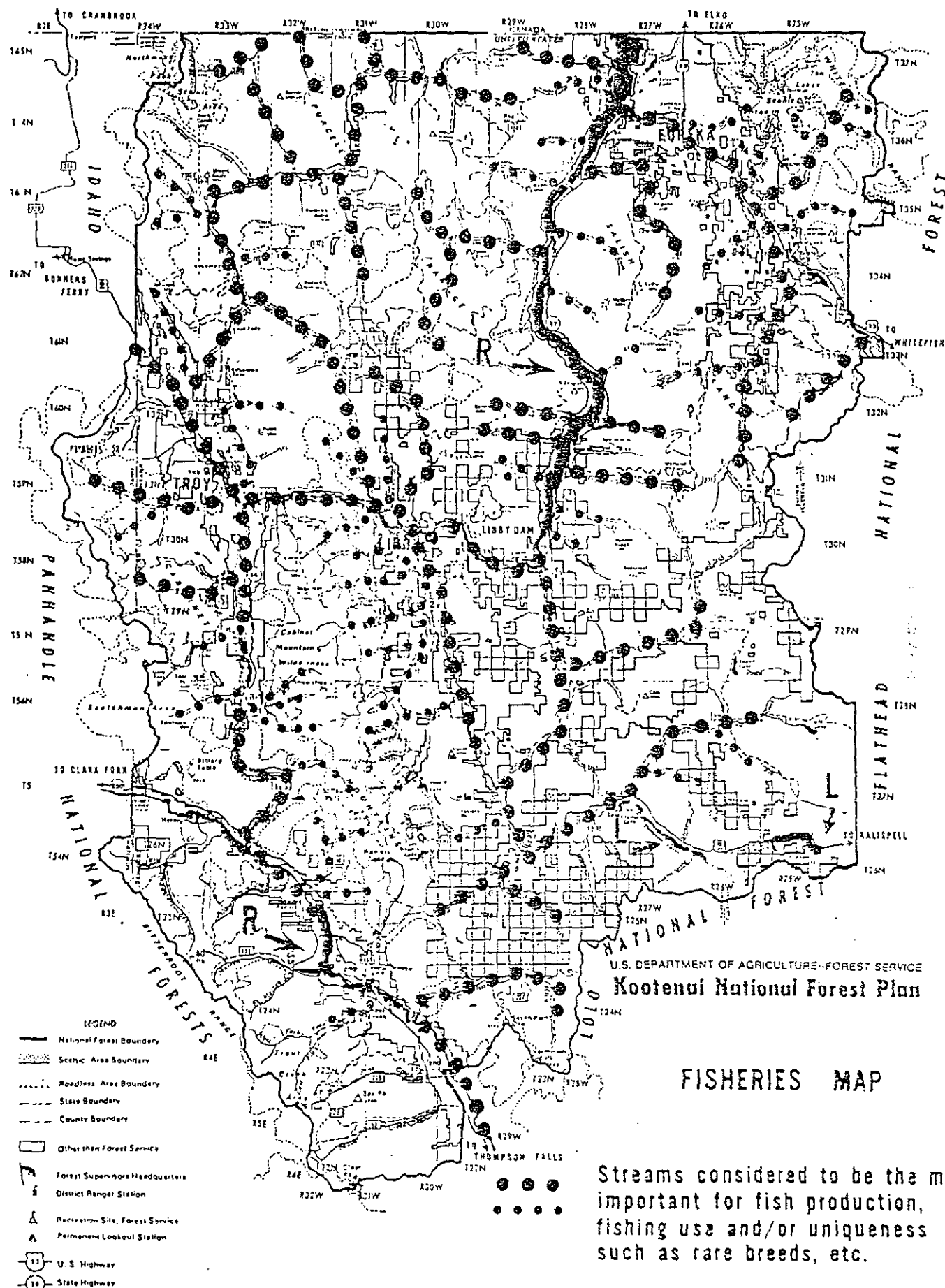
To simplify the process of managing for a number of different species, indicator species are selected as guides as to what is happening to that species and to others. Because trout are the predominant species on the Forest and the most sensitive to change, they are used as the indicator species. Although some trout, such as cutthroat, are more sensitive to habitat change than others, all stream trout species are used as indicators in order to include both spring and fall spawning activities. If a change in the species is observed (change in population, signs of disease, for example), then the habitat of that species must be closely examined to find the cause.

There are two categories of trout: the resident trout, which live and die generally within a mile of where they were hatched, and the adfluvial or migrant trout which hatch in streams, migrate to larger bodies of water, and return to their home streams to spawn when they reach sexual maturity. Unlike salmon, the trout do not die after spawning.

Because of the high demand for trout, state restrictions or constraints have been imposed on areas where fishing pressure is relatively high, such as along the Kootenai River.

Even though trout fishing opportunities are plentiful, fish productivity in a relative sense is considered low for many of the streams and lakes when compared to streams and lakes elsewhere in the Northern Region. Reasons for this situation include both low, alkalinity and water temperatures.

Quality trout habitat in some areas has shown signs of decreasing due to (1) sediment from road building and timber harvest impacting spawning gravels, (2) dewatering by private landowners, (3) removal of riparian cover (eliminating needed woody debris and winter thermal protection), (4) mining activities which degrade water quality, and (5) artificial barriers to spawning fish, i.e., improperly installed culverts.



Fish habitat improvement projects designed to correct problems created by timber harvest and road building are funded with dollars authorized by the Knutson-Vanderberg Act (1930), also called KV money. Other projects are paid for directly by funds allocated for the fisheries program. Other funding may be forthcoming in time from the Northwest Power Planning Council, a group made up of two representatives from each of the states of Idaho, Montana, Oregon, and Washington. One of the purposes of the group is to develop plans for the protection, enhancement, and mitigation of fish and wildlife resources affected by hydrodevelopment in the Columbia River Basin. Some funds are earmarked for the individual states, to be administered cooperatively by land management agencies and the various state fish and game departments.

Three main hydropower dams are located on the Forest, providing for reservoir-fishing opportunities. The reservoirs are Lake Koocanusa, Noxon Rapids Reservoir, and Cabinet Gorge Reservoir. Popularity for fishing Lake Koocanusa is increasing due to the variety of fish present and the increasing kokanee salmon fishery. Noxon Rapids and Cabinet Gorge are on the lower Clark Fork River and are not as popular due to water fluctuations and low fish productivity. Recently, however, smallmouth bass have been introduced and, along with largemouth bass, are developing into a potentially significant fishery. Nevertheless, if water level fluctuations should increase in magnitude and/or frequency (such as for meeting peak power demands or for increased power generation), the fisheries resource could decline accordingly.

Chapter 4 deals with activities on the Forest and the effects of them on the various resources. The section on water quality and fisheries pinpoints the major cause of water degradation as sediment, primarily from road building and to a lesser degree from timber harvest. Timing of activities, such as placement of culverts in streams, is critical to the long-term productivity.

7. Locatable Minerals, Oil and Gas, and Common Variety Materials

Summary of Changes between the Draft and Final EIS

The Mineral Potential Map has been revised to indicate more recent information concerning minerals potential in the Star Gulch area of Pellick Ridge in the Scotchman Peak roadless area. In summary, the mineral potential has been reduced from a high to moderate rating based on recent core-drilling samples.

In addition to the silver-copper mining proposal being developed by ASARCO at the south end of the Cabinet Mountains near Noxon, a similar proposal for another mine in the same area is being developed by U.S. Borax.

An oil and gas environmental assessment entitled "Environmental Assessment Oil and Gas Lease Applications - Kootenai National Forest Lands Exclusive of Wilderness, Proposed Wilderness, Wilderness Study Areas, and the Northeastern Portion of the Forest" dated October 22, 1982 documents the possible environmental consequences associated with leasing and provides the basis for the Forest's lease stipulations.

Known mineral resources on the Forest range from "locatable" minerals (such as gold and silver) for which mining claims can be staked to common variety materials, such as sand, gravel and building stone. Historically, these commodities have played an important role on the Forest. In recent years there has been speculation that the Forest may also overlie deposits of oil and gas. It is not known at this time whether or not economic deposits of oil and gas do, in fact, exist beneath the Forest.

Over the years the Forest has supported many small mines and a few large ones. These have produced lead, zinc, copper, silver, gold, tungsten, barite, vermiculite, and building stone. Most of these mines have been inactive for many years, but the few mines in production today contribute substantially to the nation's mineral wealth.

Principal among the currently producing mines within the Kootenai Forest are; the ASARCO Troy mine south of the town of Troy, and the W.R. Grace Zonolite Mine northeast of Libby. The Troy mine, which produces both silver and copper, is currently the nation's biggest silver producer. The Zonolite Mine is the largest producer of vermiculite in the world.

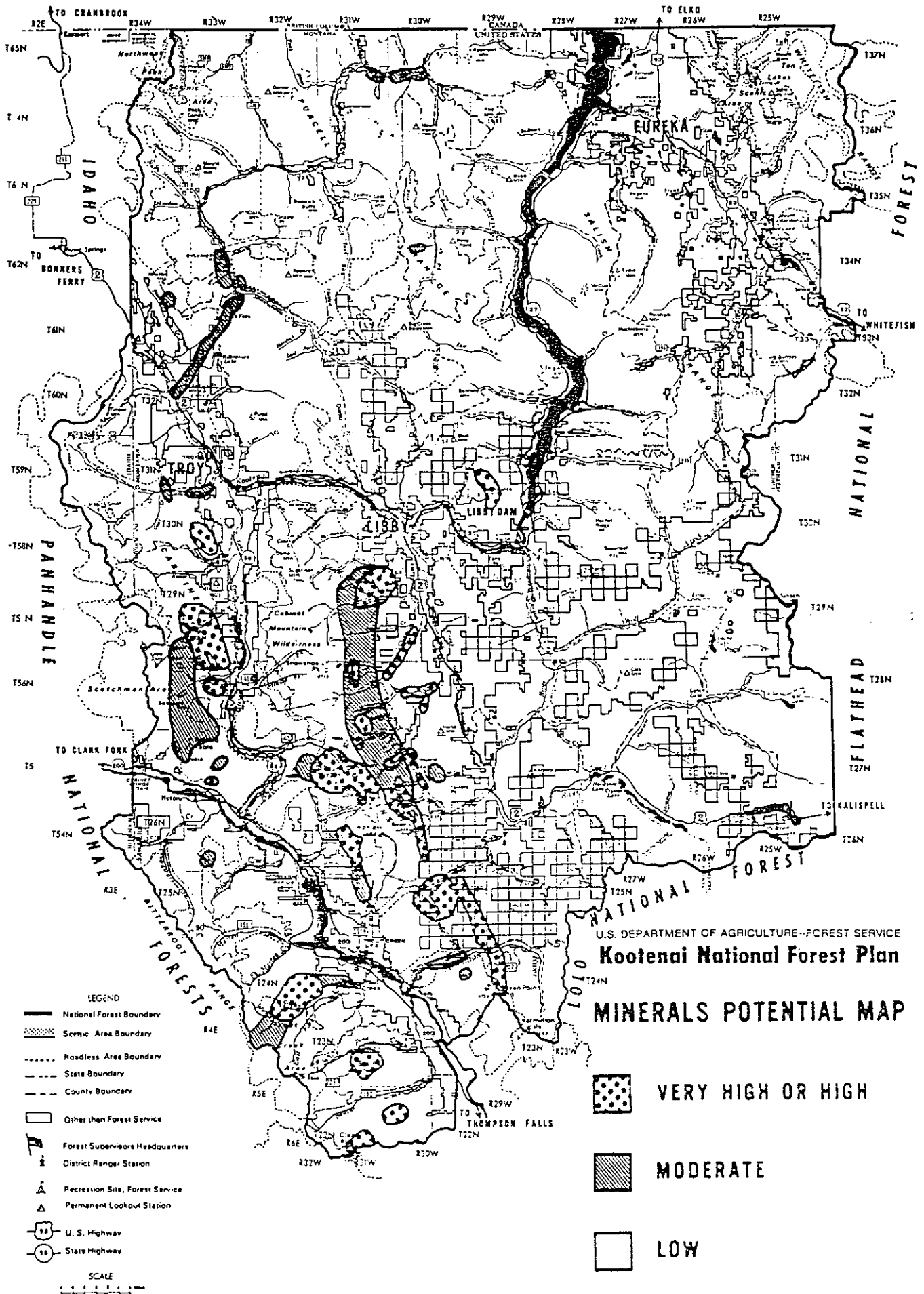
The Forest is currently processing a proposal submitted by ASARCO for the installation of another major silver-copper mine. This mine would be located at the south end of the Cabinet Mountains near the town of Noxon. The annual production from this mine is estimated to equal that of the Troy mine and is expected to be in production for 24 to 29 years.

A variety of small lode and placer mines produce small amounts of gold on an occasional basis in locations spread across the west half of the Forest.

As the historic and contemporary mining activity might suggest, considerable portions of the Forest have a high potential for mineral production. The southwest quarter of the Forest has many areas that are considered to have high potential for silver-copper production. Several known deposits are currently being evaluated through exploratory drilling to estimate production potential. Additional silver-copper deposits are actively being sought by several companies.

A large area in the west half of the northwestern quarter of the Forest is considered to be prospective for large deposits of lead and zinc. Knowledge about the potential of this area is general at this time, although two companies are conducting reconnaissance-level exploration now. It is possible that the level of knowledge about the area's lead and zinc potential could increase significantly.

Several areas on the Forest are considered prospective for gold. These areas are concentrated mainly along the east side of the Cabinet Mountains and, to a lesser degree, along the Yaak River drainage.



Common variety materials are abundant on the Forest, and are used primarily for construction of logging roads. The materials consist mainly of gravel, building stone, and rock, used as an aggregate material.

Interest in the oil and gas potential of the Kootenai is relatively new. This interest has been spurred by discovery of large oil and gas fields in the geologic province known as the Western Overthrust Belt. Although the Kootenai lies within the Overthrust Belt, it is unknown at this time whether or not the local geology is suitable for oil and gas discoveries.

Because of the geologic unknowns involved, the probability of finding oil and gas is difficult to assess. Historically the area has been considered unfavorable for finding oil and gas, but new geologic insights and preliminary seismic data have looked quite favorable to some in the petroleum industry. On the other hand, others in the industry remain skeptical about the area's potential. It may take several years of exploration before a reliable assessment can be made of the Forest's oil and gas potential. For the time being, the Forest considers the potential for oil and gas to be moderate across the entire Forest.

8. Landownership, Special Uses, and Agreements

a. Landownership

Landowners with large tracts of private land within Kootenai Forest boundaries include Champion Timberlands (which includes the former St. Regis Corporation), and Plum Creek Timber Incorporated (formerly Burlington Northern Timberlands). Another large landowner is the State of Montana. These private and State lands, although generally distributed throughout the Forest, are concentrated in four general locations; Eureka-Fortine area, Troy-Bull Lake area, Libby-South Highway 2 area, and the Clark Fork River Valley area. The heaviest concentration of private timber company lands occur in the Wolf Creek-Pleasant Valley area of the Forest (southeastern corner). These lands occur as large blocks and as checkerboard patterns. The largest concentration of noncorporate private land is in the Eureka-Fortine area (northeast corner of the Forest).

Isolated tracts of private lands surrounded by National Forest lands occur in various locations on the Forest. While there are other instances of National Forest lands surrounded by private lands, the majority of these situations are in the Eureka-Fortine area.

Checkerboard and isolated parcels of both public and private lands can create problems of rights-of-way, easements, cost-share road programs, and management of other resources such as fisheries habitat where a stream may pass through various ownerships and be influenced by activities detrimental to it such as mining and agriculture. At times, "management compatibility" problems can occur when adjacent lands are being managed for conflicting objectives, such as managing for primitive recreation and timber production side-by-side. Ownership adjustments and consolidation can correct some of these problem areas.

The Kootenai has identified about 69,000 acres of National Forest system land considered appropriate to exchange for private and State lands and has identified about 91,000 acres of available private and State lands that would be desirable to acquire (88,000 acres of lands desirable to acquire were displayed in the Draft EIS). Decisions on whether or not to exchange lands are based on meeting land management objectives such as providing improved grizzly habitat or roadless recreation.

The Kootenai has recently entered into negotiations with Plum Creek Timber Incorporated (PCTI) for an exchange of lands within the Silver Butte-Vermilion checkerboard area, located in the south central portion of the Forest adjacent to the Cabinet Mountains Wilderness. This proposed land exchange involves about 32,000 acres of PCTI lands and 35,000 acres of Kootenai National Forest lands. Purposes of the exchange would be to enhance grizzly bear management, provide increased roadless recreation opportunities, and to resolve the checkerboard ownership pattern existing in that area. The intent is to consolidate the National Forest ownership in the Silver Butte-Vermilion checkerboard area and to consolidate the PCTI ownership in several areas in the southeast corner of the Forest. For further discussion refer to Chapter II of the EIS and Appendix 9 of the Proposed Forest Plan.

b. Special Uses

There are currently about 470 special use permits in effect on the Forest. Most of these special uses are associated either with water uses or roads. Other types are for utility and communication sites, or are related to recreation and agricultural uses.

c. Rights-of-way and Cost-Share Agreements

The Kootenai usually enters into about 12-15 rights-of-way agreements per year. The agreements deal primarily with timber sale roads and capital investment projects such as bridges and roads.

The cost-share road program deals primarily with the sharing of road costs with adjacent landowners for timber harvest. The Kootenai cost-share program includes seven cost-share agreement areas involving two cooperators. These are Champion Timberlands (which includes the former St. Regis Corporation) and Plum Creek Timber, Inc. Three new cost-share agreement areas are proposed with the State of Montana.

d. Corridors

There are eleven existing electric transmission lines on the Kootenai Forest. Seven belong to the Bonneville Power Administration (BPA), two to the Washington Water Power Company, one to Pacificorp (formerly the Pacific Power and Light Company), and one to Northern Lights Rural Electric Cooperative. All the lines, except the Northern Lights REC line, are a part of the northwest power transmission grid and are interconnected. All of the lines are of two sizes, 115 kv and 230 kv.

e. Property Boundaries

There are a total of 3,000 miles of property boundary on the Forest and a program has been on-going for about 9 years to survey and monument these boundaries and corners. About 60 miles of property boundary are located each year and this program level is expected to continue unless future budgets are reduced significantly.

9. Watershed

Drainages on the Kootenai supply water to the Columbia River Basin. Forest management activities directly affect the quality and quantity of water contributed to this system. Average annual water yield from the Kootenai National Forest is estimated to be 4.1 million acre feet on 3.0 million acres of land (both Kootenai Forest land and the private land within the Kootenai boundaries). Water quality is characterized as generally excellent.

For purposes of analyzing land designation implications, the Forest was delineated into 112 major drainages. Most of the streams on the Forest have channel stability ratings of "fair to good" and can generally withstand up to a 14 percent increase in peak flow without excessive channel damage.

Almost two-thirds of the Kootenai National Forest, particularly the west half, is subject to watershed problems; frequent flooding and concentrated high water yields, sedimentation, and small slumps below clearcuts and roads. Early-winter, warm-climate-type snowpacks prevail on much of the Forest, and can yield large amounts of water during mid-winter unseasonably-warm periods. Forest-wide flooding has occurred approximately once every six years due to this phenomenon. Local, as well as, downstream damages below harvest areas are common following these climatic-snowpack interactions. Climatic data and researchers (Troendle and Leaf, 1980) have documented prevalence of this Pacific Maritime-type climate in northwestern Montana.

The relationships between water yield, stream damage, climatic events and timber harvest activities are not always clearly defined. Without any runoff, channel damage will not occur regardless of harvest activities which have occurred in the drainage. During midwinter rain and/or melt events, damages have occurred in drainages without prior timber harvest. Between these extremes, recent research (Christner and Harr, 1982) has shown that smaller climatic events can trigger significant flow increases and stream damage if significant ground disturbance has occurred in a drainage. In an effort to keep these activities below the threshold level that is considered to contribute to channel instability and downstream flooding problems, the Forest applies the equivalent-clearcut-area concept as a guideline. This approach defines the maximum area within the drainage that can be cutover based upon elevation, aspect, slope, and degree of ground disturbance. Proposals for activities which exceed this guideline require further analysis and review prior to implementation. The Forest Planning Model (FORPLAN) included constraints, as part of the minimum management requirements, to model these harvest guidelines.

A set of guidelines are used on the Forest to help carry out activities in a manner that will protect stream channels and downstream landowners (see Planning Records). Drainages that are at, or above, water-yield increases described in these guidelines and/or which have been damaged in the past (primarily due to rain-on-snow events) include the following:

<u>Drainage Name</u>	<u>Location on Forest</u>
Emerson Creek	Western Portion
Keeler Creek and some tributaries	Western Portion
Raymond Creek	Western Portion
Star Creek	Western Portion
Kedzie Creek	West-Central Portion
Studebaker Creek	West-Central Portion
Quartz Creek and some tributaries	Central Portion
Grave Creek and some tributaries	Northeast Portion
Wigwam River	Northeast Portion
Harvey Creek	Eastern Portion
Paul Creek	Eastern Portion

Of the 112 drainages used for planning purposes, 15 drainages (totaling 663,000 acres) have private lands in excess of fifty percent of the drainage. Resource impacts in these drainages are largely dependent upon decisions of the private landholders. Wherever possible, Forest Service activities in these drainages are coordinated with private activities to prevent downstream problems.

There are two municipal watersheds on the Forest: Flower Creek which supplies Libby, and O'Brien Creek which supplies Troy. Management activities are coordinated through the Water Quality Bureau of the Montana State Department of Health, the agency responsible for overseeing municipal watersheds. Road building and stream crossing associated with timber harvest activities are approved by the Bureau. Major concerns in municipal watersheds and all other watersheds include excessive water yield and sedimentation, as well as public health and sanitation.

Three major hydroelectric dams are located within the Forest boundary (Koocanusa, Noxon, and Cabinet Gorge). Hydrologic coordination with the Corps of Engineers and Washington Water Power is required to address problems such as powerpole locations and protection in floodplains. The impacts of Forest land management on sedimentation of the reservoirs and tributary spawning streams are also important considerations, not only to the public but to other agencies such as the Montana Department of Fish, Wildlife, and Parks, and the U.S. Fish and Wildlife Service.

Total Forest lake and reservoir acreage is 37,000 acres. The Forest also includes 3,200 miles of perennial streams, and adjacent to the Forest are an additional 1,300 miles of perennial streams on private land. The important Forest fishery resource requires hydrology input to mitigate land management impacts on sedimentation.

10. Cultural Resources

The Kootenai Forest has many known historic and prehistoric sites and it is likely that many more will be uncovered as projects are planned for areas previously unexamined. Prehistoric sites can take the form of camps, trails, rock art, cambium-peeled trees, quarries, burial grounds, and others.

Man has probably inhabited this area for at least 7,000 years (Thoms et al., 1984). Most of the remains of this prehistoric activity are located in the Kootenai Valley and along the tributaries of the Kootenai River. Most certainly the resources of the surrounding mountains were exploited, but fewer sites have been located there.

These early people were wandering hunters and gatherers, taking advantage of the wide range of mineral resources here, as well as the varied plant, animal and aquatic life. Although the lifestyle of these early residents is becoming more clear, there is still much to be learned about the interaction of these people with their environment.

The last prehistoric group to inhabit the area were the Kootenai Indians. The time of their arrival as well as their origin remains one of the great puzzles of North American prehistory. Their language is unique and distinctive from that of their neighbors. Ethnographic research of the Kootenai tribe was only recently undertaken, beginning in the 1940s with the work of Turney-High and continuing to the present (Manning, 1983). These studies suggest a lifestyle highly influenced by the European culture--the introduction of the horse, of fur trapping and trade, of missionaries, of mining and homesteading. Sites relating specifically to this era have yet to be clearly distinguished from sites of earlier activities.

Certain sites are still in use by Native Americans exercising their rights under the American Indian Religious Freedom Act.

Several major activities dominate the history of the 19th and 20th centuries within this region, all represented by recorded sites on the Forest. These include fur trade, missionaries, mining, homesteading and agriculture, transportation, logging, and public management of the resources. All of these themes are represented by recorded sites on the Forest.

11. Range

Livestock numbers in Lincoln and Sanders Counties have decreased steadily over the past 10-year period, indicating a declining importance of livestock production to the local area's economy. At present, 61 people have permits to graze cattle on Kootenai lands. Livestock use on the Kootenai totals about 13,000 Animal Unit Months (AUMs) per year. This use is based on 41 active grazing allotments with about 3100 animals being grazed.

The amount of potential livestock forage equals or exceeds current and projected demands (see chapter 2 and 4).

Livestock grazing on the Kootenai is limited by the nature of available range (transitory), the lack of over-wintering facilities, the remoteness of the available range, and the expense of providing adequate water and range developments. Demand is expected to be satisfied under current production levels.

Opportunities for the Forest to expand the range program are limited by the lack of primary range, the availability of suitable transitory range, the problems in moving stock to take advantage of that range and private sector interest in facing these problems. Many acres on the Forest are either too steep for stock use, the acres of transitory range are too widespread for stock to economically use them, or the range is too distant from potential users to be considered an economical opportunity. Limited as it is, transitory range is still the only opportunity for expansion. However, there are ways to make the current program more cost-efficient through consolidation of small allotments, establishment of a system that would set priorities for the use of range dollars, and by updating active allotment plans.

12. Energy

The consumption of fossil fuel energy has become an item of great concern over the last few years. The fuel consumed in the administration of the Kootenai National Forest is noted below. Additional energy, well in excess of that consumed by the Forest Service, is used by road builders, loggers and recreationists. The use of energy in Forest related activities is strongly related to the amounts of road building and logging that is done on the Forest.

As can be seen from the following table, the need to conserve fuel has resulted in decreasing fuel consumption by the Forest Service. This has been due to increased awareness of driving habits, quotas being applied and adhered to, and more economical vehicles being purchased or rented. It is expected that this trend will continue.

TABLE III-12

ENERGY CONSUMPTION

<u>Year</u>	<u>Fuel Consumed (gals.)</u>	<u>Miles Driven</u>
FY 1979	180,000	2,257,480
FY 1981	171,599	2,287,089
FY 1983	137,325	2,101,074

13. Human and Community Development

The Kootenai Forest has a positive impact on local employment. During FY 1986, the Forest employed 342 permanent and up to 144 temporary and seasonal workers at one time. Other people work for the Kootenai Forest through other authorities, such as volunteers through the Volunteers in the National Forest Act (there were 25 volunteers in 1986). Some outside agencies pay the salaries of enrollees, such as the State which pays for those working for the Kootenai through the Adult Work Experience. Additional programs include the Youth Conservation Corps (YCC), the Senior Citizens Employment Program (SCSEP), and the Youth Employment Program (YEP). In 1984, volunteers including campground hosts totaled 85 participants; YCC a total of 10; SCSEP, 16; YEP and AWE, 26.

The Kootenai presently employs 105 women and 18 minorities in permanent positions. This represents 31% and 5% of the permanent workforce, respectively. In addition, about 63% of the temporary workforce are women and about 13% are minorities, in keeping with the goals of the Forest's Affirmative Action and Equal Employment Opportunity programs.

14. Air Quality

The air quality of northwestern Montana is generally good except in the vicinity of communities with paper and sawmills. Seasonal degradation occurs as a result of smoke from wildfires and prescriptive burning, woodburning stoves, and dust from road sanding. Smoke management will continue to be an important part of planning and use of prescriptive burning to assure that air quality is not degraded. Woodburning stoves and dust from road sanding will need to be dealt with on a community-by-community basis.

15. Visual Quality

Through the years, natural occurrences, such as wildfires, and Forest management activities, such as timber harvesting and road building, have altered the appearance of the Forest. Recognizing that a large part of the enjoyment people gain from the Forest are pleasing views, Forest management includes measures to be taken during timber harvesting and road building to protect the viewing resource. The degree of this protection depends on the type of landscape involved and whether or not the area is "seen" and how often. How often an area is seen usually depends on whether or not it is close to a major road or highway, or whether it is viewed from a town. From this frequency-of-viewing and the type of landscape, is derived a "visual quality objective" or "VQO." VQO's are viewing standards or objectives, to be met during the design and implementation of a project and are (in order of "most protection" to "least protection") preservation, retention, partial retention, modification, and maximum modification. The VQO's of retention and partial retention are considered to be the most sensitive to change.

A baseline of these sensitive VQOs was determined by Forest landscape architects so that the viewing changes could be quantified. It was determined that 434,000 acres were most sensitive to change (acres seen from roadsides or from population centers) and therefore should receive maximum protection. A "retention" visual quality objective was assigned to them. An additional 909,000 acres were identified as needing some protection from change, but not as much as those in the "retention" category; a "partial retention" visual quality objective was assigned to those. The acreage allocated for each of the four VQOs by alternative is described in the timber harvest section of Chapter 4.

16. Fire Management

In addition to the 2,246,000 acres of National Forest land on the Kootenai National Forest, there are 633,000 acres of private land within and adjacent to the Forest that are a concern for fire protection.

Early fire history records for the 19th and 20th centuries show large fires (Class C and larger) occurring on the Kootenai in 1872, 1889, 1910, 1917, 1919, 1925, 1929, 1936, 1953, 1967, 1970, 1973, 1974, and 1979. Many stands of lodgepole pine which are now in 60-70 years old originated after the 1910 burn. Less dramatic but equally influential through time are the numerous small fires (Class A and B) occurring throughout the Forest. For the period 1970-79, these accounted for 96% of all fires. Lightning storms reach a peak in late June-August, with an average of 390 acres burned per year (1960-74).

The functional influence that fire has expressed on the land within and adjacent to the Kootenai National Forest is well documented (Davis and Bailey 1979, Schultz 1980, Bevins 1979) and can be seen in the nature and composition of the Forest. Through evolutionary selection, fire has shaped the structural adaptations of many of the species and research suggests that some herbaceous plants and trees not only endure fire well but appear to require it on a periodic basis to reproduce and compete successfully (Habeck and Mutch 1973, Kozlowski and Ahlgren 1974, Wright 1978).

The majority of the plant cover on the Forest is referred to as postfire secondary successional stages dominated by mixtures of Douglas-fir, ponderosa pine, western larch, lodgepole pine, and spruce. The understory vegetation is variable along elevational gradients.

The goal of fire management is to assure that land management objectives are met through a fire protection and use program which is cost effective and responsive to the Forest Plan. To meet this goal The Forest is undergoing an active Fire Management Planning process that uses the fundamental aspects of fire protection -- protection of life and property, plus the ecological aspects of fire including fire behavior, fire effects, and fire's historical role in the forest ecosystem.

Fire Management Planning provides for the assessment of conditions (fuels, topography, weather) and risks (lightning, people, equipment), and determines the necessary detection, prevention, presuppression, and suppression forces needed. This includes the necessary delegations of

authority and chain-of-command, and required communications and law enforcement including the necessary investigation of fire causes.

Fuels management is an important aspect of Fire Management, and it's purpose is to reduce the man-created and natural fuel hazards to a pre-determined acceptable level.

DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KOOTENAI NATIONAL FOREST PLAN

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

This chapter describes the activities which the Forest Service would undertake to implement each of the alternatives and how these activities affect the environment.

IV. ENVIRONMENTAL CONSEQUENCES

Significant changes From Draft to Final EIS

The effects of implementing the alternatives remain the same in the Final EIS except where technical errors are corrected. The Final Plan (Alternative JF) is added to the displays and discussion throughout this chapter.

A. Introduction

This chapter forms the scientific and analytical basis for comparison of the alternatives, including the proposed action, (Alt.J) and the Final Plan (Alt. JF) described in Chapter II. Environmental consequences are the expected effects of activities scheduled to implement an alternative on the ground. The applicable effects of all the major activities and resource programs are discussed. The order of discussion begins with those activities which have the greatest effect on the physical and biological components of the environment and ends with those that have the least effects. Economic and social effects are discussed where applicable.

The consequences are described as quantitative or qualitative changes from the current situation in terms of significance, magnitude, and duration. Where applicable, the discussion identifies consequences that are direct, indirect, cumulative, or unavoidable. The relationship of short-term use of resources on long-term productivity is also discussed, along with irreversible and irretrievable commitment of resources.

Mitigation was an important consideration in the formulation of standards and guidelines, prescriptions, and minimum management requirements associated with each of the alternatives. These items are discussed in other parts of this document or in special sections of the appendices and will not be repeated here.

This chapter will be presented in a way which attempts to avoid redundancy. For instance, the specific activities generated to enhance fish habitat are limited to a few acres on the Forest. However, the efforts to maintain or enhance fish habitat are inherent in several other activities (e.g. timber harvest or road building). The discussion for specific activities associated with fish habitat improvement is short, but effects on fish habitat are discussed in sections related to other activities or resources. To assist the reader in locating all material associated with a particular resource, use or activity, the following index was developed for this chapter. The main index at the end of this document repeats these references as well as references from elsewhere in this EIS.

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B. ACTIVITIES AND THEIR EFFECTS

1. Timber Harvest

a. Introduction

Timber harvests have a significant effect on the physical and biological environment of the Forest. The extent of these impacts depends on (1) the amount of area where timber is harvested, (2) the rate at which it is cut, and (3) methods of treatment.

Timber management consists of a series of activities prescribed to regulate growing, harvesting, and regeneration of wood crops on suitable sites. Timber harvest is just one step in the process of overall timber management.

The amount of suitable timber acreage and the volume harvested vary by alternative due to emphasis placed on other resources (such as roadless, wilderness, wildlife, visual quality) and the type and timing of special timber stand improvement activities (such as thinnings and conversion of stagnated lodgepole pine stands). Table IV-1 shows the acreage where timber management will take place (suitable timberland) and the relative intensity of that management over the long term (long-term sustained yield).

The amount of timber harvested per decade is usually closely correlated to the amount of suitable timberland available and the long-term sustained yield, if non-declining sustained yield is an objective. If a departure from non-declining sustained yield is the objective, a higher rate of harvest can occur in some decades, usually the earlier decades, with a corresponding decline in a later decade or decades.

Regulated timber yield for the first five decades for each of the alternatives is shown in Table IV-2. Note that "non-declining" yield is based upon cubic foot measure. The relationship between cubic foot measure and board foot measure varies by the size and species mix of the trees expected to be harvested. For this reason a "non-declining" yield schedule may appear to be a "departure" sequence when expressed in board feet as in Table IV-2. Most of the alternatives appear to be departure sequences, but only Alternatives D, K, M and N are true departure alternatives and Alt. D does not decline (in cubic feet) until the 6th decade. See (Table II-3) for cubic foot schedules.

TABLE IV-1		
ACREAGE OF SUITABLE TIMBERLAND		
AND		
LONG-TERM SUSTAINED YIELD (LTSY)		
(Thousands of Acres, Millions of Cubic Feet)		
Alternative	Suitable Timberland (Thousands of Acres)	LTSY (MMCF)
A	1470	84
B	1464	84
C	1466	83
D	1595	90
E	1425	82
F	1132	56
G	1386	80
H	1361	78
I (CD)	1422	74
J (PA)	1386	72
JF (FP)	1263	63
K	1386	72
L	1788	102
M	1484	84
N	1481	84
O	1389	83

TABLE IV-2

AVERAGE ANNUAL TIMBER YIELD BY DECADE
(Millions of Board Feet - Live Green Volume Only)

DEC	Alternative															
	A	B	C	D	E	F	G	H	I	CD	PA	FP	JF	K	L	M
1	226	223	225	227	218	164	213	208	150	202	227*	230	255	262	247	215
2	253	250	253	248	241	191	234	222	152	233	230	241	245	224	240	247
3	249	247	250	285	238	190	231	223	157	224	227	216	264	274	283	263
4	304	302	300	320	294	185	283	273	143	256	213	251	316	326	322	301
5	336	333	331	344	323	198	309	294	162	277	234	271	345	437	329	320

* Includes 25 MMbf of Non-interchangeable Volume in addition to 202 MMbf live green.

It is apparent from the two preceding tables that the difference in the amount of suitable timber acreage by alternative and a departure from non-declining sustained yield or other scheduling change can affect the volume of timber harvest in any decade. For example, Alternative F has a low acreage of suitable timberland because of greater emphasis on fish and wildlife objectives and thus a low level of harvest and the lowest LTSY. In contrast, Alternative L has the highest acreage of suitable timberland

and the highest LTSY because of its emphasis on timber production and the more intensive prescriptions applied on the suitable timberlands.

Alternatives D, K, M, and N are departure alternatives and have higher harvests in the first one or two decades compared to their suitable timberland acreage and LTSY. The alternatives showing the highest amount of annual harvest per decade, the highest suitable timberland acreage and LTSY indicate the greater amount of silvicultural activity.

The Final Plan (Alt. JF) has a lower suitable timber base, LTSY, and lower harvest volumes in the later decades than does the Proposed Action (Alt. J) for three reasons: (1) the suitable timber land base is smaller primarily because the old-growth timber habitats have been removed. This would tend to lower timber volumes in all decades. (2) the first decade timber volume is maximized subject to non-declining yield. With the given smaller suitable timber land base and the high first decade cut level, the harvests in later years can not rise as high as the Proposed Action. (3) the intensity of management has been reduced by lowering the anticipated amount of commercial thinning.

The 1980 Resources Planning Act (RPA) Revised Statement of Policy (Forest Service Manual 1920, R-1 Supplement No. 5, October 1982) requires a comparison of the long-term sustained yield (LTSY) for timber with the projected growth rate of timber by the year 2030 under the Final Plan. The aim is toward reaching 90 percent of the potential annual growth rate by the fifth decade. The LTSY for the Final Plan (Alternative JF) is 63 million cubic feet per year in 200 years. The predicted growth rate in 50 years for that alternative is 39 million cubic feet per year, indicating that the Kootenai would achieve 62 percent of the potential growth by the fifth decade if managed under the Final Plan. Table IV-3 displays this projected growth rate and the decade in which the growth rate first reaches 90 percent of maximum for each alternative.

None of the Alternatives meet the RPA timber growth goal due to several factors:

- (1) Non-declining even-flow and minimum management requirements do not allow quick conversion of mature stands to more rapidly-growing, younger stands in the early decades.
- (2) Stands that are costly to manage for timber (particularly stagnated lodgepole pine stands) are not converted early, which could add growth by the fifth decade.
- (3) Growth is coming from existing stands that have not had stocking control and are not achieving their potential.

The growth situation could be improved in the Final Plan by additional investments in timber management (stocking control). However, this increase in growth potential would result in a total cost increase and a decline in PNV.

TABLE IV-3				
ANNUAL LONG-TERM SUSTAINED YIELD (LTSY)				
AND				
GROWTH BY ALTERNATIVE				
(Millions of Cubic Feet)				
Altern-	LT	Growth	Growth as %	Decade When Growth
ative	SY	Dec 5	of LTSY	Reaches 90% of LTSY
A	84	48	57	7
B	84	48	57	7
C	83	48	58	7
D	90	60	67	7
E	82	44	54	7
F	56	35	63	8
G	80	42	53	7
H	78	40	51	7
I (CD)	74	43	58	after 20
J (PA)	72	45	63	7
JF (FP)	63	39	62	7
K	72	47	65	7
L	102	66	65	8
M	84	50	60	7
N	84	47	56	7
O	83	54	65	7

Alternatives with the largest acreages of suitable timber have the potential to provide the greatest benefit to the timber resource. These benefits include:

- Improved age class and size class distribution (discussed below).
- Maintenance of healthy, vigorous stands by removing diseased trees and trees subject to insect attack and by planting.
- reduced threat of insects, disease, and wildfire through improved tree health and by removal of potential fuels.
- Better utilization of growth potential of timber-growing sites by insuring that stagnated or slow-growing stands are harvested and regenerated first to allow younger, faster-growing stands to get started earlier.
- Production of higher volumes of timber harvest.
- Better geographic or spatial distribution of the harvest. With more land base to work in, certain impacts can be mitigated by careful scheduling of activities.

In a regulated Forest, it is desirable to have approximately equal amounts of each productivity class stocked with each major age class. This equality provides a more predictable situation:

- Harvest volumes are at or near optimal, and can be anticipated well in advance.
- Other activities such as thinning, planting, site preparation, etc. are at stable and predictable levels.

- Suitable habitats exist for all types of wildlife.
- Workforce and investment levels are established and generally predictable.

In general, the age classes are:

- Age Class 0-40 (seedlings, saplings, and small poles) are the younger stands which require reforestation, release, and pre-commercial thinnings to obtain desirable stocking and growth characteristics.
- Age class 40-80 are the pole-sized stands in which the first commercial thinnings can be made.
- Age Class 80-120 are the sawtimber stands where commercial thinnings and final harvests are undertaken.

Table IV-4 shows the distribution of timber age classes found in suitable forest land by the fifth decade for each alternative.

TABLE IV-4

AGE CLASS DISTRIBUTION AT END OF FIFTH DECADE
(% of Suitable Acres)

AGE CLASS	Alternative															
	A	B	C	D	E	F	G	H	I	PA	CD	FP	JF	K	L	M
0-40	48	48	48	51	48	42	48	46	38	48	48	48	47	44	52	49
40-80	14	14	14	13	13	16	13	24	11	15	18	16	16	16	16	14
80-120	25	25	25	24	24	23	24	18	22	23	26	24	24	20	25	29
120-160	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
160+	12	12	12	11	13	18	14	11	27	13	7	12	15	11	11	8

The differences between alternatives are primarily due to the age classes available for harvest on the suitable acres and the rate of harvest allowed by the goal of the alternatives. Examples of Alternative Goals are: high timber yields (Alts. L, N and D), low budget constraints (Alt. I), large roadless or wilderness acreage recommended (Alts. G and H), emphasis on big game (Alt. F), emphasis on visual quality (Alt. O).

Alternative O provides the best distribution of age classes across the forest from a timber management perspective. This is because of the low percentage of timber in age class 160+ and the higher percentage in the 80-120 age class. This indicates a quicker conversion of the older age class while still providing enough old-growth timber to meet the minimum management requirements. Alternative O also provides for a quicker replacement in the future of the 160+ age class trees with the 120-160 age class. Thus, a more even volume of timber is reaching a +120 year rotation each decade than the other alternatives. It is important to note that there is additional acreage of timber in the older age classes which is not shown in the above table because those acres are outside of the suitable timber base. Alternative JF has a small percentage of older

acres simply because most of the land in the 160+ age class was removed from the regulated timber base for old-growth habitat preservation.

b. Harvest Systems

There are two general categories of silvicultural systems associated with timber harvest: even-age and uneven-age.

Uneven-age harvest, or selection harvest, is used rarely on the Kootenai (less than one percent of all acres logged) because it requires frequent entries (typically every 10 to 30 years) and is thus very costly and repetitively disruptive to wildlife including the threatened grizzly bear. Uneven-age harvest also favors shade tolerant species for which management is limited here. In addition, the prediction of yields is very difficult and diameter class distribution is hard to achieve on-the-ground

The experience on the Kootenai National Forest with repeated salvage harvests, that parallel an uneven-age management scheme, indicates that alder and brush are often stimulated thus preventing regeneration. In other cases cedar, grand fir, hemlock and alpine fir (shade tolerant species) regenerate and the value of the stand declines dramatically. These stands tend to be of lower quality than other naturally-occurring stands because these species are susceptible to mechanical damage (and subsequent rot problems) during harvest. The repeated entries of uneven-age management increase the risk of such damage. Stands developed in this way are likely to be suppressed because of the remaining overstory. Long term yields are difficult to predict for this type of management, but they are likely to be quite low and low valued. The existing stands on the Kootenai National Forest are valuable because they arose in an even-age manner as a result of fire. The even-age management generally called for in the Forest Plan duplicates this natural process without the risks and costs of wildfire.

Use of uneven-age management on the Kootenai is thus limited to those few isolated areas where shade-tolerant species are preferred, or where a visual quality objective cannot be achieved in any other way, or where an area needs special consideration. Uneven-age systems are generally not appropriate for riparian areas because of the amount of disturbance to streamsides resulting from frequent entries.

There is very little information beyond experiences as described above which either supports or discredits uneven-age management. For this reason uneven-age management has been identified as a research need in the Forest Plan.

Because even-age harvest systems are used on the Kootenai Forest most of the time, they are discussed in depth here.

Two basic methods are used: clearcut and shelterwood. In clearcutting, all trees are removed from the area in a single cut. (A variation of clearcutting, called seed-tree cutting, is when most of the trees are removed from the site in a single cut. For the purpose of this discussion

clearcutting and seed-tree cutting are considered as similar when considering environmental effects to soil and water.) In shelterwood cutting, trees are left in the area to provide favorable site (climate) conditions until seedlings have become established. Of the even-age silvicultural methods, clearcutting (including seed-tree cutting) was determined to be the optimal method on many sites and tree stands because of good success with natural regeneration (approximately 2/3 of all areas are successfully regenerated with natural seedings). Also, many existing stands do not have desirable tree species composition or the necessary vigor needed to successfully apply other methods. Residual trees subject to windthrow, and the need to produce openings for wildlife forage are also considerations which often result in clearcutting being the optimum method. The acres of clearcutting by alternative which includes seed-tree cutting, is the amount projected that will be needed to achieve alternative objectives and respond to physical and biological limitations. Additional analysis considering site-specific data is done in project level environmental analysis. Individual stand prescriptions are prepared by certified silviculturists to determine the optimal treatments to actually be applied on-the-ground. See the Forest Plan document, Appendix 2, Vegetative Management Practices for the criteria pertinent to clearcutting, seed-tree cutting, and shelterwood cutting.

Clearcutting and seed-tree cutting have the potential for adverse environmental effects because all (or most) of the large trees are removed from the area in a short period of time, which creates large openings that exposes soil to erosional forces (Bethlahmy, 1967; Megahan and Kidd, 1972). The percentage of total timber harvest to be cut by the two systems (clearcut/seedtree and shelterwood) over a 50-year period is shown in Table IV-5.

Only Alternative O, which emphasizes visual quality, utilizes shelterwood methods to any significant extent. Alternatives J, K and JF use shelterwood to a lesser extent (7% to 8% of all acres). Alternative JF (Final Plan) clearcuts and shelterwood cuts more acreage than Alternative J (Proposed Action) to achieve the same first decade harvest levels because of the elimination of commercial thinning as a common silvicultural practice. The percentage of clearcutting and shelterwood cutting is essentially the same as the Proposed Action.

TABLE IV-5

TIMBER HARVESTED BY CLEARCUTTING AND SHELTERWOOD
(Thousand Acres and Percent of Total)

CLEARCUT/SEEDTREE SYSTEM										Alternative								
Decade	A	B	C	D	E	F	G	H	I	CD	PA	FP	JF	K	L	M	N	O
1	137	137	138	136	132	97	129	125	88	117	135	135	159	166	151	106		
2	147	164	148	194	149	94	149	155	128	126	141	145	189	122	137	62		
3	163	163	162	175	169	95	174	175	108	152	150	133	203	167	168	76		
4	185	185	185	198	181	112	177	172	116	166	143	161	178	200	199	135		
5	143	145	147	144	146	97	142	140	128	167	128	163	177	186	135	98		
(% of Total)	100	100	100	100	100	100	100	100	99	93	92	93	100	100	100	40		

SHELTERWOOD SYSTEM:										Alternative								
Decade	A	B	C	D	E	F	G	H	I	CD	PA	FP	JF	K	L	M	N	O
1	0	0	0	0	0	0	0	0	2	20	22	20	0	0	0	37		
2	0	0	0	0	0	0	0	0	3	27	26	28	0	0	0	148		
3	0	0	0	0	0	0	0	0	3	11	8	12	0	0	0	217		
4	0	0	0	0	0	0	0	0	1	3	2	3	0	0	0	162		
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148		
(% of Total)	0	0	0	0	0	0	0	0	1	7	8	7	0	0	0	60		

Even-age harvest affects most resources. These are discussed below.

The Visual Resource: Even-age management has varying effects on the visual resource, depending on the emphasis given to that resource in a particular alternative. The greatest visual impact would occur in the high timber harvest alternatives in which large areas are assigned to "modification" or "maximum modification" visual quality objectives (Table IV-6). In alternatives with high timber production, only the lands that are unsuitable for timber production would be assigned a "Retention" or "Partial Retention" visual quality objective. The following table shows the relative acres of each visual quality objective.

TABLE IV-6

AREA BY VISUAL QUALITY OBJECTIVES
(Thousands of Acres and Percent of Forest)

Alternative																	
VISUAL QUALITY OBJECT	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	CD <u>I</u>	PA <u>J</u>	: : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : 						

Prior to the development of these alternatives, the Forest landscape architects determined how many acres were most sensitive to change, that is, how many could be viewed from roadsides or from population centers and therefore would benefit most from protection. They found that 434,000 acres fit this category; a "retention" or "no change" visual quality objective would be the ideal objective. They also found that an additional 909,000 acres could benefit from some protection from change, but not as much as those in the "retention" category. A "partial retention" visual quality objective was therefore deemed ideal. The table above portrays the tradeoffs by alternative. As expected, in alternatives with high timber values, such as Alternatives D and L, the number of acres given protection are relatively few. In alternatives, such as O, which favors other values such as visual quality and roadless areas, the acreage is larger.

Recreation: Even-age management can adversely affect the recreation experience by disrupting trail systems or creating unnatural openings. The experience may be enhanced by careful placement of openings to create vistas.

Watershed: Even-age harvest has a bearing on water yield because the entire mature canopy is removed, thus reducing evapo-transpiration and interception losses. The accumulation of snow and the rate of melt in these cutover areas are often increased during peak runoff periods in the spring (Rice, 1980). More recent research indicates that the portion of an area involved in roads, skid trails, or other compacted surfaces is even more important in determining water yield impacts from timber harvest (Christner and Harr, 1982; Harr, 1975, 1979). The effects of road interception and redirection have also been evaluated as significant

(Megahan, 1972; Rice, 1980). In extreme cases, this can lead to slumps, the slipping of soil and rock on steep slopes and clay soils (Dryness, 1967; Fredriksen, 1970; Megahan, 1972), or, more frequently, channel damage. Mass failure hazards are generally insignificant on the Forest, but the potential for large scale channel damage is moderate to high on the western half of the Forest due to a typically transient snowpack and a history of mid-winter rain-on-snow events (Harr, 1981; Harr and Berris, 1983).

Water yield increases from timber harvest tend to occur during the peak flow periods. Instead of slowly but steadily melting during the winter months, much of the moisture within openings is retained until the entire snowpack reaches a density of about 40%. At this time it runs off rapidly. The water situation for an area harvested by even-age methods will generally recover to preharvest conditions within 20 to 50 years after harvest, assuming regeneration occurs promptly (Tolle, Rost, Park, and Collett, 1976).

Alternatives that increase the amount of timber harvest and road building will increase water yield which can increase sedimentation, and can cause effects downstream from the activity, such as fish loss.

Even-age management of riparian areas affects stream environments if trees are removed from the streambanks. Bank stability is reduced and debris which could provide fish habitat and organic energy (the base of the biotic food chain) is removed. (Most of the pools in low-gradient Forest streams have been formed by woody debris. In time the debris rots, so future maintenance of satisfactory pool-riffle ratios depends on trees periodically falling into streams.) In the short-term, fish populations are not affected, but in 40 years there will be a reduction in fish if woody debris is not added.

As stated above, water yield increases on the Forest are primarily a function of the total area harvested and the silvicultural system used. The magnitude and duration of these increases generally occur during spring peak-runoff periods and could affect the stability and integrity of stream channels. If harvesting is concentrated in a drainage or confined to a given aspect and/or elevation, the chances of channel damage increase.

The following table displays the projected water yield increases by alternative by decade for the next 50 years. They range from approximately 3% (Alt. I) to 5% (Alt. L) in the first decade to approximately 4% (Alt. JF) to 7% (Alts. L and M) in the fifth decade. The modeling process for water yield volumes is very crude due to lack of field data to verify model adjustments for the Kootenai National Forest. This means that field measurements may differ significantly from the volumes estimated in the following Table. A research need to address this problem has been identified in the Forest Plan. The State Water Quality Standards are the key item of concern here because increased water yield is usually associated with increased sediment delivery to streams and reduced water quality. In order to insure no violation of State Water Quality Standards, the monitoring standards in the Forest Plan have been made stronger. Thus, regardless of the estimated water yields, the State

Water Quality Standards will not be violated. All of the alternatives include provisions for limiting the amount of harvest activity in drainages so that stream channel damage will not occur.

As stated above, the main reason for the increased water yield is the amount of acres harvested, climatic pattern where harvesting occurs (i.e., elevation and location on Forest) and topography (i.e., steepness of slope and aspect). The Final Plan involves harvest on fewer total acres, but more acres are clearcut compared to the Proposed Action because commercial thinning is not used. The net result is that the water yield increase is larger for the Final Plan than the Proposed action, but the percent increase above baseline is essentially the same.

TABLE IV-7

INCREASED WATER YIELD OVER BASELINE CONDITION
(Thousand Acre-Feet/Year
and Percent Increase Over Baseline Conditions)*

DEC-	Alternative															
	ADE	A	B	C	D	E	F	G	H	CD	PA	FP	JF	K	L	M
										I	J					
1		171	157	159	162	161	162	162	159	143	161	186	172	206	180	176
		+4%	+4%	+4%	+4%	+4%	+4%	+4%	+4%	+3%	+4%	+4%	+4%	+5%	+4%	+4%
2		207	206	208	240	204	181	200	194	171	198	222	212	268	210	213
		+5%	+5%	+5%	+6%	+5%	+4%	+5%	+5%	+4%	+5%	+5%	+5%	+7%	+5%	+5%
3		258	255	257	290	239	194	236	224	177	220	217	226	295	267	273
		+6%	+6%	+6%	+7%	+6%	+5%	+6%	+5%	+4%	+5%	+5%	+6%	+7%	+6%	+7%
4		255	252	251	299	241	206	230	217	162	217	187	217	293	265	263
		+6%	+6%	+6%	+7%	+6%	+5%	+6%	+5%	+4%	+5%	+4%	+5%	+7%	+6%	+7%
5		245	242	240	284	231	215	220	206	190	233	179	229	283	290	258
		+6%	+6%	+6%	+7%	+6%	+5%	+5%	+5%	+5%	+6%	+4%	+6%	+7%	+7%	+6%

*For comparison purposes only, the baseline water yield Forest-wide is 4,109,000 acre-feet/year.

Fisheries: Timber harvest in riparian areas has the potential to adversely affect fisheries habitat. Removal of trees along streamsides can reduce the amount of instream debris recruitment. Woody debris in streams produces pool habitat, cover, diversity of habitat, and organic energy. Also, timber harvest along streamsides removes canopy cover that can result in higher summer temperatures and anchor-ice problems in winter.

As the area scheduled for harvest increases in size, the percent of riparian area involved also increases. Those alternatives with the most

acres of timber to be cut have the greatest potential to create conflict in riparian areas.

The primary impact of timber harvesting on fisheries comes from the roads constructed in conjunction with timber harvest. The actual removal of timber generates levels of sediment that are significantly less than those from road construction. In fact, Megahan and Kidd (1972) state that roads probably cause more than 80 to 90 percent of the erosion and sedimentation problems.

There is an inverse relationship between road construction and fisheries production. The amount of sediment in a stream above the natural rate is directly related to fish loss. The road systems needed for timber harvest often produce sediment above the transport capacity of local streams and the resulting deposits of sediment adversely affect fish reproduction potential.

Forest standards have been developed to mitigate the negative impacts harvesting might have in riparian areas. Sediment production and mitigation measures are dealt with in the Roads Management section of this chapter.

Fuels Reduction: Even-age harvest systems provide the best opportunity for reduction of fire hazard. In clearcuts, there are no living trees to be protected from slash disposal methods. Disposal of slash in shelterwood harvests is more difficult and costly because the standing trees must be protected.

Big Game: Timber harvest alters big-game habitat by changing the kind, size, degree, and interspersions of cover and foraging sites. Those species which feed primarily on vegetation found in the early successional stages (e.g., grasses, shrubs) will benefit from the openings created by timber harvest. Examples are elk winter-ranges, bear spring-ranges, and bighorn sheep ranges. However, a balanced amount of cover and forage is necessary for animals to benefit from habitat changes. Animals which prefer forested areas, such as whitetail deer and moose, may be negatively affected by timber harvest. In all cases, (1) the degree of harvest, (2) the relationship with other harvested sites and cover, (3) the frequency of harvest, and (4) the amount of future human activity in the area will dictate whether timber harvest benefits or reduces big-game habitat effectiveness. High market or timber alternatives (Alts. A, L, M, and N) tend to create abundant forage along with reductions in cover and less big game. Alternative F, which maximizes elk habitat potential, includes a timber harvest schedule at about 60 to 70 percent of the maximum (Alternative L).

Habitat is also affected by the distribution and scheduling of timber management activities. If poorly managed (no form of road closure, logging during periods of high use by elk, etc.), the disturbance may cause the elk herd to leave an area and move elsewhere if that is possible. Controlling the timing of harvest and road building activities is therefore essential to minimizing the impact to the herd. Providing an adequate, secure area for elk to migrate to, during periods of activity,

is another important mitigating measure. The Road Management section deals with this concern as well.

Early in the planning process, elk were identified as an indicator species for big game--essentially a barometer to measure habitat change. A wealth of recent research data on elk exists, making it somewhat easier to determine habitat needs and relationships and to compare their needs with other big game species. Specific timber prescriptions were developed which optimize elk habitat needs and timber harvesting. These prescriptions, however, have enough latitude that on a site-specific basis other species can be favored if need be.

Timber harvest which directly benefits big game habitat is predominantly related to winter ranges. In these situations, removal of the timber canopy and the subsequent increase in grasses and forbs can significantly improve winter range forage quantity and quality. In summer range situations, however, forage is generally not a limiting factor and timber harvest does not significantly improve elk range through forage production. It is true that harvesting on summer range increases forage availability, but elk use of the range will be dictated more by the remaining cover, protection of special habitat features (e.g., wallows) and control of vehicle disturbance. Therefore, timber harvest on summer ranges must be more sensitive to disturbance, provision of displacement areas, seasons of operation and scheduling of activities.

Grizzly Habitat: Timber management activities can directly affect the grizzly population through habitat changes incurred as a result of vegetation manipulation such as timber harvesting, site preparation, etc., and in increased human encounters because of increased road access (Aune, 1983). Timber management activities, if well coordinated, can produce positive benefits by producing more desirable forage for grizzlies through certain timber harvest and site preparation practices such as small clearcuts and broadcast burning of slash instead of tractor-piling (Ruediger & Mealey, 1978). If road closures are instituted in a timely manner, human/bear encounters can be kept to a minimum.

Chapter II of this document displays the acres of timber harvest by decade for both grizzly ecosystems represented on the Kootenai. Harvest is also broken out by management situations 1 and 2 (based on the "Inter-Agency Guidelines") which define various forms of grizzly habitat. Alternative JF, the Final Plan, projects more harvest in the first decade in most management situations within the Cabinet-Yaak and Northern Continental Divide Ecosystems compared to the Current Direction (Alt. I), but is still less than most of the other alternatives.

Cavity-dependent species: Even-age timber harvest results in reductions in habitat for cavity-dependent species unless special precautions are taken. Even then, cavity habitat is reduced through cutting, disposal and site preparation. Specific silvicultural prescription direction and special contract language can mitigate the loss of cavity habitat by protecting existing snags and making provision for replacement trees.

Old Growth Timber: Harvest under an even-age system removes all elements of old-growth timber from a given stand, thus eliminating that habitat at that site.

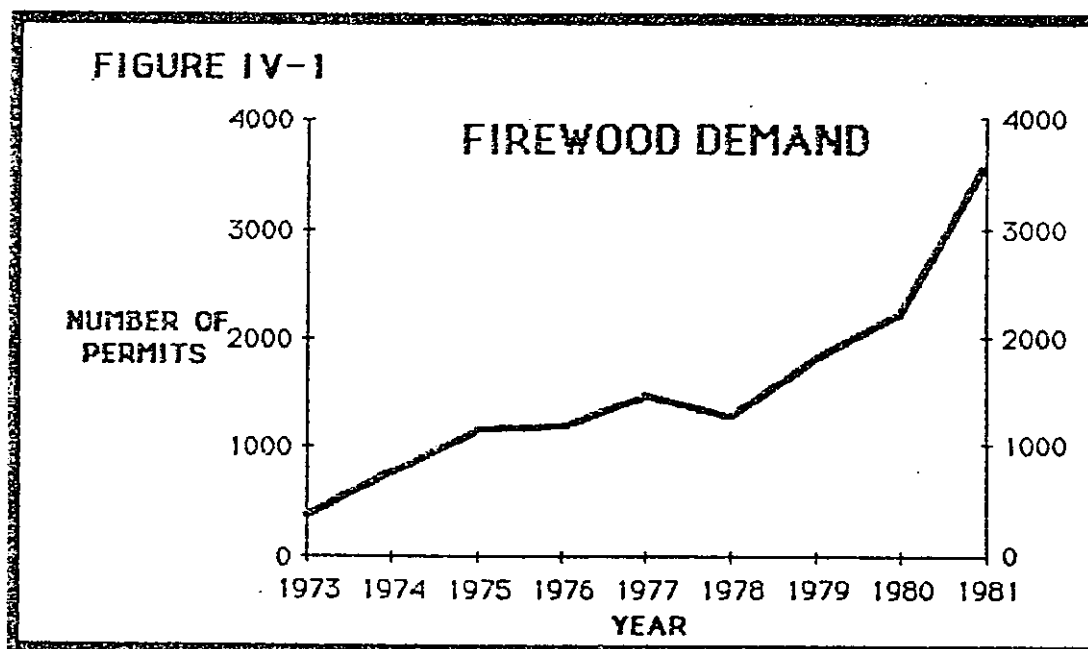
Natural old-growth timber consists of existing stands located in areas where development is not permitted, such as in areas designated for wilderness, primitive recreation, or old-growth retention. These stands will go through natural changes and will not be manipulated, with the possible exception of protection from fire. The Proposed Action included special old-growth management on a 250-year rotation. Several commentators suggested that this Management Area (MA 13) be removed from the regulated timber base. The analysis displayed in Appendix B shows that removal of this Management Area from the regulated timber base had little effect upon other outputs and generally reduced the risk that the public saw in attempting to manage these stands. Management Area 13 has been removed from the regulated timber base in the Final Plan and will be managed without harvest.

In all alternatives, at least 8-10 percent of the suitable timberland must be in old-growth forest at all times to satisfy the needs of wildlife species dependent on old growth habitat (McClelland, 1977). The goal was exceeded in most alternatives because other constraints or allocations were even more limiting (Table IV-8). Lands not selected for timber production (including existing wilderness) have the potential to produce old-growth stands unless catastrophic fire, insects or diseases kill the trees. The Final Plan (Alt. JF) retains 10 percent of Forest land base, below 5,500 feet in elevation, in old-growth habitats. This is over 90 percent of the existing old-growth which fits the biological definition of "old-growth". (Note that elevations above 5,500 feet do not generally provide the necessary habitat components for old-growth dependent wildlife species.)

Table IV-8 in the DEIS showed old-growth acreage as the total acres on the Forest that are projected to have stands of 160 years or older by decade ten. The percentages shown were calculated by dividing these acres by the acres available for scheduled timber harvest. This was not meaningful because the old stands would occur in locations both inside and outside the regulated timber base. The following table shows the percentage of overmature stand acreage of the total forest acreage. This includes areas both inside and outside Management Area 13 and includes acres that may not be considered "old-growth timber" in the biological sense because certain habitat components are missing.

Table IV-8		
OVERMATURE TIMBERLAND IN THE YEAR 2080		
(Thousands of Acres)		
Alternative	Timber Age 160+	Percent of Forest
A	204	9%
B	203	9%
C	204	9%
D	186	8%
E	206	9%
F	344	15%
G	218	10%
H	230	10%
I (CD)	537	24%
J (PA)	255	11%
<hr/>		
JF (Final)	311	14%
<hr/>		
K	255	11%
L	168	7%
M	191	9%
N	196	9%
O	232	10%

Firewood Gathering: Timber harvest activity provides an abundant supply of firewood. Figure IV-1 displays the estimated number of permits issued to people for firewood between 1973 and 1981. Although some of the permits are for other products, such as posts, it is estimated that at least 90% were for firewood. No data is available from 1981 to 1985 as permits were not required. In 1985 a policy was instituted which required payment for a firewood permit. During Fiscal Year 1986, 1,550 permits were issued under this program. A total of \$17,415 in returns to the Treasury were generated. This figure of 1,550 permits is not comparable to the figures displayed in Figure IV-1 because, with the addition of a charge for the permit, actual use patterns may have changed. For example more people may have picked up free permits than eventually used them. No data is available on actual use patterns.



Road restrictions often follow completion of timber sales to protect recreation and wildlife values and to reduce maintenance costs. As roads are restricted, access to certain areas for firewood gathering may become limited. Some of the temporary restrictions occur in the fall at a time when individuals are gathering firewood for the coming winter. The Proposed Action (Alt. J) proposes more miles of road restrictions than any other alternative, because it combines a relatively high timber harvest and road construction program with mitigation to support a relatively strong wildlife program. The reader is referred to the road management section of this chapter for further discussion of this subject.

Insects and disease: Even-age harvest systems provide the best opportunity for control of insects and disease because all diseased or susceptible trees are removed and replaced by a young, vigorous stand. Clearcutting may be the only system which provides this control if all trees are unhealthy. In some cases where shade is necessary for seedling survival, a shelterwood cut is appropriate, provided the remaining overstory is removed before the young trees can be infected.

Minerals: Minerals and oil/gas exploration activities are generally compatible with timber management because of the need for roads to carry out most of the work.

Local economy: Timber harvest significantly affects the local economy because it contributes to the timber-based industry that is a dominant factor in the local economy.

Any alternative that changes the amount of regulated timber to be harvested from the current level (1974-83 average harvest) of approximately 148 million board feet (mmbf) has the potential to change the economy and the lifestyle of the local communities. Harvest schedules were constrained so that timber harvests could drop by no more than 25 percent from one decade to the next in order to minimize any changes in community lifestyles and stability. With the exception of Alternatives K, L and JF, initial (first decade) harvest levels were not constrained upward to meet or exceed current levels, yet no alternative fell below the historic harvest levels.

The level of timber harvest is important not only in providing jobs in the timber industry, but in other areas as well. Table IV-9 shows the significance of a timber harvest program of 100 mmbf on the local economy.

The Final Plan impacts the local economy in the same way as the Proposed Action. A further analysis was completed, in response to public comment, to estimate future changes in timber supplies in all ownerships in the area. This analysis is summarized in Appendix B and in Chapter III. The Final Plan had first decade timber harvest levels constrained upward to the maximum possible under non-declining yield constraints (202 MMBF per year regulated volume) to minimize social disruption associated with expected supply reductions from private lands in the area.

Cost: Clearcutting is the least costly method of harvesting trees because high volumes per acre are removed. Shelterwood cutting is more costly because a second harvest of the remaining overstory is required. Costs vary by species harvested, land slope, yarding distance, and other factors, but the removal of all trees from a site is cheaper per unit volume than removal of only a portion of the overstory. These lesser costs include the fact that even-age management cutting units are easier to lay out and mark than other harvest units, so less manpower and time are required.

TABLE IV-9

IMPACTS OF A 100-MMBF TIMBER PROGRAM ON THE LOCAL ECONOMY*

SECTOR	TOTAL INCOME (MM \$)	EMPLOYMENT (NO. JOBS)
Agriculture	0.52	34.2
Meat Animals/Other Livestock	0.02	0.9
Metal Mining	0.00	0
Other Mining	0.00	0
New Construction	0.00	0
Maintenance and Repair	0.06	2.3
Misc. Manufacturing	0.04	1.7
Food Products	0.01	0.3
Logging/Sawmills	5.22	193.9
Other Wood Products	3.08	205.6
Trans./Comm./Util.	0.56	19.4
Wholesale/Retail Trade	0.54	51.8
Finan./Insur./Real Estate	0.74	8.3
Hotels and Lodging	0.02	2.8
Misc. Services	0.47	44.2
Eating/Drinking Places	0.16	26.5
Govt. Enterprises	0.06	1.6
TOTAL	11.50	593.5

* Local economy is defined as private-sector activity in Lincoln and Sanders Counties. Only the jobs and income associated with the portion of the 100 mmbf program expected to be processed in the two-county area (53%) are included in Table IV-9.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - From a timber production standpoint even-age harvest systems provide the best chance to improve the long-term productivity. To a large extent, insects and diseases are controlled, young and vigorously growing trees replace slow growing, old trees, fire hazards are reduced, and the proper mix of tree species can be introduced. However, with these systems, the visual quality and dispersed recreation opportunities change.

Timber growth rates for the Forest as a whole will remain below the potential levels because of fishery/water quality constraints on roading, which ultimately control the rate of converting overmature stands to regenerated stands. Some soil is lost and peak flows of water are increased. Habitat for wildlife species which prefer closed canopies is reduced but habitat for those species preferring openings is increased.

Irreversible and Irretrievable Commitment of Resources - Most areas previously harvested are irreversibly committed to timber harvest in the future. The wildlife habitat changed by the harvest and the dispersed recreation opportunities lost or drastically changed are irretrievable.

Adverse Effects Which Cannot be Avoided - Visual quality may be lowered by even-age harvest. Some soil will be eroded and water quality may be lowered. Wildlife habitat will decrease for species preferring dense canopies. Fish habitat could be changed by harvest occurring in riparian areas through increased sedimentation, loss of debris recruitment, and decreases in canopy cover. Semi-primitive recreation opportunities will be lost.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - Since most of the timber on the Forest will be harvested by even-age harvest systems, most of the energy required will be directly associated with these systems. The total energy requirements for harvest operations during the first decade are shown in Table IV-10.

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: TABLE IV-10 :
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: ENERGY CONSUMPTION REQUIRED FOR TIMBER HARVEST IN THE FIRST DECADE :
: (Billion B.T.U.'s) :
:
: Alternative :
: CD PA FP :
: SYSTEM A B C D E F G H I J JF K L M N O :
:
: Logging 48 48 48 48 46 35 42 44 34 42 42 48 57 55 52 45 :
: Hauling 50 50 50 51 49 37 47 46 33 45 45 51 57 58 55 48 :
:
: Stand :
: Exam 1 1 1 1 1 .8 1 1 .8 1 1 1 1 1 1 1 :
: :

c. Logging Methods

The choice of a logging method depends largely on topography and soil sensitivity. On slopes under 40 percent, tractor yarding is generally appropriate. On 40 to 60 percent slopes, tractor operation becomes quite dangerous and cable or skyline systems are most often used. Helicopter or other aerial methods are generally prescribed on areas of sensitive soils, on slopes over 60 percent, and on areas where roads cannot be constructed. The combination of logging systems prescribed for various sites is described in the Forest Plan. Each of the systems is discussed below.

1. Tractor Logging

Tractor yarding involves dragging the logs or trees behind a skidding machine from the stump to the landing where the logs are loaded onto trucks to be hauled to the mill. Skidding downhill is usually the most efficient. Tractor yarding distances will vary according to topography and costs. Average skidding distances on the Kootenai are up to 800

feet, with maximum skidding distances up to 1200 feet. Logs or trees may be skidded with the leading ends suspended above the ground or with the entire length of the logs/trees dragging. Table IV-11 displays the acreage and percent of the total suitable timberland base that is expected to be logged using tractors, and provides a comparative view of the total impact of this logging system. The lower the acreage which will be eventually logged using this method, the lower the magnitude of the environmental impacts associated with the system.

TABLE IV-11		
TRACTOR LOGGING BY ALTERNATIVE		
ALTERNATIVE	THOUSAND ACRES	PERCENT OF SUITABLE LAND
A	779	53
B	776	53
C	777	53
D	845	53
E	784	55
F	555	49
G	776	56
H	762	56
I (CD)	811	57
J (PA)	790	57
JF (FP)	715	57
K	790	57
L	894	50
M	772	52
N	770	52
O	778	56

The impacts associated with a logging system also vary by the schedule of application of that system. If all the acreage noted in the above table were harvested in one decade, the impacts would be much greater than if that harvest were spread out over several decades. Table IV-12 displays the acreage expected to be harvested with tractors in each of the first five decades for each alternative. It also displays the percentage of the five decade total that is logged in each decade. An alternative with 20 percent in each decade has an even level of harvest over time and lower impacts than an alternative which has extreme levels of harvest in some decade. Also shown for each alternative is the standard deviation from the mean of the five decades of percentages. A small standard deviation indicates a more even level of activity over time whereas a large standard deviation indicates variations in activity which would cause more extreme impacts in peak decades and lesser impacts in other decades. The percentages are used for the basis of this standard deviation in order to remove differences caused by the relative scale of the programs which is represented in Table IV-11 above.

TABLE IV-12

TRACTOR LOGGING OVER TIME
(Average Annual Acres)

ALT. UNITS	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	STD DEV
A Acres	22,800	12,000	9,100	14,000	12,100	
Percent:	33	17	13	20	17	7.68
B Acres	22,600	12,400	8,800	14,300	12,400	
Percent:	32	18	12	20	18	7.35
C Acres	22,700	12,100	8,500	14,200	12,000	
Percent:	33	18	12	20	17	7.84
D Acres	20,500	13,100	18,400	13,800	13,800	
Percent:	26	17	23	17	17	4.24
E Acres	22,400	11,700	9,300	14,100	11,900	
Percent:	32	17	14	20	17	7.04
F Acres	10,700	7,000	3,200	8,100	5,600	
Percent:	31	20	9	24	16	8.28
G Acres	22,000	11,200	9,300	13,400	12,300	
Percent:	32	16	14	20	18	7.07
H Acres	21,400	11,400	9,000	12,700	10,800	
Percent:	33	18	14	19	16	7.52
I Acres	11,900	9,100	10,100	8,100	7,800	
(CD) Percent:	25	19	22	17	17	3.46
J Acres	19,700	12,100	13,700	11,200	13,200	
(PA) Percent:	28	17	20	16	19	4.74
JF Acres	12,300	7,300	8,900	10,400	8,200	
(FP) Percent:	26	15	19	22	17	4.32
K Acres	21,600	12,900	11,800	10,800	13,000	
Percent:	31	18	17	16	18	6.20
L Acres	22,900	14,800	11,600	14,900	9,600	
Percent:	31	20	16	20	13	6.82
M Acres	25,100	9,600	9,000	16,100	15,800	
Percent:	33	13	12	21	21	8.43
N Acres	24,700	10,700	9,000	14,200	12,300	
Percent:	35	15	13	20	17	8.77
O Acres	24,700	21,500	18,700	21,500	15,900	
Percent:	24	21	18	21	16	3.08

Alternative F has a smaller timber program and, consequently, less tractor logging than the other alternatives. Even though the schedule of tractor logging for Alternative F is not well-distributed over time, the program is small enough that it does not exceed any other alternative in any one decade. Alternative L has the greatest amount of land subject to tractor logging and the logging is not well-distributed over time. Alternative L generates the largest impacts due to tractor logging of any alternative.

The Final Plan has fewer impacts caused by tractor logging than does the Proposed Action. Because commercial thinning does not occur, more volume per acre is harvested and fewer acres need to be logged to produce a given volume of timber. The reduced acres of tractor logging are also more evenly distributed over time (as indicated by the standard deviation). This reduces impacts still farther.

Most of the soil disturbance associated with logging is due to removal of the timber from the site. Logging with tractors causes soil disturbance on about 21 percent of the area (Megahan, 1980). If the soils are light-colored, the redistribution of surface layers can be seen from long distances, reducing the visual quality.

Tractor yarding has the potential to cause soil compaction, soil disturbance and loss of soil productivity (Froelich et al., 1980; Rice et al., 1972). Soil compaction is a problem on the Kootenai because of the loose, very friable soils present as a surface layer over much of the area, the glacial tills with very uniform particle sizes (mostly silts and very fine sands) and the wet soils. Compaction increases bulk density that reduces or eliminates soil macropore porosity which: (1) reduces soil aeration necessary for plant roots to exchange gasses, (2) reduces soil infiltration rates, (3) reduces permeability of the soil, (4) alters or destroys soil structure, (5) modifies water supply to roots, and (6) increases mechanical impedance of soils to root development. These factors affect plants by causing roots to be short, stubby, deformed and shallow, increasing susceptibility to disease and blow-down potential and reducing seedling establishment. Compaction can be minimized by limiting tractor use to the dry season, requiring a cushion of snow, or operating equipment on frozen soils. Skid trails can be located away from problem areas but, even with restrictions, some soil disturbance inevitably occurs when tractors are maneuvered in a logging unit.

Exposure of mineral soil is necessary for seedling establishment and tractor logging does expose mineral soil on a significant portion of the area. However, most topsoils are thin, and if topsoil is removed by the tractor operation, the productivity of the site is decreased (Froelich, 1979a and 1979b). Displacement or mixing of the topsoil can also change the fertility of bared areas.

The organic layers are very important because of the high amount of nutrients they can store and the influence they have on modifying overland flow (Harvey et al., 1980 and 1981). The potential for overland flow is very high during rain-on-snow events and warm spring

days. When the organic layers are removed, site productivity is reduced and rills and gullies can form from overland flow.

Skid trails developed during tractor logging can intercept slope water, concentrating flows which potentially become very erosive. Proper and timely erosion control measures must be applied. On especially sensitive soils, the number of skid trails can be limited or another logging system can be required.

Adverse effects on streams and fish populations result from soil disturbance and erosion (Platts, 1980). An increased sediment load in streams causes the gravel beds to become plugged, causing fish eggs to smother from lack of circulating water. Insect populations, important food sources, are also reduced in numbers and diversity. Tractors operating in streams can have a severe impact on the stream channel and cause excessive sedimentation for miles downstream as well as substrate compaction and disturbance. For this reason it is standard practice to prohibit tractors from operating parallel to or in streams. Any crossings or other in-stream work are carefully planned; consideration is given to the use of temporary culverts and logs, and to the rescheduling of activities (winter crossings, for example).

Tractor logging requires road development. Roads increase access to big-game summer range and in doing so reduce security for elk and other big-game species. On the other hand, tractor logging can be a benefit to big game because of the diversity possible in shaping cutting units (e.g., feathered edges). Forage growth can be stimulated by the ground scarification caused by tractors.

Tractor logging is the least expensive method available for getting logs to the loading area. This can mean a greater return to the U. S. Treasury if this system can be used in lieu of the more expensive systems.

Noise of logging operations can degrade the recreation experience in an area over the short-term. In alternatives with low timber harvest levels, the disturbance will be minimal because only a few timber sales will be active at any one time and these are likely to be scattered throughout the suitable timberland. In alternatives with high timber harvest levels, there will be numerous sales and the recreation value of large segments of the Forest will be disturbed.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Some tractor logging may occur on soils that are wetter than desirable. In these cases, soil compaction will occur and affect future productivity. Impacts on the area can be minimized by using dedicated skid trails and/or logging on snow. In all cases, some soil will be displaced which may affect the long-term productivity and this soil movement can lower the water quality and fish habitat of the streams. These water quality effects, however, are generally of short duration.

Irreversible and Irretrievable Commitment of Resources - Tractor logging the current stand of trees does not irreversibly commit the area to tractor logging in the next generation. However, if the road system is

designed to accommodate tractor logging, there is a strong possibility that tractors will be used in the future. The soil lost or unduly disturbed by the tractors constitute an irretrievable loss to the site.

Adverse Effects Which Cannot be Avoided - Tractor logging can leave skid trails which may be unsightly to Forest visitors. These trails will eventually revegetate or be screened from view. During the logging operation, considerable noise and dust are generated by the tractors and soils are disturbed. Soil disturbance is followed by a loss in water quality and some loss in fish productivity. Some fish habitat may be disturbed or destroyed.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - The energy used is expended by the tractor used in this logging method.

2. Cable Logging

Cable logging involves dragging the logs along the ground and is rarely used in areas located more than 800 feet from the initial landing site. Because the logs are dragged along the ground, cable logging has effects similar to tractor logging but the effect is not as severe because the weight and track of the tractor are absent. However, skid trails can be obvious and about 15 percent of the soils are disturbed (Dyrness, 1967). Because of soil sensitivity, cable logging is used about 15 percent of the time on slopes under 40 percent and is used about 70 percent of the time on the less sensitive soils on slopes between 40 and 60 percent. Table IV-13 displays the acreage and percent of the total suitable timberland base that is expected to be cable logged and provides a comparative view of the total impact of this logging system. The lower the acreage which will be eventually logged using this method, the lower the magnitude of the environmental impacts associated with the system.

TABLE IV-13

CABLE LOGGING BY ALTERNATIVE

<u>ALTERNATIVE</u>	<u>THOUSAND ACRES</u>	<u>PERCENT OF SUITABLE LANDS</u>
A	500	34
B	498	34
C	498	34
D	542	34
E	470	33
F	419	37
G	444	32
H	436	32
I (CD)	455	32
J (PA)	430	31
<hr/>		
JF (FP)	419	32
<hr/>		
K	430	31
L	644	36
M	519	35
N	518	35
O	458	33

The percentage of suitable base remains essentially the same from the Proposed Action to the Final Plan. The acreage declines by six percent because the suitable base is smaller in the Final Plan due to the enlargement of MA 13 and its removal from the suitable timber base.

The impacts associated with a logging system also vary by the schedule of application of that system. If all the acreage noted in the above table were harvested in one decade, the impacts would be much greater than if that harvest were spread out over several decades. Table IV-14 displays the acreage expected to be cable logged in each of the first five decades for each alternative. It also displays the percentage of the five decade total that is logged in each decade. An alternative with 20 percent in each decade has an even level of harvest over time and lower impacts than an alternative which has extreme levels of harvest in some decades. Also shown for each alternative is the standard deviation from the mean of the five decades of percentages. A small standard deviation indicates a more even level of activity over time whereas a large standard deviation indicates variations in activity which would cause more extreme impacts in peak decades and lesser impacts in other decades. The percentages are used for the basis of this standard deviation in order to remove differences caused by the relative scale of the programs which is represented in Table IV-13 above.

TABLE IV-14

CABLE LOGGING OVER TIME
(Average Annual Acres)

ALT. UNITS	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	STD DEV
A Acres	6,600	7,300	10,100	5,400	6,500	
Percent	19	20	28	15	18	4.85
B Acres	3,500	7,200	10,200	5,200	6,700	
Percent	11	22	31	16	20	7.45
C Acres	6,700	7,400	10,300	5,200	6,700	
Percent	19	20	28	14	19	5.05
D Acres	5,300	11,200	14,800	6,000	8,200	
Percent	12	25	32	13	18	8.46
E Acres	6,000	7,700	9,500	4,800	6,400	
Percent	17	22	28	14	19	5.34
F Acres	2,400	2,800	6,100	4,200	5,200	
Percent	12	13	30	20	25	7.71
G Acres	5,700	7,700	8,900	4,700	6,300	
Percent	17	23	27	14	19	5.10
H Acres	5,300	7,900	8,400	4,400	6,200	
Percent	17	24	26	14	19	4.95
I Acres	4,000	5,300	7,900	2,300	8,000	
(CD) Percent	15	19	29	8	29	9.11
J Acres	5,000	7,000	8,600	4,800	7,300	
(PA) Percent	15	22	26	15	22	4.85
JF Acres	2,800	7,700	6,300	3,300	3,500	
(FP) Percent	12	33	27	14	14	9.41
K Acres	5,400	7,800	8,400	4,700	7,100	
Percent	16	24	25	14	21	4.85
L Acres	9,900	8,100	13,800	6,700	8,700	
Percent	21	17	29	14	19	5.66
M Acres	6,100	7,900	11,300	5,200	9,800	
Percent	15	20	28	13	24	6.20
N Acres	7,400	6,700	11,700	6,100	5,800	
Percent	20	18	31	16	15	6.44
O Acres	7,000	10,900	10,700	9,400	11,400	
Percent	14	22	22	19	23	3.67

Alternative F has a smaller timber program and, consequently, less total cable logging than the other alternatives. Even though the schedule of cable logging for Alternative F is not well-distributed over time, the program is small enough that it does not exceed any other alternative in any decade except Alternative I in the fourth decade. Alternative L has greatest amount of land subject to cable logging and the logging is not well-distributed over time. Alternative L generates the largest impacts due to cable logging of any alternative even though some alternatives are expected to have more cable logging in certain decades.

The Final Plan has fewer impacts caused by cable logging than does the Proposed Action with the exception of decade 2 which has slightly larger impacts.

Because the heavy tractor is not used, cable logging does not cause severe soil compaction. Because the logs are dragged uphill, soil erosion and overland flow are dissipated instead of concentrated as happens when tractor logging is done.

Cable logging can lead to a reduction of cavity-dependent species habitat because of the need to remove existing snags in the pathway of the logs. Due to the physical operation of the system, cable logging does not permit much opportunity to modify shapes of cutting units.

Except for intensity, the effects of cable logging are the same as those for tractor logging. The major difference between the methods, other than cable being less severe on the specific site, is that cable logging generally requires more miles of road than tractor logging per acre harvested.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Cable logging affects long-term productivity less than tractor logging because the effect of compaction is not as severe. There is less soil disturbance and less loss of soil. As with tractor logging, cable logging in itself does nothing to enhance soil productivity.

Irreversible and Irretrievable Commitment of Resources - The fact that an area is cable logged does not commit the area to be logged in the future. However, because the road system is in place and considerable money will be spent in generating a new stand of trees, it is likely that the area will be logged and that a cable system will again be used. The soil lost by the use of the system is irretrievable.

Adverse Effects Which Cannot be Avoided - Considerable noise and dust are created by cable logging although it may be less than with tractor logging. Soils will be disturbed and some may erode into streams causing a loss of water quality and fish habitat. The visual quality will be lowered until vegetation grows and hides the view of skid trails.

Conflicts With Objectives of Other Land Management Plans, Policies and Controls - None identified.

Energy Requirements - The energy used is expended by the machinery used in this logging method.

3. Skyline Logging

Approximately 10 percent of suitable land will be skyline logged. Skyline logging lifts at least one end of the log clear of the ground and is typically used at a distance of up to 1200 feet. The system is used on about 20 percent of the slopes between 40 and 60 percent and on about 25 percent of the logged area on slopes exceeding 60 percent. Its use on slopes of less than 60 percent is generally restricted to soils that are very sensitive to disturbance. Use of this system is functionally limited by topography which must have certain characteristics for the machine and cables to operate effectively. Since these systems (both running skylines and live skylines) tend to be cheaper (Olsen, 1980) and less environmentally damaging than cable logging, efforts are being made to identify more areas where this system can be used instead of the cable system. Table IV-15 displays the acreage and percent of the total suitable timberland base that is expected to be skyline logged and provides a comparative view of the total impact of this logging system. The lower the acreage which will be eventually logged using this method, the lower the magnitude of the environmental impacts associated with the system.

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: TABLE IV-15 :
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: SKYLINE LOGGING BY ALTERNATIVE :
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: <u>ALTERNATIVE</u> :	: <u>THOUSAND</u> <u>ACRES</u> :	: <u>PERCENT OF</u> <u>SUITABLE LANDS</u> :
: A :	: 162 :	: 11 :
: B :	: 146 :	: 10 :
: C :	: 161 :	: 11 :
: D :	: 175 :	: 11 :
: E :	: 142 :	: 10 :
: F :	: 136 :	: 12 :
: G :	: 139 :	: 10 :
: H :	: 136 :	: 10 :
: I (CD) :	: 142 :	: 10 :
: J (PA) :	: 139 :	: 10 :

: JF (FP) :	: 124 :	: 10 :

: K :	: 139 :	: 10 :
: L :	: 197 :	: 11 :
: M :	: 163 :	: 11 :
: N :	: 163 :	: 11 :
: O :	: 139 :	: 10 :

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The impacts associated with a logging system also vary by the schedule of application of that system. If all the acreage noted in the above table were harvested in one decade, the impacts would be much greater than if that harvest were spread out over several decades. Table IV-16 displays the acreage expected to be skyline logged in each of the first five decades for each alternative. It also displays the percentage of the five decade total that is logged in each decade. An alternative with 20 percent in each decade has an even level of harvest over time and lower impacts than an alternative which has extreme levels of harvest in some decades.

Also shown for each alternative is the standard deviation from the mean of the five decades of percentages. A small standard deviation indicates a more even level of activity over time whereas a large standard deviation indicates variations in activity which would cause more extreme impacts in peak decades and lesser impacts in other decades. The percentages are used for the basis of this standard deviation in order to remove differences caused by the relative scale of the programs which is represented in Table IV-15 above.

TABLE IV-16

SKYLINE LOGGING OVER TIME
(Average Annual Acres)

ALT. UNITS	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	STD DEV
A Acres	2,100	2,200	3,000	1,700	2,000	
Percent	19	20	27	16	18	4.18
B Acres	2,100	2,200	3,000	1,600	2,000	
Percent	19	20	28	15	18	4.85
C Acres	2,100	2,200	3,100	1,600	2,000	
Percent	19	20	28	15	18	4.85
D Acres	1,700	3,400	4,600	1,900	2,600	
Percent	12	24	33	13	18	8.69
E Acres	1,900	2,300	2,900	1,500	1,900	
Percent	18	22	28	14	18	5.29
F Acres	800	900	1,800	1,300	1,600	
Percent	13	14	28	20	25	6.60
G Acres	1,800	2,300	2,700	1,500	1,900	
Percent	18	22	26	15	19	4.13
H Acres	1,700	2,400	2,600	1,400	1,900	
Percent	17	24	26	14	19	4.95
I Acres	1,200	1,600	2,400	700	2,400	
(CD) Percent	15	19	29	8	29	9.11
J Acres	1,600	2,100	2,600	1,500	2,200	
(PA) Percent	16	21	26	15	22	4.53
JF Acres	900	2,300	2,000	1,000	1,100	
(FP) Percent	12	32	27	14	14	8.92
K Acres	1,700	2,300	2,600	1,400	2,200	
Percent	17	22	25	14	22	4.42
L Acres	3,100	2,500	4,200	2,100	2,700	
Percent	21	17	29	14	19	5.66
M Acres	2,000	2,400	3,500	1,600	3,000	
Percent	16	19	28	13	24	6.04
N Acres	2,300	2,000	3,600	1,900	1,800	
Percent	20	17	31	16	16	6.36
O Acres	2,200	3,300	3,200	2,000	3,500	
Percent	16	23	22	14	25	4.74

Alternative F has a smaller timber program and, consequently, less total skyline logging than the other alternatives. Alternative H maximizes wilderness recommendations thus removing some of the steeper ground from the suitable timber base. This steep ground would have been skyline logged so its removal lowers the total skyline acreage to the level of alternative F. The schedule for skyline logging for alternative H is more evenly distributed over the first five decades than for Alternative F so the impact of this logging system will be least for Alternative H. Alternative L has the greatest amount of land subject to skyline logging and the logging is not well-distributed over time. Alternative L generates the largest impacts due to skyline logging of any alternative even though some alternatives are expected to have more skyline logging in certain decades.

The Final Plan has fewer impacts caused by skyline logging than does the Proposed Action with the exception of decade 2 which has slightly larger impacts. Because commercial thinning does not occur, more volume per acre is removed in the Final Plan and fewer acres need to be harvested to produce a given volume of timber. The reduced acres of skyline logging are not as evenly distributed over time (as indicated by the standard deviation) as in the Proposed Action. This less even distribution is related to the larger impacts of skyline logging in decade 2.

Skyline logging has minimal effect on the visual resource because logs are yarded with one end lifted off the ground. Therefore, the major disturbance to the soil is at the upper and lower ends of the skyline cable system. Edges of skyline units can be blended into the uncut forest with greater ease than with either tractor or cable systems. Fewer roads are necessary because yarding distances can be greater than for tractor or cable systems. Since roads have the longest and most permanent effect on the visual resource, the logging system which requires the least miles of road is the most desirable from a visual resource standpoint.

Skyline systems have a low potential for damage to soils except in cable corridors where some dragging of logs is typical. This dragging of logs has effects similar to those of cable logging, but is less severe or intensive. This means that the system has a lower potential for adverse effects on water quality or fish habitat. Skyline systems which cross streams must have the logs suspended to avoid, to the extent possible, disturbance to the stream.

The topography associated with skyline systems creates problems for the disposal of slash. Hand piling is effective, but expensive. Because of the lack of other machinery, firelines are difficult to build and broadcast burning is difficult to control on the usually steep slopes without a good fireline. Since soil disturbance is minimal in skyline yarded sites, fire is often necessary to bare the soil for planting. The slash must be burned in such a way so that a balance can be maintained between exposing mineral soil and loss of control.

Skyline logging is similar to cable logging in requiring the removal of all snags from the pathway of the logs, resulting in a reduction of

habitat for cavity-dependent species. Still, skyline logging requires the least miles of road on steep ground, and thus offers greater security to wildlife because of limited access to big-game ranges. The system itself has little effect on forage or cover. Soil disturbance occurs on only about five percent of the area which means that forage species receive little stimulation from scarification (Dryness, 1967). The silvicultural system and post-logging slash disposal has more effect on forage and cover than skyline logging.

A well-stocked understory of trees can usually be saved as the next generation by applying a skyline system. In other cases, since little soil is disturbed, regeneration of tree seedlings is a problem unless fire can be used to bare soil. If this occurs, productivity of the site will be reduced by the amount of time it takes for regeneration to be established.

Skyline logging is more expensive than tractor yarding, but less expensive than cable logging (Olsen, 1980). Any logging operation disrupts recreation traffic on the roads within the active timber sale area. Interruptions of traffic may be longer for skyline operations than cable or tractor logging. Equipment is difficult to move and can block the roads for several hours at a time.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Since skyline logging causes less severe environmental consequences than tractor or cable logging systems, soil productivity is less affected. Although there is some soil disturbance with skyline logging, less is eroded and water quality is seldom severely lowered. Because of the lack of heavy equipment in the area, the low-growing vegetation is not destroyed. Due to the difficulty in disposing of slash, there can be some effect on regeneration, reflected by lower volume production in the next generation.

Irreversible and Irretrievable Commitment of Resources - Just because the current stand of trees is logged by the skyline system does not mean the next generation will be logged in the same way. However, the roads are designed to preclude use of conventional systems. Hence, if harvest is assumed for the future generations, some sort of skyline logging, or an equivalent system, will likely be used. The irretrievable commitments of resources are the potential lower volume production if regeneration is delayed or reduced because of less site scarification.

Adverse Effects Which Cannot be Avoided - Despite the fact that skyline systems produce fewer environmental consequences than the more conventional systems, some soil will be lost or displaced, and some water quality degradation may occur. Slash control will be more difficult because of the problems with construction of firelines and piling slash. Since most skyline operations are on steep slopes, any visual degradation is readily seen and, in some instances, may be seen for long distances. Recreation opportunities will be degraded while the harvest is occurring because of noise, dust and equipment in the roads.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - The energy used is expended by the machinery used in this logging system.

4. Aerial Logging

Approximately 2 percent of suitable lands will be logged by aerial methods. On the Kootenai Forest, the only aerial system proven practical is the helicopter. As with skyline logging, helicopter-logged cutting units blend easily into the uncut forest. Few roads are needed because external yarding distances are much greater than for conventional systems (up to 5000 feet), including skyline logging. Helicopter logging leaves the soil surface virtually undisturbed, affecting overall less than one percent of the entire logging area (Dryness, 1972). Landings, however, are disturbed and require rehabilitation on the one, to two-acre sites following completion of the project (Megahan, 1980). Table IV-17 displays the acreage and percent of the total suitable timber base that is expected to be aerial logged and provides a comparative view of the total impact of this logging system. The lower the acreage which will be eventually logged using this method, the lower the magnitude of the environmental impacts associated with the system.

TABLE IV-17		
AERIAL LOGGING BY ALTERNATIVE		
ALTERNATIVE	THOUSAND ACRES	PERCENT OF SUITABLE LANDS
A	29	2
B	29	2
C	29	2
D	32	2
E	28	2
F	23	2
G	28	2
H	27	2
I (CD)	23	2
J (PA)	23	2
<hr/>		
JF (FP)	21	2
<hr/>		
K	28	2
L	36	2
M	30	2
N	30	2
O	28	2

The percentage of the suitable base remains unchanged from the Proposed Action to the Final Plan. The acreage declines by 25% because of the generally smaller regulated timber base caused by the enlargement of Management Area 13 and its removal from the regulated timber base.

The impacts associated with a logging system also vary by the schedule of application of that system. If all the acreage noted in the above table were harvested in one decade, the impacts would be much greater than if that harvest were spread out over several decades. Table IV-18 displays the acreage projected to be aerial logged in each of the first five decades for each alternative. It also displays the percentage of the five decade total that is expected to be logged in each decade. An alternative with 20 percent in each decade has an even level of harvest over time and lower impacts than an alternative which has extreme levels of harvest in some decades. Also shown for each alternative is the standard deviation from the mean of the five decades of percentages. A small standard deviation indicates a more even level of activity over time whereas a large standard deviation indicates variations in activity which would cause more extreme impacts in peak decades and lesser impacts in other decades. The percentages are used for the basis of this standard deviation in order to remove differences caused by the relative scale of the programs which is represented in Table IV-17 above.

TABLE IV-18

AERIAL LOGGING OVER TIME
(Average Annual Acres)

ALT. UNITS	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	STD DEV
A Acres	170	370	640	200	310	
Percent	10	22	38	12	18	11.14
B Acres	180	360	660	180	320	
Percent	11	21	39	11	18	11.49
C Acres	170	370	690	180	320	
Percent	10	21	40	10	19	12.27
D Acres	100	700	970	300	490	
Percent	4	27	38	12	19	13.17
E Acres	130	400	600	160	300	
Percent	8	25	38	10	19	12.19
F Acres	27	110	430	240	360	
Percent	2	9	37	21	31	14.63
G Acres	110	400	560	160	290	
Percent	7	26	37	11	19	12.00
H Acres	90	420	540	150	300	
Percent	6	28	36	10	20	12.41
I Acres	120	280	490	70	550	
(CD) Percent	8	19	32	5	36	13.87
J Acres	100	340	450	190	380	
(PA) Percent	7	23	31	13	26	9.80
JF Acres	40	490	405	100	140	
(FP) Percent	3	42	34	9	12	16.99
K Acres	100	390	500	200	360	
Percent	7	25	32	13	23	9.95
L Acres	420	450	990	320	580	
Percent	15	16	36	12	21	9.51
M Acres	100	440	840	160	540	
Percent	5	21	40	8	26	14.20
N Acres	200	340	890	250	260	
Percent	10	18	46	13	13	14.82
O Acres	170	500	540	180	650	
Percent	8	25	26	9	32	10.84

Alternative F has a smaller timber program and, consequently, less acreage available for aerial logging than the other alternatives. The aerial logging schedule for Alternative F is not very evenly distributed over time so several other alternatives have larger acreages of aerial logging in decades four and five. Since Alternative F logs fewer acres than any other alternative in three of five decades, it generates the least overall impact due to aerial logging.

Alternative L has the greatest amount of land subject to aerial logging and the logging is not very evenly distributed over time. Alternative L generates the largest impacts due to aerial logging of any alternative even though Alternatives D and O are expected to have more aerial logging in certain decades.

The Final Plan has fewer impacts associated with aerial logging than does the Proposed Action except in the second decade when slightly larger impacts are expected to occur. Because commercial thinning does not occur, more volume per acre is removed and fewer acres are logged to produce a given volume of timber in the Final Plan. The reduced acres of aerial logging in the Final Plan are not as evenly distributed over time (as indicated by the standard deviation) as the Proposed Action. This less even distribution is related to the larger impacts of aerial logging in decade 2.

Helicopter logging is the most expensive of all the available systems and can be twice as expensive as cable logging (Olsen, 1980). Helicopters can not operate safely when less than 40% of the crown cover is removed, thus light thinnings are not practical with this system.

Slash disposal on helicopter logged areas is hard to accomplish. No heavy equipment is available to pile the slash or to construct firelines. Hand piling can be applied but this is quite expensive. As with skyline logging, the lack of or expense of slash control and lack of mineral soil exposure can have significant effect on regeneration (Smith, 1982) and increase the probability of unwanted fire.

Helicopter logging can be viewed as the best system for wildlife because few roads are required, providing maximum security for big-game species. At the same time, this kind of logging requires that all snags be felled within the cutting units for safety purposes, thus removing important cavity habitat.

There is considerable noise generated by the helicopters. This can have an undesirable effect on recreationists in the area and may affect the distribution of wildlife in the area.

The greatest effect of helicopter logging is the volume of traffic produced on the road away from the landing. Logs are moved very rapidly from the woods to the landing and trucks are usually loaded immediately. Twenty or more truck loads may be hauled from one landing in a day.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Helicopter logging has little effect on long-term soil productivity due to the fact that little soil is displaced. Problems with slash control and regeneration may lengthen the next rotation, but the soil productivity of the site will be maintained. Since helicopter logging takes place on steep slopes, openings can be seen from long distances but recovery is rapid since there are no roads.

Irreversible and Irretrievable Commitment of Resources - Since few roads are built into the area, there is little irreversible commitment of the site to harvest in the future. However, since considerable time and effort are likely to be spent producing another generation of trees, the site has a high probability of being logged in the future. Because most helicopter logging operations take place where roads would cause significant, undesirable effects, helicopters or other aerial systems are the sole means of harvest. If aerial systems were not used, the timber grown on these sites would be irretrievably lost to the market.

Adverse Effects Which Cannot be Avoided - Because of the steep slopes, the logging operation is hard to screen and openings are usually visible for long distances. A high level of noise is generated during helicopter logging operations. Slash control is difficult or expensive. Regeneration may be delayed because of lack of slash control and mineral soil exposure.

Conflicts With Objectives of Other Land Management Plans, Policies and Controls - None identified.

Energy Requirements - Helicopter logging uses considerable energy per unit.

d. Slash Control Including Prescribed Burning

Unusable limbs, tops, and cull logs usually must be removed from a timber harvest unit before regeneration can take place. The most common method of disposal is to burn the slash on site, but in some cases large amounts are hauled away to be used as firewood. The objective of slash control and fuel management is to maintain fuel loading within acceptable limits for prevention and control of wildfire. Burning also helps prepare sites for regeneration and eliminates barriers to animal movement (Smith, 1962).

Slash may be tractor-piled and burned on gentle slopes, and handpiled and burned or broadcast-burned, regardless of slope. In some situations where slash is not evenly distributed and a mature overstory has been left, underburning of concentrations of slash is the only effective method of slash disposal. Slash disposal activity varies directly with timber harvest level. Alternatives which generate the highest timber harvest also generate the highest level of slash control.

Slash disposal can cause short-term degradation of foreground viewing. In broadcast burning units, all residual vegetation is usually burned and the unit looks scorched and black. Visual degradation usually lasts only until the first growing season because forbs, grasses, and shrubs resprout

or seed and grow rapidly after fire. Burned dozer piles leave scars that are readily visible on site and, in some cases, from several miles away. Burned handpiles are virtually invisible to the casual observer after a short period of time. Hot underburns can cause scorch marks on trunks of remaining overstory and can kill lower branches, and even entire trees occasionally. These visual effects will last until red needles fall and the scorched bark is replaced.

Air quality can be degraded by prescribed fire. Prescribed burning will be concentrated in times when fuels are dry enough to burn and weather conditions are favorable for controlling the fire. Suitable conditions occur for only a short time in the spring and fall. Fire weather conditions must be carefully monitored and burning allowed only when smoke will be rapidly dispersed. The higher the timber harvest level, the greater the air quality conflict because more slash will have to be burned in the short time available.

Slash is either piled for burning or a fireline is built around the unit for broadcast burning. On gentle slopes, tractors are used to pile slash in windrows. This activity has a high potential for degrading the soil resource (Glassy and Svalberg, 1981). If care is not taken, topsoil, litter, and duff can be pushed into the piles. Excessive mineral soil is then exposed to erosion between the windrows. The windrows will not burn as well because the soil smothers the fire. If windrows and the soil beneath them are too dry when burned, the topsoil may be baked, become sterile and impervious to wetting (Glassy & Svalberg, 1981). The soil structure may be severely altered. Little or no vegetation will grow to protect the soil from erosion during the several years necessary for recovery.

Unlike dozer piling, handpiling and burning will have no noticeable effect on the soil. Small areas under the piles may be scorched, but handpiles are usually small and burn cool enough to cause little damage. Bennett (1982) describes methods of controlling burn intensities to reduce risk of soil degradation and erosion. Soil losses caused by burning will be no greater than natural rates if fires are properly managed (Glassy and Svalberg, 1982).

Firelines around broadcast burn units may be a source of sediment if proper erosion control measures are not taken. Mineral soil must be exposed so fire will not creep over the line. The soil surface is then exposed to overland flow and subsequent erosion is likely. Ditches to divert water from the fireline into adjacent undisturbed areas are required in these circumstances and will solve the problem.

Water quantity is affected more by removal of trees than by slash disposal. The only measurable effect on water yield would occur where large areas of mineral soil were exposed and overland flow was increased by a decrease in infiltration rate. Water quality can be affected through the erosional processes associated with overland flow. Overland flow could increase sediment delivery to the streams if a sufficient strip of undisturbed vegetation is not present between the burned unit and the stream.

Slash disposal has an effect on fisheries and streams if water quality or quantity is affected. The removal of large woody material from streams or streambanks will affect the formation of pools by removing existing or potential debris necessary for pool creation. Overland flow from burned units may carry high amounts of sediment which will negatively alter fish spawning.

Slash disposal has an effect on big-game cover when small conifers that remain after logging must be burned in order to dispose of the slash. Forage may be temporarily reduced by slash disposal activities. However, the reduced competition from trees and the increase in nutrients rapidly released by fire result in a flush of shrub, grass, and forb growth in the subsequent growing season.

A totally clean forest floor is lacking cover for a wide variety of small animals, many of which depend on insects for food. The disposal of all dead, down, and decaying-logs removes a whole segment of the forest ecosystem. Some harmful insects and animals are eliminated, but beneficial ones also die or move. The objective of slash disposal should include provisions for leaving sufficient woody material to support the full complement of organisms present in the forest ecosystem.

Bark beetles, with the exception of the mountain pine beetle, and fungi can build up in slash and spread to living trees. Elimination of slash destroys the habitat for these insects and diseases and controls their spread. Dozer-piling in a partial cut can result in mechanical damage to residual trees and make them subject to insect or disease attack.

Costs of slash disposal vary by fuel treatment method, size of unit, and slope. Handpiling is more expensive than machine piling, small units cost more per acre than larger units, and units on steep slopes are more expensive to treat than those on gentle slopes. Fuel treatment cost per acre is independent of Forest Plan alternative, but the higher the timber output, the higher the total slash disposal costs. Slash disposal is a necessary cost to the production of timber and, as such, has an effect on the calculation of PNV. How much slash disposal is required depends on the acres of timber harvested each year. Some slash control will be required on practically every acre. Average number of acres requiring fuel treatment are shown in Table IV-19.

TABLE IV-19

AVERAGE ANNUAL FUEL TREATMENT
(Thousands of Acres)

Alternative																		
DEC-											CD	PA	FP					
ADE	A	B	C	D	E	F	G	H	I	J	JF	K	L	M	N	O		
1	14.7	14.6	14.7	14.8	14.3	11.5	14.1	13.8	10.8	13.5	13.5	14.9	14.7	16.6	15.8	14.2		
3	15.9	15.8	16.0	17.8	15.4	12.9	15.0	14.6	11.2	14.6	14.8	14.2	16.7	17.2	17.7	16.6		
5	20.4	20.2	20.1	20.8	19.7	13.3	19.0	18.2	11.4	17.4	15.2	17.1	20.9	25.6	20.0	19.6		

The primary reason for the variation in acres between alternatives is the amount of timber harvest, i.e., more timber harvest creates more slash which requires more fuel treatment. Slash disposal through prescribed fire affects recreation by creating smoke which may degrade air quality enough to cause local short-term problems. Units harvested but unburned may be nearly impassable to big game if slash loads are high. The problem is greater in high timber output alternatives and when poor weather for burning causes a time lag between harvest and slash disposal.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity -

Slash control, if properly done, maintains or increases long-term productivity. Productivity is adversely affected if slash is not treated or if slash is treated in a poor manner. There is always a chance during machine-piling and windrowing for excess soil to be displaced and erosion to occur. Soil compaction may also result. Fertility is lost and the next generation of trees suffers. Burning at the wrong time and allowing the fire to become too hot generally has the same effect. Most other effects of slash control are short-term and have little influence on productivity.

Irreversible and Irretrievable Commitment of Resources - Control of slash on a harvest site does not irreversibly commit this area to slash control in the future. The purpose of slash control is to provide a suitable site for establishment and protection of another generation of trees.

Considering the time and effort expended in slash control, it is likely this future generation of trees will be harvested and that slash created by that harvest will also be treated. The soil inevitably lost or displaced in slash control efforts is irretrievable.

Adverse Effects Which Cannot Be Avoided - The most obvious adverse effect is the smoke put into the atmosphere by prescribed burning. Though this effect is short-lived, the more timber harvested, the more smoke. Other adverse effects include the short-term scorched and blackened vistas and the displacement of wildlife and possible erosion of soils.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - If a lot of slash is treated by prescribed fire at any one time and not properly coordinated, the Forest slashburning program could conflict with the clear air standards set by the State and Federal governments.

Energy Requirements - Some energy is required in slash control. If machinery is used, the energy required for a particular site can be significant. A small amount of energy is used in torches to light fires. Handpiling or slash requires little energy outside the muscular activity of those persons doing the piling.

e. Site Preparation and Reforestation (Tree Planting)

The objective of site preparation is to create areas where tree seedlings have a good chance for survival. Site preparation requires the removal of competing vegetation and exposure of mineral soils. The seeds and

seedlings of most tree species that are planted in organic matter, or duff, dry out and fail to survive.

Site preparation is usually associated with logging and slash disposal activities. When dozers are used to skid logs and pile slash, the result is enough mineral soil exposed to provide planting sites. Cable logging displaces some topsoil and broadcast burning or burning handpiles results in some spots where mineral topsoil is exposed. In units where insufficient mineral soil is exposed or competing vegetation has had time to regenerate, the soil surface must be scarified or the competing vegetation must be removed before planting. Scarification can be done by dozers or other machines on gentle slopes, but must be done by hand on steeper slopes. The amount of soil disturbance associated with site preparation can occur on upwards of 70% of the area. The percent will vary depending on the amount of slash present on the site and how complete the site preparation is to be.

In areas identified as important grizzly feeding sites where huckleberries are predominant, site preparation through scarification has a negative influence because it disrupts plant rhizomes and severely reduces berry production. In these areas, broadcast burning is favored over machine scarification.

Site preparation has the same effect on the visual resource, soils, water quality and quantity, and fish as the soil-disturbing portion of slash disposal.

Handscalping of the individual tree planting sites is the least costly method of site preparation and handpiling and burning are the most expensive. Handscalping is also least effective because not all competing vegetation is removed and seedling failure is high. Machine scarification, piling, and burning, on the other hand, are most effective because enough mineral soil is exposed and most competing vegetation is removed. It is also possible to "overscarify" and cause damage to the soil and water resource.

Environmental effects of site preparation vary by many factors, but, as a rule, the higher the timber output, the greater the potential for environmental degradation because more site work is required. The following table shows the amount of site preparation for reforestation that is expected over the next five decades.

TABLE IV-20

AVERAGE ANNUAL SITE PREPARATION AND REFORESTATION OVER FIVE DECADES
(Thousands of Acres)

DEC- ADE	Alternative																	
	A	B	C	D	E	F	G	H	I	J	CD	PA	: FP :	: JF :	K	L	M	N	O
1	14.4	14.4	14.6	14.5	13.8	11.3	13.3	12.5	9.9	12.1			:14.1:	14.1	21.1	17.4	16.0	10.6	
3	19.6	19.3	19.2	21.1	18.9	11.4	18.4	17.5	12.0	16.0			:16.4:	14.2	17.7	20.7	21.4	9.0	
5	15.6	15.6	15.5	17.0	15.2	12.3	14.5	14.1	14.9	18.0			:12.9:	17.6	17.0	21.2	15.1	10.7	

The different acres shown by alternative by decade are the direct result of different acreages being harvested. The acres are closely correlated to the total volume harvested although it can vary somewhat because the different productivity classes have different volumes per acre on-site when they are harvested. For example; lodgepole pine has a lower volume per acre than mixed conifer, so more acres of lodgepole need to be harvested to attain the same volume that could be produced on fewer acres of mixed-conifer lands. The Final Plan clearcuts more acreage in the first decade than does the Proposed Action because the same volume of timber is produced without commercial thinning. Acres needing reforestation are those that are clearcut so the reforestation needs are higher for the Final Plan in the first decade. Beyond the third decade, the Final Plan produces less timber and therefore requires less reforestation than the Proposed Action.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Timber productivity of sites depends in part on how quickly trees are established after harvest. Adequate site preparation is necessary to ensure seedling survival and give them a good start for competition with other vegetation. Care must be taken in site preparation work that the topsoils are not removed, because they represent the necessary ingredient for the maintenance of productivity.

Irreversible and Irretrievable Commitment of Resources - Since considerable money and effort are expended in preparing the site for a new generation of trees, it is highly probable that the next generation of trees on the site will be harvested. Soils displaced by site preparation activities are irretrievably lost.

Adverse Effects Which Cannot be Avoided - The temporary unsightly appearance of piled slash and disturbed soil on sites that have been prepared for regeneration is unavoidable and will remain until vegetation grows and mitigates the effects. Soils can be eroded or displaced. If burning is used, smoke is generated. The noise and scars of site preparation can affect recreation use for a short time.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - Energy requirements for site preparation are very similar to those for slash control (see above).

Tree planting (reforestation) occurs after harvest, slash disposal, and site preparation unless natural regeneration is prescribed and accomplished. The proportion of harvest areas to be planted varies by harvest method, land type, and prescription. Roughly one-third of all sites must be planted. The remainder are expected to regenerate naturally which has been the experience on the Kootenai Forest.

Tree planting is also scheduled to occur in harvest units where planting failures have occurred, in burned-over areas, and in selection or shelterwood areas where the remaining trees are heavily infested with dwarf mistletoe. In the high timber output alternatives, most of the nonstocked areas are scheduled for planting. In the low timber output

alternatives, fewer nonstocked acres are scheduled to be planted because of the high cost of site preparation and because planting these sites yield a lower return. Average annual acres regenerated both naturally and by planting over five decades is shown in Table IV-20.

The primary environmental effect of planting is the quicker regeneration of trees. This results in a more rapid recovery of the visual character of the landscape; shortened return to pre-harvest levels of water yield, water quality, and time of peak flow; and a more prompt protection of the soil from erosion. Regeneration causes forage to decrease because of shading and competition of the growing trees, but speeds the process of recovery of big-game hiding and thermal cover.

Planting of certain species can benefit wildlife. The presence of the more fire-resistant species, such as ponderosa pine and douglas fir, on a site improves the chances of a successful prescribed burn on big-game winter range. These same species provide excellent thermal cover and snow intercept. Also, planting of larch and ponderosa pine will provide cavity habitat for wildlife at some time in the future.

Insect and disease problems can be minimized by the establishment of a young, vigorous stand of trees. Often, the problems can further be minimized by planting a different species than was harvested or by planting a mixture of tree species. These different species may also enhance the value of the next generation of trees. However, care must be taken to assure that the trees introduced are compatible with the sites on which they are planted.

Planting is labor-intensive and costs are high. It is more expensive to plant on slopes of over 40 percent; on thin, rocky soils, and in clearcuts because more seedlings are planted per acre. Most of the planting will be done by contract which will directly benefit the local economy.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Planting can have a definite effect on productivity of the next generation of trees. The stand is quickly established and begins to grow instead of waiting for natural regeneration. This shortens the time for the next harvest. Other species or a mix of species can be introduced on the site, if compatible, and lessen the loss to insects and diseases in addition to producing more wood fiber. These activities should not affect the productivity of the site and will give quicker protection to the soils by producing an overstory more quickly. Though this more rapid growth of timber will reduce the forage available to livestock or big game, it will also provide the hiding cover and protection from cold needed by the big game.

Irreversible and Irretrievable Commitment of Resources - Because of the expense of planting, it is reasonable to assume that the next generation of trees will be harvested. For all practical purposes, this is an irreversible commitment. The only irretrievable commitment associated with planting would be in cases where the planting fails. The fiber lost during this period of time could not be recovered.

Adverse Effects Which Cannot be Avoided - A certain percentage of the plantings on the Forest will fail. This expense is difficult to recover.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - Some energy will be required in transportation of tree planting crews to the field. This is a small portion of the total energy use on the Forest.

f. Timber Stand Improvement

Precommercial and commercial thinning are the two activities associated with timber stand improvement. Precommercial thinning occurs when the regenerated stand is about 20 to 30 years old (too small for commercial products). Commercial thinning occurs from 40-80 years when a commercial product, such as poles, can be harvested. The objective of thinning is to reduce competition among crop trees so maximum growth per tree is realized. The resulting trees are fewer but larger and are more valuable at time of harvest.

Thinning can have an adverse effect on viewing from the foreground until the slash decays or is otherwise disposed of. The more open aspect of the thinned stands is not likely to be noticed by the casual observer.

The slash created by thinning is a fire hazard that is difficult to manage. Broadcast burning or underburning is not possible without damage to the remaining trees and burning handpiles can cause considerable damage also. Fortunately, the relatively fine fuels are packed down by snow and decay within one or two years, so the risk of losing the thinned stand to fire is low.

Thinned stands produce slightly more forage for a short time after thinning, but this advantage is soon lost by the rapidly expanding canopy of the remaining trees. Hiding cover for big game may be reduced by thinning but recovers rapidly as the remaining trees occupy the available space. A more or less diverse stand can result from thinning, depending upon the objectives for the species designated to remain as crop trees. If a mix of species is desired, thinning to emphasize one species would be a detriment to diversity and could affect the habitat of certain small animals, birds, and insects. The removal of insect-infested, diseased, and slow-growing trees will result in a healthy, vigorous stand, but will also reduce actual and potential feeding and nesting sites for cavity-dependent species.

The most effective silvicultural treatment to accelerate the growth in regenerated stands on the Kootenai is to precommercially thin prior to age 30. All alternatives provide the opportunity for this practice.

TABLE IV-21

AVERAGE ANNUAL PRE-COMMERCIAL THINNING
(Thousands of Acres)

Alternative

DEC-											CD	PA	FP					
ADE	A	B	C	D	E	F	G	H	I	J	JF	K	L	M	N	O		
1	1.8	1.9	1.8	0.2	1.8	1.4	1.8	1.7	2.3	1.8	1.7	1.8	2.7	2.1	1.9	2.7		
3	9.9	10.4	10.4	11.2	9.0	3.5	8.1	7.8	3.7	9.9	8.5	11.1	15.4	13.3	9.5	11.1		
5	8.9	8.9	8.7	11.9	10.1	4.4	10.3	9.8	7.0	4.7	5.5	4.6	10.0	9.7	9.5	10.5		

The preceding table shows that a substantial thinning program will be underway by the end of the third decade, with some tapering off by the fifth decade for half of the alternatives. Alternative F, which favors big game habitat management produces low timber harvest levels and shows less thinning by the end of Decade 5. Alternatives which provide for high timber yields (Alt. L) or high present net value (Alt. M) recommend the greatest amount of precommercial thinning. Alternative J, the Proposed Action, provides for a moderate amount of precommercial thinning in keeping with its intent to provide for a combination of wildlife and timber management designations. Alternative JF, the Final Plan, is similar to the Proposed Action.

The following table shows the amount of commercial thinning scheduled for decades one, three, and five in all alternatives.

TABLE IV-22

AVERAGE ANNUAL COMMERCIAL THINNING
(Thousands of Acres)

Alternative

DEC-											CD	PA	FP					
ADE	A	B	C	D	E	F	G	H	I	J	JF	K	L	M	N	O		
1	17.4	17.2	17.1	13.1	16.6	2.8	16.5	16.0	15.2	12.6	0.0	12.9	15.5	15.8	18.6	19.3		
3	3.4	3.4	3.3	17.6	3.4	1.3	3.1	3.0	8.1	7.8	0.0	7.7	12.9	4.0	3.8	3.9		
5	5.3	5.9	5.5	8.1	5.3	4.4	6.3	5.0	3.3	4.8	0.0	4.8	4.6	7.9	5.0	6.3		

The preceding table indicates that commercial thinning will be predominant in the first decade under all alternatives except Alternatives F and JF. The predominance of commercial thinning in the first decade is to prepare the large inventory of pole-sized timber on the Kootenai for future increased timber yields. Alternatives D and L continue into the third decade with high levels of commercial thinning to obtain the timber yields desired for those alternatives. The other alternatives do not make these investments. Commercial Thinning was not required in the Final Plan because of the anticipated difficulty (negative economics) in actually

carrying out a significant program, although it will still be permitted on a case-by-case basis.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Thinning increases the size and potential value of wood fiber thus enhancing productivity.

Irreversible and Irretrievable Commitment of Resources - Thinning a stand makes a reasonable commitment to harvest the remaining trees in the stand. In unique situations, final harvest would not need to occur and the land could still be available for other uses if desired.

Adverse Effects Which Cannot be Avoided - Some of the slash created by thinning may not be treated. This will present a fire hazard for a few years after thinning. Temporary losses of hiding cover and protection from cold will affect big game use of the areas. The visual resource can be adversely affected for a short period of time.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - Most of the energy used in precommercial thinning will be used in transportation of crews to the sites. This is a small portion of the total Forest use. Energy used in commercial thinning is a part of the energy used in regular timber harvest, as discussed earlier.

2. Road Management

The transportation system is integral to the successful management of every other resource program on the Forest. Even the use of the Cabinet Mountains Wilderness depends in part on the road system which provides access to trailheads.

The term "road management" refers to all road-related activities, i.e., construction, reconstruction, maintenance work, and control of road use through restrictions such as closures, both temporary and permanent. Note that use-restrictions usually apply only to motorized vehicles. There are generally no restrictions on foot travel and very few on horse travel.

Road management has a greater influence on Forest resources than any other activity. Effects are both positive and negative: Roads are essential for managing the timber resource in an economically sound way, to the development and use of recreation areas, to fighting wildfire and to extracting valuable minerals as well as reaching potential oil and gas deposits. Roads also create or introduce problems not present when an area was roadless. Soil is displaced by the construction and reconstruction of the roads which can lead to degradation of water quality and fisheries habitat, big game habitat effectiveness can be reduced, and visual quality can be impaired. Roadless areas lose their value for wilderness consideration and primitive recreation after roads are constructed through them.

To allow for maximum public use of the road system and yet to protect other resources and control the degree of disturbance to them, road use is frequently restricted to non-motorized travel after project work is over. Restrictions can be seasonal or year-long, depending upon the reasons for them. Major reasons include protection of wildlife habitat, water quality and soils, maintenance cost reduction, public safety, conflict of use, and legal mandates, such as those protecting wilderness areas.

When roads are open to motorized access, they provide increased opportunities for recreation activities such as berry picking and fishing, driving for pleasure, snowmobiling, motorcycling, hunting, and camping. Roads allow the handicapped, elderly, families with young children, and visitors interested in short trips into the Forest to enjoy outdoor recreation. During the part of the year that roaded areas are closed to motorized access, these opportunities are foregone, but the area then offers the chance to hunt on foot or on horseback in a roaded but traffic-free setting, to cross-country ski or to hike.

Of the 6,200 miles of road on the Kootenai in 1986, 993 miles have been closed year-long; to protect recreation, wildlife values, and unstable soils as well as to reduce maintenance costs and accomplish other goals described above and, 676 miles are closed on a seasonal basis for many of the same reasons. This is a total of 1,669 miles restricted or approximately 27% of the existing road system. Table IV-23 displays the miles of projected road restrictions (both yearlong and seasonal) by alternative.

TABLE IV-23

TOTAL MILES OF ROAD RESTRICTED SEASONALLY OR
YEAR-LONG BY THE FIFTH DECADE

Alternative	Year-long or Permanent Closure	Temporary or Seasonal Closure	Total With Use Restric- tions	% of Total Projected Road Miles
A	3889	1221	5110	45
B	3846	1264	5110	46
C	3860	1260	5120	46
D	3665	1105	4770	41
E	3554	1326	4880	45
F	3795	1165	4960	50
G	3560	1220	4780	44
H	3649	1081	4730	45
I (CD)	2280	2310	4590	47
J (PA)	3632	2448	6080	57
JF (FP)	3423	2307	5730	57
K	3632	2448	6080	57
L	4400	1290	5690	46
M	3560	1540	5100	45
N	3875	1255	5130	46
O	2615	685	4300	40

In general, the amount of road restrictions is in direct proportion to the amount of total roads needed to manage the suitable timberland and the emphasis given to big-game habitat management. This means that the more miles built, the more miles of restrictions needed because of certain minimum requirements such as grizzly bear recovery goals, big-game management goals, water quality protection, etc. Alternatives J, JF, and K reflect the common goal of big-game (elk) production and recreation management. Alternative JF (Final Plan) has fewer miles of road with use restrictions than Alternative J (Proposed Action) because it has fewer total miles. This, in turn, is due to its smaller suitable timber land base.

Table IV-24 and Table IV-25 portray the number of miles of road to be constructed over five decades under each alternative. (Arterial roads are the main roads on the system, such as the Pipe Creek Road or the Forest Development Road on the west side of Lake Koocanusa. Collector roads lead off of arterials and locals take off of collector roads. The design standard of arterial roads is higher than that of collector roads. The local road has the lowest design standard of the three and is often closed when a project, such as a timber sale, is completed.)

It is important to note in interpreting the following tables that the Kootenai National Forest is in the midst of the first road building decade at this time. Approximately 1,400 miles of roads needed to complete the system under the Current Direction have already been constructed since the base year of 1978. 1978 was the base year used in the FORPLAN model and all projections were made from that date when the Forest road system totaled approximately 4,800 miles. As of January 1, 1986 the Forest road system totaled approximately 6,200 miles. To compute the total number of miles of new road remaining to be built on the Forest under each alternative, 1,400 miles must be subtracted from the total shown. The miles remaining to be constructed and the total miles anticipated to be needed for each alternative are shown in Table IV-26.

TABLE IV-24 TOTAL COLLECTOR ROADS TO BE CONSTRUCTED					
BY DECADE					
(1978 Base Year - Miles)					
ALTERNATIVE	DECADE:	DECADE	DECADE	DECADE	DECADE
	1	2	3	4	5
A	63	63	63	2	0
B	62	62	62	5	0
C	63	63	63	2	0
D	62	62	67	0	0
E	60	60	60	11	0
F	44	44	44	47	12
G	58	58	58	17	0
H	56	56	56	23	0
I (CD)	41	41	41	41	27
J (PA)	56	56	56	23	0
JF (FP)	55	55	55	26	0
K	64	59	53	15	0
L	66	66	59	0	0
M	73	55	63	0	0
N	60	59	63	0	0
O	62	62	62	5	0

TABLE IV-25 TOTAL LOCAL ROADS TO BE CONSTRUCTED					
BY DECADE					
(1978 Base Year - Miles)					
ALTERNATIVE	DECADE:	DECADE	DECADE	DECADE	DECADE
	1	2	3	4	5
A	2629	2489	1163	0	0
B	2595	2428	1189	0	0
C	2614	2491	1057	0	0
D	2607	2496	1593	0	0
E	2567	2344	1049	0	0
F	1976	1899	981	0	0
G	2450	2274	1033	0	0
H	2423	2126	1051	0	0
I (CD)	1806	1532	1334	174	0
J (PA)	2380	2408	913	0	0
JF (FP)	2317	2434	310	0	0
K	2699	2490	545	0	0
L	3031	2527	1814	0	0
M	3079	2179	979	0	0
N	2833	2420	1023	0	0
O	2497	2341	865	0	0

TABLE IV-26

TOTAL ROAD SYSTEM

Alter- native	Miles to be Constructed After 1/1/78	Miles to be Constructed After 1/1/84	Miles to be Constructed After 1/1/86	Total Road System Needed Now & Future
A	6472	5272	5072	11272
B	6403	5203	5003	11203
C	6353	5153	4995	11153
D	6887	5687	5487	11687
E	6151	4951	4751	10951
F	5047	3847	3647	9847
G	5948	4748	4548	10748
H	5791	4591	4391	10591
I-CD	5037	3837	3637	9837
J-PA	5892	4692	4492	10692
JF-FP	5252	4052	3852	10052
K	5925	4725	4525	10725
L	7563	6363	6163	12363
M	6428	5228	5028	11228
N	6467	5267	5067	11267
O	5885	4685	4485	10685

Under alternatives F and I, about 3,650 miles of new roads are needed to complete the transportation system. Alternatives H and O are conservative in the amount of road construction, and prescribe no roads for any inventoried roadless area. At the other end of the spectrum is Alternative L which requires 6,160 miles of road to access all land suitable for timber outside current wilderness boundaries. In all of the alternatives, most of the roads would be built by the end of the third decade.

Road construction is directly tied to the amount of projected timber harvest. In Alternative M, timber harvest is emphasized thus, even though the road system is built quickly, the net contribution to PNV is relatively large. In Alternatives F and I, timber harvest is constrained so, even though road building progresses slowly, the contribution to PNV is lower.

The smaller suitable timber land base of the Final Plan is estimated to require 640 fewer miles of road to access than the Proposed Action. It is important to note here that the estimated road construction mileages described above are not goals. In fact it is a Forest goal, as described in the Forest Plan, to construct the minimum number of roads necessary to permit efficient management of the Forest. The above mileages are estimates of the number of miles that will be needed. Continuing transportation planning activities are intended to identify specific ways of reducing the needed mileages.

In the discussion below, the effects of roads on resources are treated in some depth. Mitigation efforts are also described.

Inventoried Roadless Areas: There is strong public feeling about the fate of inventoried roadless areas, a problem that Congress debated during the final days of its session in 1984. Should a particular area be granted wilderness designation or should it be allocated for some other use? What values other than roadlessness does it have? In a discussion of road management it is important to point out that for all practical purposes, once a road is constructed in an inventoried roadless area, the quality that made that area unique from a roadless or wilderness potential standpoint is gone.

Recreation: Roads are essential to developed recreation and to reaching trailheads and other dispersed recreation sites. There are 28 campgrounds, seven picnic grounds, 18 boat sites, a winter sports area (Turner Mountain) and 1,300 miles of trail on the Forest, all tied in one way or another to the road system. One form of recreation, driving for pleasure, is totally dependent on roads.

As beneficial as roads are in providing access to various points on the Forest, they tend to concentrate people in certain areas, leading at times to overuse at the most popular sites. Soil compaction and erosion and an increased incidence of vandalism can follow. When these occur, roads to the sites can be closed to allow areas to recover physically and to discourage further abuse. Generally speaking, alternatives favoring roadlessness including wilderness, such as Alternatives E, G, H, J, K, and O, favor recreation in most of its forms. The exception is roaded recreation, opportunities which will continue to increase as road construction increases. (Roads to developed sites often serve purposes other than recreation.) The effects of recreation on the forest environment are dealt with in the recreation section of this chapter.

Fire Control: Roads built into roadless areas result in increased access which leads to a greater potential for man-caused fires. However, this same access makes fire suppression easier by quick delivery of firefighters to the scene and by the fact that the road now may serve as a fuel break. There is little variation among the alternatives with regard to fire control.

Visual Resource: Road construction can affect the visual character of the land by changing its color, texture, or line. Roads across open areas on steep slopes are highly visible for many miles. Cuts and fills are often visible even through a screen of vegetation. Where the visual resource is important, the visual impact can be reduced by leaving vegetative screens, seeding, or treating cut and fill slopes with a darkening agent.

Because roads and timber harvest activities are so closely intertwined, the relationship of the viewing resource to just one or the other is difficult to analyze. For that reason the viewing resource is treated in the timber section of this chapter. Tradeoffs by alternatives are explained in Table IV-6. With the exception of Alternative O, which is designed to provide significant protection for roadless areas and the visual resource, the Proposed Action (Alternative J) recommends the fewest number of acres for "maximum modification". With the exception of Alternatives G and H, which favor wilderness values, the Proposed Action recommends the greatest number of acres for "preservation/retention".

Cultural Resources: Road construction could destroy cultural resources if a road were planned through the middle of an area having cultural importance. Before a major project is undertaken, however, the site is routinely examined by Forest archeologists to determine if it has any cultural resource value. Very few conflicts between archeological sites and land management activities have occurred in the past. Roads close to an archeological site can be a benefit by improving public access to it for viewing and pleasure, but that same road makes the area vulnerable to vandalism. Such problems must be dealt with on a case-by-case basis and through public education and law enforcement. There is no significant difference among alternatives with regard to protecting the cultural resources. There is, however, an increased risk of damage to cultural resources associated with those alternatives which involve more miles of road construction.

Wildlife: Roads, and their subsequent use by vehicles, impact wildlife habitat, particularly big game habitat, more than any other Forest management activity. The primary effect is increased vehicle access that results in loss of animal security areas, displacement of animals, increased competition among animals for more limited resources and increased vulnerability of animals to both legal and illegal harvest. Studies have shown that grizzly bear (Aune, 1983), caribou (Johnson, 1977), and elk (Lyons, 1984) are directly affected by open roads. Elk habitat effectiveness drops by almost 90% as open road density increases from 0-4 miles/square mile. Human activities and encounters with wildlife can disturb elk calving areas, summer and winter ranges, animal migration sites, dens, forage areas, and security areas. Alternatives which minimize wildlife disturbance, such as F and I, have the fewest total miles of road. Other alternatives which would provide more disturbance include J (Proposed Action), E, G, H, K, and O. Alternatives recommending the most miles of road will produce the greatest disturbance.

The most obvious effect of open roads is to provide easy access into the animals' habitats. Animals are more easily killed by legal hunting or poaching. This is of particular concern where grizzly habitat occurs, as man-caused mortalities are an important management concern. To avoid over-harvest and to support the State's goals for big game management (a relatively long season with a harvest within reasonable limits), the Forest has a program of road restrictions, some seasonal, some year-long, following timber harvest. Restricting road use to non-motorized travel can restore important security to areas historically used by big game to acceptable levels even though the road still provides a travelway for horseback riders and hikers. Table IV-27 displays the miles of road affected by closures, either temporary or permanent, by the fifth decade. Table IV-23 displays the type of restriction, i.e., temporary or yearlong.

TABLE IV-27

ROADS WITH NO RESTRICTIONS BY THE FIFTH DECADE
(miles)

ALTERNATIVE	Total Road Miles By Decade 5	Road Miles With Restrictions	ROAD MILES WITHOUT RESTRICTIONS
A	11,272	5,110	6,162
B	11,203	5,110	6,093
C	11,153	5,120	6,033
D	11,687	4,770	6,917
E	10,951	4,880	6,071
F	9,847	4,960	4,887
G	10,748	4,780	5,968
H	10,591	4,730	5,861
I (CD)	9,837	4,590	5,247
J (PA)	10,692	6,080	4,612
JF (FP)	10,052	5,730	4,322
K	10,725	6,080	4,645
L	12,363	5,690	6,673
M	11,228	5,100	6,128
N	11,267	5,130	6,137
O	10,685	4,300	6,385

Alternative JF (Final Plan) will offer the greatest security to wildlife, the grizzly bear, and other threatened or endangered species. Other alternatives favoring wildlife are J, K, F, I (the Current Direction alternative), G and H. Alternatives D and L emphasize timber and thus road building, and would create the greatest threat to security for wildlife and for threatened and endangered species, such as the grizzly. Overall public access would not be diminished over what is available now. Miles of road currently open total 4,400 compared to 4,322 proposed for decade 5 in Alternative JF. Additional road closures would primarily affect roads constructed between now and decade 5.

New roads may cross game trails and change animal movement patterns. Narrow roads built to follow the terrain with minimum cuts and fills reduce these impacts. Road use restrictions are also effective in encouraging big game to return to the area where they may take advantage of foraging opportunities created by timber harvesting, burning, or seeding.

Road construction on big game winter range may cause few problems to the animals if construction activity occurs when few or no animals are present. Roads may be a benefit in these situations by improving access for habitat improvement on winter ranges.

Road construction activity on big-game summer range displaces the animals, a situation that will continue as long as heavy traffic is allowed. If road building is scheduled to avoid activity in adjacent drainages, elk will have

a secure area to move into. However, displacement of one population segment into another area could result in increased competition for space and forage if the displacement areas are limited.

Many potential wildlife impacts are mitigated through road design and location. This involves providing access to game trails at regular intervals for game passage, reducing cuts and fills on major ridge crossings, and avoiding meadows, wallows, ridges and saddles, regularly used by big game. Additional mitigation measures are applied through road closures and timber sale scheduling.

Parts of the habitat for some small animals will be destroyed by road construction but other habitat may be created for those animals who exist along the edge of the forest.

Soil, Water, and the Fisheries Resource: Road construction and maintenance produce the greatest impacts of any activity on soil, water and fisheries through erosion and sedimentation. Sediment can fill the spaces between gravels, smothering fish eggs, small fish, and fish food. Fry and fingerlings lose hiding cover and are more vulnerable to predators. In addition, roads tend to concentrate water runoff, further increasing surface erosion and sediment buildup in streams. Roads can behave like first order drainages. They can intercept flow and can be efficient in carrying water to a stream channel thus increasing peak flows. Roads with deep cuts through the soil mantle can interrupt the sub-surface flow of water and increase the mass failure hazard in unstable soil types or increase peak flow levels of runoff.

Since roads probably cause more than 80 to 90 percent of the erosion and sedimentation of an area (Megahan and Kidd, 1972), roads that are constructed through or adjacent to riparian areas can adversely affect stream channel stability, water quality, and fishery habitat. For this reason, in all alternatives, road building and timber harvest activities are constrained to minimize effects on the stream environment. Culvert placement and bridge building, for example, can not take place at those times when fish are spawning or when the redds are vulnerable to sediment increases.

Roads also can expose selected stream reaches to overfishing due to additional public access. Stream crossings can interrupt fish migration if crossings are improperly designed or installed.

Table IV-28 displays the anticipated sediment yield entering third order streams by the fifth decade. High (H), Medium (M), and Low (L) values have been assigned to express sedimentation rate increases above the natural background sediment. There is a close correlation between these ratings and the amount of road construction by alternative. These ratings do not include impacts from temporary roads that will be closed and reclaimed after use. Mass wasting is not reflected because road-related mass failures are not significant on the Forest.

TABLE IV-28

POTENTIAL FOR SIGNIFICANT SEDIMENT IMPACTS ON
THIRD ORDER STREAMS BY THE FIFTH DECADE
(High, Medium, or Low)

	Alternative															
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>CD</u> <u>I</u>	<u>PA</u> <u>J</u>	<u>FP</u> <u>JF</u>	<u>K</u>	<u>L</u>	<u>M</u>	<u>N</u>	<u>O</u>
Potential																
Sediment	M	M	M	H	M	L	M	M	M	M	M	M	H	H	M	M

The fisheries/water quality objectives are the primary control on road construction in the first three decades of all alternatives. The greatest amount of sediment is produced by road and timber activities in Alternatives D, L, and M which propose a larger road system than the others. In all alternatives, road building and timber harvest are designed to mitigate effects on stream environments through proper road location, road construction and design, and road maintenance practices.

These mitigation practices include: (1) location of roads out of the riparian zone; (2) dewatering channels during culvert installations; (3) minimizing stream crossings; (4) providing minimum widths, cuts, and fills; (5) slope stabilization by seeding, fertilizing, and the use of right-of-way slash at the toe of critical fill slopes; (6) maintaining road prism for adequate drainage; (7) installing sediment traps at critical stream crossings; and (8) imposing travel restrictions during the wet season to reduce the need for further road work. These measures will not eliminate sediment from new roads, but will significantly reduce the amount delivered to stream channels.

Sediment in streams has an adverse impact on trout populations. The combination of sediment and the location of the areas designated for road construction and timber harvest affect trout population the most. All alternatives project declines of approximately 4% to 7% in the existing total trout population (See Table II-24 in Volume I of the Final EIS). Decline in the migratory fish population is estimated from 8% to 12%. Alternatives D and H will have the greatest effect on the total fish population and Alternatives D and I produce the greatest decline in migratory fish numbers. These declines will level off and stabilize in approximately 30-40 years, and begin to slowly improve but never regain their original levels. The exceptions are Alternatives D, K, and L. These alternatives continue at their reduced levels with no anticipated improvement.

Timber: Roads provide access to timber so that it can be managed. Logging systems and transportation systems are planned concurrently to insure that the most cost-effective harvesting system is implemented, while at the same time giving recognition to other resources, such as wildlife habitat.

Roads remove some timberland from production. For every mile of road built, roughly four to eight acres of land are involved, extending from the top of the cut to the bottom of the fill slope. This roadbed acreage cannot

be managed for wood in the future. Natural regeneration may occur along cut and fill slopes, but it is unlikely that merchantable timber will be produced.

Cost: As road standards increase, mitigation measures for sediment reduction also increase because of additional exposed soil surface areas. Mitigation costs are included in the total road costs and can reduce returns to the U.S. Treasury. The increased mitigation costs do not affect the return payments to the states and counties because road costs are included as a gross receipt to the U.S. Treasury in the form of a capital asset or investment value.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Construction of roads has a long-term effect on timber productivity by allowing access for silvicultural treatments. The acreage required for the roadbed itself will be removed permanently from the timberland base of the area as long as the road remains active. Rehabilitation of an old roadbed is not always successful because of the poor quality of the subsurface soil exposed at the time of road building.

Roads remove the habitat of small animals and birds even though the edges of roads may create habitat for others. Roads change the type of recreation experience available in the area. Actively traveled roads can have an adverse effect on the movement of big game animals. Roads can also have an impact on the visual quality of the area. Even after construction, roads continue to produce sediment which can reduce water quality and fisheries habitat over the long term.

Irreversible and Irretrievable Commitment of Resources - Road construction is an irreversible commitment of resources since roads are essentially permanent features of the landscape. If roads are not built, timber cannot be economically harvested and an irretrievable loss of a particular use of the timber resource occurs. If roads are built, future options are foregone for wilderness reconsideration, and semiprimitive recreation and roadless wildlife habitat are irretrievably lost.

Adverse Effects Which Cannot Be Avoided - Roads have an adverse effect on the visual resource. Wildlife habitat and wildlife movement patterns can be disrupted. Roadless recreation opportunities are lost. Future wilderness consideration and roadless area management potentials are foregone. Road construction and maintenance cause soil disturbance and erosion. Water quality of streams is lowered by road building and fish habitat quality is reduced.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None identified. The Forest works closely with other landowners to efficiently develop access required to manage the land.

Energy Requirements - Road construction and maintenance require the largest amount of energy use of any activity on the Forest. This is displayed in Table IV-29.

TABLE IV-29															
ENERGY REQUIRED FOR ROAD CONSTRUCTION AND MAINTENANCE															
DURING THE FIRST DECADE															
(Billion B.T.U.s)															
Alternative															
CD PA : FP:															
A	B	C	D	E	F	G	H	I	J	JP	K	L	M	N	O
923	910	917	914	901	720	866	858	575	845	823	943	1074	1059	984	882

3. WILDLIFE AND FISH HABITAT IMPROVEMENT

a. Big Game

The objective of wildlife habitat improvement is to maintain productivity of winter range forage areas primarily by spring burning on grassland or mixed-grass and shrubland. Most burns are planned to be of low heat intensity, "cool", and vegetation is expected to resprout rapidly. The soil surface will be exposed for a short time and there is a risk of some accelerated erosion. Air quality degradation is similar to that experienced with fires from timber harvest slash control and managed fire. Burning can cause short-term degradation of foreground viewing. Since the vegetation (grass and shrubs) is burned, the area will look scorched and black until the next growing season when these plants resprout and begin to green up the area.

Shrub, grass and forb seeding or planting is more opportunistic than planned. These activities are generally pursued on relatively small areas where some disturbance has eliminated or reduced the natural ground cover. Effects of these activities are mostly positive in that soils are protected, forage is produced and the visual aspect is improved. Effects of these activities will be more fully explored by individual analyses as projects are proposed.

The primary foods on big game winter ranges are grasses and shrubs. These plants respond very rapidly when seeded, planted, or pruned and many are already present due to past vegetative manipulation (timber harvest) or wildfire. Availability of forage can be deliberately increased by cutting, prescribed fire, and plant manipulation, with the animal carrying capacity increasing significantly. Table IV-30 displays by alternative the acreage scheduled for these activities.

TABLE IV-30															
WILDLIFE HABITAT IMPROVEMENT															
(Thousands of Acres/Year in decade one)															
Alternative															
CD PA : FP:															
A	B	C	D	E	F	G	H	I	J	JP	K	L	M	N	O
0.6	0.6	0.6	0.6	0.5	0.3	0.4	0.1	3.8	5.6	5.6	5.6	0.6	0.6	0.6	0.6

The acres treated in each alternative are linked almost directly to the total acres allocated to big game winter range (MA 10) under each alternative because approximately 75% of wildlife habitat burning is done on winter range. Also, a schedule of treating the acreages to improve forage production, consistent between alternatives, establishes the amount to be treated in each decade. Basically, a 20-year rotation was established so that each year about 5% of the MA 10 acres would be treated to improve forage production. Each acre would then be treated about once in every two decades to maintain forage levels and to cycle through all MA 10 acres on a 20-year basis.

Other activities which improve or degrade wildlife habitat are associated with timber harvest, road construction and management, and livestock grazing. The effects of these other activities on wildlife are discussed in the appropriate sections of this Chapter.

Because the amount and carrying capacity of winter ranges can be significantly modified by weather and varying management practices, it is difficult to base a population figure on the winter range situation. In the Kootenai Plan, elk population numbers were calculated on the basis of summer range acres and the density of elk that can occur. On summer ranges, factors other than weather or food availability (most importantly, cover and security) dictate the carrying capacity and are therefore more indicative of population. It was estimated in 1983 that the Kootenai habitat supports a population of 5,500 elk. The amount of winter range acres and the potential forage that could be produced were then examined to determine if sufficient winter range was available to support the population that could be raised on the summer range. This analysis demonstrated that winter range acres could provide sufficient forage for elk herd increases under any alternative, if they were manipulated to increase forage. In addition, significant acreages of winter range are found on private lands, particularly in the Fisher River drainage, and these acres are in addition to those used in the winter range carrying capacity analysis.

A wide variety of non-game wildlife dependent on a variety of habitats occurs on the Forest. Minor programs in non-game and waterfowl habitat improvement are also carried out on the Kootenai, including construction of waterfowl nest structures and protection and creation of snags.

The specific activities associated with wildlife habitat improvement will not have much effect on the economic base or lifestyle of the area because of the few acres affected.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The productivity of areas that are burned may be changed. If trees are occupying these sites, some or all may be killed. This is especially true of tree seedlings. Burning is implemented to maintain or enhance the production of suitable wildlife forage.

Prescribed burning retains the vegetation in an early stage of plant succession as well as enhancing palatability and availability. The relationship between artificially maintaining an area in an early stage of plant succession for extended time periods and its effect on long-term

productivity is speculative at this time. We can guess that the practice may eventually alter soil and waterflow and thus may eventually affect long-term productivity of the soil.

The productivity of acres that are burned is not decreased unless soil loss occurs or waterflow is altered. This does not normally occur with prescribed fires because of their relatively small size and controlled intensity. On-site vegetation can be killed or fire-scarred. However, burning releases nutrients on site and can increase productivity for a few years, resulting in vigorous new growth of established species. In addition, some trees and shrubs require heat for seed germination; fire can result in their germination and growth.

On those lands where elk habitat is managed to achieve close to full potential use, timber sales and entry schedules are likely to be affected in order to provide security areas.

Irreversible and Irretrievable Commitment of Resources - The act of burning or planting does not constitute an irreversible commitment of the areas to this activity. Different areas will be scheduled for treatment each year. Vegetation consumed by fire is a loss, but natural plant succession returns burned sites to more vigorous native vegetation in a relatively short time. Many present-day sites owe their vegetative makeup to past fires and since fire is a natural force that has a long history on the Kootenai, its prescribed application does not pose an irreversible commitment of the land.

Adverse Effects Which Cannot be Avoided - The soil surface will be exposed by burning for a few days or weeks and there is a risk of accelerated erosion. Air quality degradation is similar to that experienced from timber harvest slash control. The blackened areas from burning will be noticeable for short periods of time, especially along frequently traveled roadways. Some short-term surface soil erosion may result from constructed fire control lines.

Conflicts with Objectives of Other Land Management Plans, Policies and Controls - Prior to initiation of any wildlife project, it is subjected to analysis under procedures defined by the National Environmental Policy Act, and effects are identified at that stage as well as any conflicts between agency goals. Generally no conflicts exist, because the goal of the Forest and those of other State and Federal agencies are to maintain and protect the wildlife resource.

The State Department of Fish, Wildlife, and Parks is responsible for management of wildlife, the U.S. Forest Service for management of wildlife habitat on National Forest land. It is difficult to separate one from the other; the welfare of wildlife is directly dependent on the quality of the habitat that supports it. For this reason, close cooperation between the two agencies is essential. These efforts result in an exchange of ideas and recommendations concerning land management activities, such as timber harvest and road management.

Energy Requirements - Energy will be required for prescribed fires designed to enhance wildlife habitat. Because of the small acreage

involved, this energy use will amount to only a small percentage of the total energy used on the Forest.

b. Threatened and Endangered Species

The Kootenai provides habitat for four species which are listed as threatened or endangered. These include the endangered bald eagle, peregrine falcon, and gray wolf, and the threatened grizzly bear. (For more information about the Endangered Species Act, the reader is referred to the section on this subject in Chapter 3 and Appendix D.)

Bald eagles occur predominantly as winter migrants along major waterways throughout the Forest. Up to 35 bald eagles can be seen during winter months in various locations. This number is extremely fluid as individual birds come and go depending on weather patterns and season. Only two active nests are known to occur within the Forest boundary, one is on private corporate timberland.

To date, no conflicts have occurred between nesting bald eagle adults and forest management activities. Under any alternative, potential conflicts should be reconcilable. A routine effort is made to monitor wintering and nesting eagles in conjunction with the national mid-winter eagle surveys and through the efforts of a local volunteer. As a result, important perch and roost areas have been identified. It is possible that management of bald eagle habitat may have some effect on site-specific Forest activities. However, projected Forest management activities will be minimally affected overall by bald eagle habitat management.

Gray wolf habitat on the Kootenai is found in the northeast corner of the Forest in the Whitefish Mountains. This area is recognized as a possible extension of occupied wolf habitat lying to the north and east in Canada. Several relatively routine observations of wolf tracks are verified in the area annually. Currently, researchers feel that wolves are only transients in the area and that no resident individuals or packs occur within the boundary of the Kootenai.

The area delineated as wolf habitat is also recognized as grizzly habitat and important big game habitat. Since elements of managing for grizzlies and big game are consistent with wolf habitat management and since all alternatives meet grizzly recovery goals, we can assume that all alternatives likewise support gray wolf habitat needs. The management of grizzly habitat benefits many other wildlife species as well.

All proposed alternatives are aimed at achieving recovery of the grizzly bear population on the Kootenai. Grizzly habitat on the Kootenai is contained in two different grizzly ecosystems, the Cabinet-Yaak Ecosystem (CYE) and the Northern Continental Divide Ecosystem (NCDE). Of the grizzly habitat on the Kootenai, 15 percent is in the NCDE and 85 percent in the CYE. Grizzlies in the NCDE are felt to be relatively abundant in number and an annual controlled harvest is allowed by the State. Conversely, grizzlies in the CYE are felt to be extremely low in number and have been protected from harvest for the past decade. On the

Kootenai, the two ecosystems are separated by major water features, highway developments and communities, and distances of up to about 25 miles.

Grazing by domestic livestock in grizzly habitat has occurred to date without incident, although grazing in grizzly bear spring range may have to be modified in the future to avoid conflict. Special mitigation clauses are contained in permits and no changes to those clauses are anticipated because of the Proposed Forest Plan. Livestock grazing on the Kootenai is a small program and site-specific modifications to protect habitat of threatened or endangered species will have a minimal effect on the overall program.

Peregrine falcons are seasonal migrants on the Kootenai. Very infrequent observations are made during either spring or fall migration periods. Only two confirmed sightings have been recorded within the last several years, and those occurred during migration. No special habitat or status for peregrines is currently included in Forest programs.

Mountain caribou have recently been recognized as a sensitive species in Montana. ("Sensitive" status signifies that a species is not numerous and that efforts will be made to protect the species and its habitat from further degradation until further knowledge of its status can be gained. This short-term classification can lead either to upgrading or downlisting of the mountain caribou in Montana.) The Whitefish Range in the northeast corner of the Kootenai is felt to represent the best potential habitat. Verified track observations were recorded there in 1983 and 1984. Because the area is located in identified grizzly bear and wolf habitat where development, if any, is minimal, management for caribou needs should have minimal effect on other Forest programs. Many of the prime spruce basins remaining in the area are in the Ten Lakes Montana Wilderness Study Area and the protected status is highly compatible with caribou. Given that the Whitefish Range is all "grizzly situation 1" (Interagency Guidelines) and that portions are proposed for nondevelopment, caribou should not be adversely affected by any alternative.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Decisions made regarding the management of bald eagles, gray wolves, and grizzly bears could result in lower levels of outputs of other resources. The timing and level of activities permissible for timber management in grizzly habitat will mean that opportunities to manage stands for maximum growth will be reduced.

Some decisions regarding minerals have resulted in limitations on the timing, duration, and location of exploration and development activities. This has occurred mainly in relation to grizzly habitat but it is possible that similar limitations could be related to bald eagle nesting or wolf activity. Generally, long-term mineral goals have been accomplished since those non-renewable resources are not dependent on being gathered at a particular time, as is timber. Because minerals are "where you find them", it is possible that a set of mutually exclusive circumstances between a listed species and an ore deposit could develop. To date, no such irreconcilable occurrences have happened.

Dispersed recreation opportunities may be limited in some areas. Snowmobile use in important denning or wintering sites could be restricted. However, restrictions of this nature are usually a redirection of those activities into areas where they are acceptable, not an elimination of that opportunity on the Forest.

By definition, dispersed recreation implies low densities of people. However, occasional concentrations of recreationists can occur in areas with special attractions. Efforts to reduce these concentrations is consistent with quality recreation experiences and land management direction, particularly in wilderness areas, as well as desirable for grizzly habitat management. Generally, low density dispersed recreation is not a measurable conflict with grizzly or wolf habitat management.

Because bald eagle nesting sites are selected by the birds for specific attributes, protection of those nesting territories will limit the kinds of management that can occur. The basic vegetational features of the area must be retained, which can limit timber management. However, only two nests are known to occur on the Forest and one is on private land. Generally, nests are found in riparian habitats, within which management limitations already occur. Therefore, the protection of bald eagle nesting territories will result in very minimal effect on Forest programs.

Irreversible and Irretrievable Commitment of Resources - Protection and maintenance of threatened or endangered species habitat will have an effect on the extraction of some resources. A decision to protect listed species habitat may result in reduced timber output; trees ready for harvest at a certain time may not be available because of protective measures. With respect to the timber market, such losses are irretrievable, but with respect to the biotic community, there will be no irretrievable loss.

Decisions to protect a listed species habitat are based on the Endangered Species Act and, as such, are subject to change as the law is changed. No change in law is anticipated in the foreseeable future, so the commitment to manage habitat for listed species is assumed to be irreversible.

Adverse Effects Which Cannot be Avoided - The management of habitat for listed species is not anticipated to result in any adverse effects to soils, watersheds, or the basic productivity of managed sites. Generally, management for the listed species is that which perpetuates the natural character of the Forest. This may involve a more ambitious prescribed fire program which includes reduced suppression of naturally-ignited fires. Since this is an attempt to let natural forces continue their role in a forested ecosystem, it is not viewed as an adverse effect.

Conflicts with Objectives of Other Land Management Plans, Policies and Controls - Actions identified in the proposed plan with regard to management of listed species habitat are consistent with approved recovery plans (grizzly bear) and responsive to guidelines and plans generally accepted to represent state-of-the-art management (bald eagles, wolves). The Final Forest Plan itself supersedes existing land use plans for the Kootenai and, therefore, represents the current management posture. Similar plans are in existence for adjacent National Forests and the

management strategy for listed species has been coordinated with these Forests. Since the listing for threatened and endangered species applies only to the United States, no similar comparisons can be made with adjacent British Columbia. However, it is not anticipated that management for listed species on the Kootenai will be in conflict with any stated goals for those species in British Columbia.

Energy Requirements - No special energy requirements are associated with the management of threatened or endangered species habitats.

c. Watershed and Fisheries Improvement

Forest management activities directly affect the quality and quantity of water entering the Columbia River Basin. Quality is characterized as generally excellent. Water yield from the Forest is estimated to be 4.1 million acre feet per year. For purposes of land allocation, the Forest is delineated into 112 drainages, having channel stability ratings ranging from "fair" to "good". Drainages can generally withstand up to 14 percent increase in peak flow, without significant channel damage.

Sixteen species of game fish are found in the streams and lakes of the Kootenai National Forest. Six of the species are trout, the most popular of which are the westslope cutthroat and rainbow. The Kootenai River, the second largest stream in Montana, provides some of the best fishing for trout and whitefish in the state (Konizeski, 1982). Trout can attain a large size in the river because of the rich environment. Fishing in Lake Koocanusa above Libby Dam is becoming more popular each year. Trout, both rainbow and westslope cutthroat, are plentiful and kokanee salmon, introduced a number of years ago, are increasing in numbers. Smaller streams on the Forest provide challenging fishing. Species are listed in Chapter 3.

Changes in water quality and fish habitat are affected primarily by road construction and, to a lesser degree, timber harvest. Sediment introduced into streams from these activities can have a significant adverse effect on both spawning and rearing of fish. The sediment can reduce available space for rearing, and, by degrading spawning gravel, decrease egg-to-fry survival. In general, the more sediment produced by an alternative, the greater the reduction in fish habitat potential. Watershed analysis will be a part of all analyses for road construction and timber harvest to assure the channel stability and sediment levels in streams are within acceptable levels. Maintenance of fisheries by controlling excessive sedimentation from roads and timber harvest is discussed in the Roads Management and Timber Harvest sections of this chapter.

Projects designed to improve water quality will usually benefit fish. Typical activities include channel stabilization, debris alteration, and revegetation of problem areas. Streambanks weakened by grazing livestock can recover by installing fencing and placing cattleguards at critical junctions (see Range Management section). Although each project usually only covers a few acres, the work is usually very important to recovery on that site and to improving water quality and fish habitat downstream.

Application of these techniques will generally prevent significant impacts upon fisheries downstream from the Forest boundary.

Table IV-31 shows the average annual acreage involved in water quality improvement projects by alternative by decade.

Past placer mining activities have degraded a significant amount of fish habitat on the Forest. Dredging of streams tends to artificially straighten channels, remove large boulders and woody debris, and eliminate riparian vegetation. All these elements are important fish habitat components, adding the necessary structure and diversity to a stream. The Forest is involved in an extensive habitat improvement effort in these areas.

TABLE IV-31					
AVERAGE ANNUAL ACREAGE OF WATERSHED					
IMPROVEMENT AND/OR MAINTENANCE BY ALTERNATIVE					
(Acres/Year)					
ALTERNATIVE	DECADE	DECADE	DECADE	DECADE	DECADE
	1	2	3	4	5
A	93	104	102	129	138
B	92	103	103	124	137
C	93	104	103	123	136
D	93	102	117	132	141
E	90	99	98	121	133
F	67	79	78	76	81
G	88	96	95	116	127
H	86	91	92	112	121
I (CD)	62	62	65	59	67
J (PA)	83	96	92	105	114
JF (FP)	83	96	92	105	114
K	95	99	89	103	111
L	105	101	109	130	142
M	108	92	113	134	180
N	102	99	116	132	135
O	88	102	108	124	132

All fish habitat improvement measures are designed to increase production of wild stocks of fish. Few measures are considered which deal with fish stocking, which is the responsibility of the Montana Department of Fish, Wildlife, and Parks. The Forest's responsibility is to maintain habitat for natural production, important both for total fish yields and for future hatchery stocks. Fish habitat improvement projects, averaging between 30-50 per year on the Kootenai, include replacing or retrofitting the bridges and culverts that were not designed for fish passage in the past, modification of debris jams that are barriers to fish passage, revegetation of streambanks, adding debris where lacking, and construction of plunge pools and overhead cover. The newly created pool in a previously straight, smooth-flowing stream is used by fish for rest, cover, and for wintering-over, reducing the number of fish that die each year from effects of anchor-ice. The material displaced by the pool creates new gravel beds upstream and downstream for spawning and checks the stream's flow during high water. This reduces damage to streambanks and channels from flooding.

These acres include both P&M and KV dollar investments. KV funding, which provides most of the money for habitat improvement, is directly related to the magnitude of timber sales.

Table IV-32 shows the average annual acres of fish habitat improvement by decade for each alternative.

TABLE IV-32						
AVERAGE ANNUAL ACRES OF FISH HABITAT IMPROVEMENT						
BY ALTERNATIVE AND DECADE						
ALTERNATIVE	DECADE:	DECADE	DECADE	DECADE	DECADE	
	1	2	3	4	5	
A	120	130	130	160	170	
B	120	130	130	150	160	
C	120	130	130	150	160	
D	120	130	150	160	170	
E	120	130	130	150	160	
F	100	110	110	110	110	
G	120	130	130	150	160	
H	120	120	120	140	150	
I (CD)	100	100	100	90	100	
J (PA)	120	130	120	140	140	
JF (FP)	120	130	120	140	140	
K	120	130	120	130	140	
L	130	130	140	160	170	
M	140	120	140	160	200	
N	130	130	150	160	160	
O	120	130	140	150	160	

Trout from Lake Koocanusa depend upon the streams feeding into the Lake for spawning. The same kinds of habitat improvement projects planned for other streams will be carried out here to increase the fisheries resource. The State Department of Fish, Wildlife & Parks has legal responsibility for the fish and operates the Murray Springs Hatchery (near Eureka, Montana) for stocking the reservoir and other areas with westslope cutthroat. Presently, the Department is planting vegetation at the upper end (within the U.S. boundary) to encourage an increase in the red-sided shiner, an important food-base for rainbow trout.

Important to water quality and the fisheries resource is the timing of other resource activities, especially during spawning in spring and fall. Mitigation measures include scheduling these activities at times when impacts will have minimal effects on spawning. For example, after fertilized eggs are deposited in the gravel beds, they begin to absorb water and become "water hardened". Following this stage the eggs become more sensitive to any type of disturbance, such as seismic vibrations during mineral exploration. Following this critical period, the eggs soon become "eyed" and are fairly insensitive to shock, although consideration must be given to the fact that these time frames are dependent on water temperature and type of fish.

Water quality is an important issue on the Forest because of the municipal watersheds; Flower Creek, supplying the town of Libby, and O'Brien Creek, supplying Troy, Montana. Management activities are coordinated through

the Water Quality Bureau of the State Department of Health and Environmental Sciences. Road building and stream-crossing construction projects within these drainages must receive State approval. Of major concern is preventing excessive water yield and sedimentation. The Forest Service and the State have a cooperative agreement to implement the "208 Program" on the National Forests in the State of Montana. In this agreement the State Department of Health and Environmental Sciences agrees to recommend the Forest Service as the management agency for the water resources on National Forests in Montana, but the Forest Service agrees to coordinate projects with the Department that have the potential to adversely impact water quality.

When the landownership pattern of a drainage is mixed, there is little the Forest can do about what occurs on portions of streams located on private land. Debris jams, sediment from overgrazing or over-harvest, pollution from fertilizers, mining, or from other wastes are problems beyond the jurisdiction of the agency. However, the Kootenai Forest can recognize those off-site impacts in its own planning and can avoid adding to an existing problem by placing limits on its own management options.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The projects associated with improving water quality and increasing fish passage and migration are designed to maintain or enhance the productivity of existing populations of game fish by protecting their habitat and opening up areas previously closed because of blockages, etc. The timing of activities close to the stream and in-stream is critical to reducing impacts to the fish.

There may be short-term lowering of water quality and removal of streambank vegetation while equipment works near or in the stream. Gabions may be used on some projects that will reduce the natural look until revegetation occurs. There will be some sedimentation during the rock placement of riprap or gabion filling of a short duration. Much of these impacts may be mitigated by working the projects during periods of minimum streamflow.

Irreversible and Irretrievable Commitment of Resources - There are few irreversible or irretrievable commitments of resources associated with watershed or fish habitat improvement projects because of the limited area that is involved.

Adverse Effects Which Cannot be Avoided - The stream bottom will be disturbed and water quality will deteriorate for a short period of time when people are working in streams to stabilize channels and manipulate debris.

Conflicts with Objectives of Other Land Management Plans, Policies and Controls - Prior to initiation of any project, it is subjected to analysis under procedures defined by the National Environmental Policy Act. Effects are identified at that stage as well as any conflicts between agency goals. Generally no conflicts exist, because the goals of the Forest and those of other State and Federal agencies are to improve water quality and protect the fisheries resource.

The State Department of Fish, Wildlife, and Parks is responsible for management of the fisheries resource, the U.S. Forest Service for management of the fisheries habitat within National Forest boundaries. It is difficult to separate one from the other; the welfare of fish is directly dependent on water quality. For this reason, close cooperation between the two agencies is essential. A Memorandum of Understanding exists, supporting this cooperation. These efforts result in an exchange of ideas and recommendations concerning land management activities, such as timber harvest and road management.

The Northwest Power Planning Council, funded by the Bonneville Power Administration to develop regional plans designed to offset adverse impacts to fisheries from past dam construction, works through the State Department of Fish, Wildlife, and Parks on mitigation projects. No conflicts exist between the goals of the Forest and the Council. It is possible that some funding will come to the Kootenai for fishery mitigation projects.

Energy Requirements - Energy will be required to complete the projects and to monitor watershed conditions on the Forest, but this will be a small portion of the total Forest use.

4. Recreation

a. Developed Recreation

Fifty-four developed recreation sites are located on the Forest. The sites include 28 campgrounds, 7 developed picnic grounds, one winter sports area, and 18 boating sites, some with swimming beaches. These sites occupy 2,320 acres and have little or no effect on management of other resources because of their protected status. All developed sites, for example, have been withdrawn from mineral entry. Vegetation is managed solely for the purposes of retaining adequate ground cover and providing desirable recreation settings.

Several developed sites on the Kootenai are heavily used. Those being used at or near capacity include Little and Big Therriault Lakes, Tobacco River, Peck Gulch, Dorr Skeels and North Dickey Lake. Sites on the shores of Lake Koocanusa have seen increasing use levels. These sites and others often serve as a base of operation for dispersed recreation activities. Campers will take off from these bases with backpack or trailbike to visit other parts of the Forest.

The use of pavement in these campgrounds, necessary to prevent soil and water problems from excessive trampling, increases overland flow because of removal of vegetation. Other environmental degradation takes place because of increased sewage, garbage, water pollution, and vandalism.

Developed recreation sites attract people to the area from other regions. This increased population, although transient, benefits the local economy.

Although the demand for developed recreation is expected to steadily increase, the Forest will be able to comfortably meet that demand without

expansion of facilities for at least two decades. More intensive management can help the existing sites service more people and satisfy demand for as long as 10 decades if use were evenly distributed. Certain sites are more attractive than others, thus demand can not be expected to be equal for all sites. The increasing recreational importance of the Kokanee salmon fishery in Lake Koochanusa is drawing increased use to that area while other, less attractive, areas are under-used. Some expansion of existing facilities and possible creation of new ones along with closure of unused facilities are being considered now to meet growing demand for sites in the more attractive areas.

: TABLE IV-33		
: PROJECTED DEMAND FOR DEVELOPED RECREATION		
: (RVD's)		
:		
:		
	<u>Decade</u>	<u>Demand</u>
	1	296,000
	2	325,000
	3	354,000
	4	385,000
	5	417,000
:		
:		

Developed recreation sites are high-cost-per-acre facilities because of construction, maintenance, cleanup, monitoring and policing. In recent years, some of these responsibilities have been shouldered by volunteers who work for the Forest for a nominal fee as Campground Hosts. Their presence is believed to be a major deterrent to vandalism at the developed sites.

Use fees, which cover only part of administrative costs, are becoming accepted by the public as appropriate and necessary as long as they are tied directly to the kinds of facilities provided, i.e., the more highly developed, the greater the charge. These fees have little effect on the PNV of the Forest, although at some heavily used sites, such as Rexford Bench, the fees are almost covering administrative costs.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Developed sites are important to the public's overall recreation experiences. Sites are typically committed to long-term use. The effects of roading and use could be expected to be obvious for a long period of time even if the sites were abandoned. Efforts to restore an abandoned site to previous vegetative productivity would be costly.

Acreage committed to developed recreation is available for only limited timber production (generally to remove hazardous trees or to maintain the attractiveness of the site). Because of the concentrated use of the area, the vegetation is often suppressed.

Irreversible and Irretrievable Commitment of Resources - Once established, these sites are likely to be maintained as recreation sites and become an irreversible, long-time commitment to that resource. The amount of wood

fiber and forage which would have been produced on the sites are irretrievably reduced.

Adverse Effects Which Cannot be Avoided - Some of the vegetation on these sites will be lost or suppressed. Dust and noise will be produced from the concentration of campers. The opportunity for vandalism will be present due to the numerous and costly facilities concentrated in one place. Some of the wildlife habitat in the area will be destroyed or vacated. Riparian areas and their associated resources (water, soils, vegetation) can be negatively impacted.

Because developed sites are often located in riparian zones, they are sometimes located on or near significant archeological and historical sites. Risk of damage to those sites exists, but care is taken to prevent development activities from adversely affecting cultural resources.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - Non-fee or low-fee Forest Service campgrounds situated near private "pay" campgrounds can provide unfair competition for the private operation. One remedy is to charge more for use of the Forest Service site. Facilities provided by private campgrounds tend to be more extensive than those provided by the Forest Service thus the product is different enough from the user's perspective so that differentiation based only on price is generally limited.

Energy Requirements - Energy is needed to cleanup and maintain these sites. ~~Most campgrounds will require garbage removal on a regular basis~~ and yearly maintenance of the facilities will be energy-intensive. Users will consume energy proportionate to the distance they travel and time spent in use of the areas. Over the planning period, such requirements would generally increase proportionally with use levels.

b. Dispersed Recreation

Dispersed recreation can take place on land or water and involves activities that do not depend on developed sites. Generally speaking, people are dispersed throughout an area rather than concentrated, as they would be at a campground. Management for dispersed recreation sometimes includes construction and maintenance of facilities such as toilets, hitching racks and parking areas, or of systems such as trails. The purpose of these efforts is to enhance the recreation experience of the Forest visitor and to protect other resources.

The effects of these activities on soils, water, and vegetation are similar to those discussed for developed recreation sites; the difference in environmental degradation is a matter of degree, with dispersed recreation producing fewer problem areas that require rehabilitation.

Occasionally a dispersed site becomes very popular and begins to receive concentrated use that can, in time, pose soil and sanitation problems. Close monitoring of the site is essential to keep impacts to a minimum. Some change in management, such as conversion of the site to a developed one, may become necessary to protect the basic resources.

Some areas prove to be more vulnerable than others, such as riparian or streamside ecosystems where campsites and trails are often located. Although effects for the most part are localized to these small areas, soil compaction, overland flow, erosion, and degraded water quality can occur and have effects downstream (Cole and Schreiner, 1981; Pacha, 1980). If it appears that an area is not going to be able to recover sufficiently for the next season of use, the area can be closed and detours designed to divert traffic away from the site.

Off-road vehicles can also adversely impact soil, vegetation, and water in heavy-use areas or those that are highly erosive. The impact of horse and foot traffic in wet or sensitive areas is even more common. Trails and campsites show significant resource damage when use becomes concentrated and visitors fail to properly dispose of wastes or fail to bring sufficient food for livestock. Bacterial contamination of streams and lakes by such organisms as Giardia lamblia can result from these abuses as well as from natural causes. Unless a visitor knows how to obtain water that is potable, he may be subject to physical distress. Temporary closure of an area may be the only solution to full recovery of the vegetation. Signing of the area can help to educate the public passing by to understand the reasons for the closure and the need to disperse people to other sites.

Dispersed recreation occurs in two settings: roaded and roadless. The amount of each is directly related to the amount of timber harvest and roading allowed under each alternative (see the sections on timber harvest and road management in this chapter). Many forms of dispersed recreation are a byproduct of timber harvest. Activities enhanced by roads include wood-gathering, sightseeing, snowmobiling, motorcycling, hunting and camping. Roads closed seasonally to protect wildlife and other resources still provide ready access to hunters and others who are traveling on foot or horseback.

Primitive (wilderness) and semi-primitive non-motorized recreation requires a roadless setting. Activities occurring here can include horseback riding, hiking, hunting and fishing, and cross-country skiing.

Semi-primitive motorized recreation requires a predominantly natural-appearing setting with access primarily by trails and primitive roads. Activities occurring here include trail biking, snowmobiling, four-wheel driving, and motor boating.

With the exception of acreage set aside for wilderness and for roadless recreation, most forms of dispersed roaded recreation can occur anywhere on the Forest wherever roads are open and where there are no site-specific restrictions.

The following table displays the acreage available to meet the demand for all forms of recreation other than developed. For ease of discussion, the term "dispersed recreation" is used.

TABLE IV-34			
ACREAGE AVAILABLE FOR DISPERSED RECREATION			
(Thousands of Acres)			
Alternative	Roadless Recreation	Roaded Recreation	Wilderness Recreation
A	304	1,848	94
B	262	1,818	158
C	244	1,827	176
D	252	1,836	158
E	196	1,770	281
F	307	1,845	94
G	135	1,712	399
H	88	1,663	498
I-CD	284	1,805	158
J-PA	358	1,728	160
JF-FP	348	1,724	173
K	358	1,728	160
L	255	1,897	94
M	295	1,857	94
N	299	1,853	94
O	399	1,672	176

The "roadless" category includes the acres identified by the roadless inventory, the Ten Lakes Montana Wilderness Study Area, as well as smaller pieces scattered throughout the Forest. (If a roadless area was under 5,000 acres in size, it could not be counted as part of the official inventory. These non-inventoried roadless lands total approximately 60,000 acres.) The "wilderness" category includes both existing and recommended wilderness. Most of the alternatives mix roadless and wilderness acres in a way that reflects their individual emphases. For example, Alternative H maximized wilderness. It included wilderness designation for all inventoried roadless acres and thus recommended "roadless" allocation for very few other acres.

The "roaded" category of recreation constitutes the majority of the recreation opportunity because most of the Kootenai Forest is roaded (74%) to some extent. In contrast, the "unroaded" category (wilderness and roadless) totals approximately 26% of the Forest. The range of alternatives for the "unroaded" category runs from a high of 26% (Alts. H and O) to a low of 16%. This represents a high of 586,000 acres (Alt. H) and a low of 349,000 acres (Alt. L) or a difference of 237,000 acres. The difference between the high and low ends of the "unroaded" category is the result of different amounts of land being recommended for timber management. Acres to be logged require the construction of roads. When the roading occurs, the "unroaded" recreation category ceases to exist.

Table IV-35 displays the expected demand for dispersed recreation, both roaded and unroaded, over the next fifty years. This demand will be met

through designation of a portion of the Forest's 404,000 inventoried roadless acres as well as through designation of some of those smaller scattered parcels that could not be counted as part of the roadless inventory. Roaded recreation, particularly driving for pleasure, will be easily satisfied through the existing and proposed road system (see the section on road management in this chapter for miles of road proposed under each alternative). The reader is also referred to the sections in this chapter on roadless areas and wilderness.

.....					
: TABLE IV-35					
: PROJECTED DEMAND FOR DISPERSED RECREATION					
: (Thousands of Recreation Visitors Days [RVDs])					
:					
: Recreation -					
: Type					
: DECADE					
: 1 2 3 4 5					
: Roaded 436 478 521 566 615					
: Roadless 123 135 147 160 173					
: Wilderness 18 20 22 23 25					
:					

"Roadless" refers to both "semi-primitive non-motorized" and "semi-primitive motorized recreation", as described in Chapter 3 in the section on the recreation resource. The Table above shows an increased demand for all forms of recreation over the next 50-year period. "Demand", as used here, assumes that the cost to the public to recreate will remain constant over time. A diversity of settings, both roaded and unroaded, are needed to satisfy predicted use.

Analysis has shown that the Kootenai has the capacity to meet expected demands for all forms of dispersed recreation for the next six decades. Beyond the sixth decade, however, the demand for semi-primitive motorized recreation opportunities is expected to exceed capacity based upon demand projections (see Chapter II, Table II-7).

In general, when projected recreation use approaches capacity, the quality of the experience is degraded if use is not limited. Excessive use can cause erosion, soil compaction, and loss of vegetation along main trails and roads, and at the more desirable campsites. These are minor effects if the total Forest is being considered, but are important esthetically to those people using the trails, roads, and campsites.

Management of the Forest for a balance of diverse recreation settings will affect the local economy. Those businesses and people dependent on recreation and tourism will benefit from a recreation program that provides for a wide range of settings and opportunities. There will be effects on the wood products industry as some timber-producing areas are removed from the timber base. The magnitude of these impacts are covered in Chapter II.

Direct revenue from dispersed recreation is insignificant under current national policies, but because values have been assigned to recreation visitor days, dispersed recreation has a value and a positive effect on the present net value of the Forest. The relationships between income and jobs in the timber industry (manufacturing) are different from those in the recreation (services) sector. As discussed in Chapter II and Appendix B, increases in recreation opportunity which are formed by removal of land from the suitable timber base cause a net decrease in jobs and income because fewer, lower paid service sector jobs supplant more numerous, higher paid manufacturing (lumber) jobs.

Dispersed recreation opportunities are important to maintaining traditional lifestyles in the local and regional area.

The costs per acre for maintaining dispersed recreation sites are generally less than those for developed sites.

Hunting is considered in this section because it is viewed by most people as sport or recreation. To a small population of outfitters and guides, it is also a major source of income. The northwest corner of Montana is becoming increasingly popular for hunting because of the number, quality and diversity of big game species found here.

Regulation of big game numbers is the responsibility of the Montana State Department of Fish, Wildlife, and Parks; management of big game habitat is the responsibility of the Kootenai Forest. The number of acres made available for both summer and winter ranges will ultimately have a bearing on the numbers of big game available for hunting. (The reader is referred to the section in this chapter on big game management that describes measures to improve and increase big game habitat.)

Elk are used as an indicator species for big game. In all alternatives, the size of the elk herd is increased over time by increasing the number of acres of both summer and winter range. (Current habitat supports an estimated population of 5,500 elk; the potential exists to support a population of about 10,000 elk.) Table IV-36 displays the increased hunting potential resulting from that action, by alternative, over a 50-year period. Included are both elk and other big game hunting.

Larger big game populations have the potential to increase recreation use and generate a greater number of hunting license fees for the State and to affect the local economy in a positive way. Game populations respond slowly to changes in land management as envisioned in the Proposed Action and the other alternatives. For this reason the populations are essentially the same in all alternatives in the first decade and then begin to diverge in future decades. Hunter recreation is expected to follow suit.

TABLE IV-36

POTENTIAL HUNTER RECREATIONAL VISITOR DAYS
(Thousands per Year)

Alternative	Decade				
	1	2	3	4	5
A	65	109	174	216	268
B	65	110	176	217	269
C	65	110	175	217	270
D	65	105	166	203	256
E	65	109	174	216	268
F	65	119	204	250	317
G	65	109	176	217	270
H	65	110	177	219	273
I (Curr. Dir.)	65	100	150	184	231
J (Prop. Act.)	65	105	164	202	248
JF (Final Plan)	65	103	164	202	254
K	65	106	164	202	248
L	65	109	175	214	269
M	65	108	171	212	262
N	65	109	173	214	266
O	65	110	176	217	273

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The short-term use (construction and maintenance) of trailhead facilities, toilets, hitchracks, stock ramps, and loading areas will produce long-term effects on productivity of the sites similar to those experienced at developed recreation sites, but over smaller areas. Although trails can be abandoned and may eventually return to near-original condition, this is not likely to happen as long as the demand for dispersed recreation remains high.

Irreversible and Irretrievable Commitment of Resources - Once facilities and trails are constructed, they are likely to be maintained into the foreseeable future. The vegetation displaced by these facilities constitutes an irretrievable loss of that resource.

Adverse Effects Which Cannot be Avoided - The loss of vegetation because of the construction and maintenance of the facilities and trails cannot be avoided. Facilities and trails will tend to concentrate use in certain areas and along certain routes which can, in turn, lead to soil erosion and water diversion. Mitigation can include site-specific closures and use restrictions until the area recovers. Adverse effects of roadless management would be the same as those discussed in wilderness and roadless areas.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - Dispersed recreation may conflict with other resource uses such as timber harvest and mineral exploration and development. Timber harvest can eliminate segments of existing trails if prescriptions do not allow

for their protection. Also, development of adjacent private lands may limit access to trails and other sites located on Forest Service land.

Energy Requirements - Less energy is required for the maintenance of dispersed recreation facilities than for maintenance of developed sites. Some energy is required to clear and maintain trails but this is small compared to total energy use on the Forest. In the past few years, energy expended for trail maintenance has shifted from the government to the private sector as organizations such as the Backcountry Horsemen become active in maintaining trails on the Kootenai.

The major use of energy associated with dispersed recreation is that used by the public in getting to the recreation areas. Generally, the more remote the area, the more energy required to get there.

5. Mining and Oil and Gas Exploration and Development

Mineral activity on the Kootenai Forest involves (1) locatable minerals, (2) oil and gas, and (3) common variety materials such as sand and gravel. Increases in exploration and/or production efforts are expected for all three categories. It is important to note that, unlike many resources the Forest manages, mineral activity levels and locations are generated by specific actions on the part of the minerals industry rather than a program established by the Forest Service. Further, these actions are the result of exploration processes aimed at discovery and evaluation of resources not previously known. For these reasons, accurate projections regarding when and where specific activities will take place are difficult to make.

The following section includes reference to some impacts on other resources caused by mineral activity. It is also important to note the impacts which Forest management of other resources can have on mineral activities. The most severe limitations occur in areas being managed for wilderness which now are only available for mineral activity if mineral rights had been established prior to the area being withdrawn from mineral entry.

Additional limitations occur in some areas being managed for certain wildlife and recreation resources. The timing and location of exploration activities are strictly regulated by considerations for such things as key wildlife habitats, areas being managed for semi-primitive recreation, and developed recreation sites. The net effect of these various management practices on mineral activities has been to substantially reduce the area and time available to conduct work. These practices have also greatly increased the cost and complexity of conducting mineral operations on Forest lands.

The principal interactions of mineral development with other resources are generally similar to those described for road building and timber harvests. Some key interactions that differ from other Forest activities are cited below.

a. Locatable Minerals and Common Variety Materials.

Locatable minerals are those for which mining claims can be staked; common variety materials include such things as sand and gravel.

Activity related to locatable minerals is high on portions of the Forest. This reflects a combination of sustained demand for the commodities involved and the high mineral potential on these particular areas (See Chapter III for more discussion).

Locatable mineral activity is expected to increase regardless of the alternative selected. There are more than 7,500 mining claims on the Forest but only a small portion of them result in surface-disturbing activity in any given year. Most of the activities on these claims are exploratory efforts such as geologic mapping, geochemical and geophysical prospecting, and core drilling. Currently, there are two major mines in operation within the Forest boundary; one of these produces silver and copper (ASARCO) while the other produces vermiculite (W.R. Grace). Another large scale silver-copper mine has been proposed by ASARCO at the south end of the Cabinet Mountains. Underground portions of this proposed mine would extend within the Cabinet Mountains Wilderness area itself, but access to the deposit would be gained by tunnelling in from outside the wilderness.

Several companies have been exploring for additional locatable mineral deposits on the Forest in recent years. Most of the exploration has taken place in the southwestern quarter of the Forest, much of it directed toward silver-copper deposits such as the one currently being mined at Troy. Other commodities actively being sought on the Forest include gold, lead, and zinc.

Surface protection requirements incorporated in exploration plans are designed to protect such resources as wildlife and fisheries, air and water quality, archeological sites, recreation and scenic values. These requirements result from a variety of federal and state laws and regulations. Site reclamation measures are an integral part of these requirements. Compliance inspections by Forest personnel carried out during the operations assure that the surface protection requirements are met.

Discovery and development of large mineral deposits can affect the physical, biological, social and economic environments. Vegetation, water quantity, soils at mine sites, and visual resources are most directly affected while water quality, wildlife and local communities receive less direct effects. A key direct effect which could occur is sediment discharge into streams from ruptured tailings pipelines or settling impoundments; proper design and maintenance can generally reduce this risk. The potential adverse effects on the physical and biological environments can be largely avoided or mitigated through surface protection measures.

The indirect effects on grizzly bears is a particularly important consideration on the Kootenai. Grizzlies receive special protection under the Threatened and Endangered Species Act. This protection imposes

limitations on how activities may be conducted in grizzly bear habitat. Conflicts between mineral activity and grizzlies are routine on the Kootenai since much of the area known to have high mineral potential falls within grizzly habitat.

In general, the effects on social and economic environments caused by mineral development are not under the influence of the Forest Service. Should an influx of people come into the area as the result of the development of a large mineral deposit, a mix of positive and negative effects on local services, organizations and facilities could occur. Perceptions as to what constitutes a positive or negative change can be expected to vary. The effects of an influx of people can sometimes be lessened or avoided by hiring local people, as was done when the Troy mine was opened.

Activity associated with extracting common variety material is modest but widespread on the Forest. Most of the activity involves the creation of numerous small borrow pits from which material is taken for road building and road maintenance. A few areas on the Forest have produced building stone. Demand for each of these materials is expected to increase slightly in the next few years; traditional source areas will be able to satisfy the bulk of this demand.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Contemporary locatable mineral exploration methods are likely to have only nominal long-term effects on the productivity of specific sites. Development of mineral deposits, on the other hand, consistently involves long-term effects on site productivity where roads, tailing ponds, and millsites are involved. These long-term effects are typically quite local, (e.g., the ASARCO mine at Mt. Vernon occupies approximately 300 acres).

Activity related to common variety materials tends to influence long-term productivity in that the sites are typically used intermittently over long periods of time but receive only modest reclamation measures during the life of production. This is largely offset by the small size of the areas typically involved. Also, many of the materials are common enough that when new source areas are needed it is often possible to select one involving a minimal surface resource trade-off.

Irreversible and Irretrievable Commitment of Resources -- If locatable mineral development takes place, commitment to removal of the mineral resource becomes irreversible unless economics dictate otherwise. Disturbed sites may be rehabilitated and, although the vegetation lost while the development was in place is not retrievable, the site preparation could actually maintain or improve future productivity. Similar considerations apply to common variety activities but to a lesser extent.

Adverse Effects Which Cannot Be Avoided -- If mineral exploration and development occur, soil will be disturbed, erosion may occur, and water quality and quantity may be lowered. Visual resources are mainly affected by the development phase. Wildlife and fish habitat may be impacted; some impacts can be mitigated by regulating periods of activity or by providing

compensation for lost habitat. The wildlife habitat considerations on the Kootenai may be particularly important in that much of the area identified as having high mineral potential is also identified as being grizzly bear habitat. Similar considerations apply to common variety materials but on a smaller scale.

Conflicts with Objectives of Other Management Plans, Policies and Controls
Mineral activities on the Forest will not conflict with any other land management plans. Due to applicable laws and regulations, locatable minerals may take precedence over other activities and resources; therefore, conflicts with other policies and controls are likely. The situation where this will most likely occur is where statutory rights to explore for and mine mineral deposits (Mining Act of 1872) conflict with the agency's statutory obligation to protect threatened and endangered wildlife species (Endangered Species Act). For example, locatable mineral activity can and does take place in areas where the Forest is trying to limit other human activity in order to help protect grizzly bears. This type of conflict is not expected to occur in extracting common variety materials because of existing controls and availability of these materials.

Energy Requirements -- Energy requirements should continue to be a small portion of the total Forest need. Some energy will be used in monitoring exploration, mine development, and mineral production activities. The energy consumed by the private sector in actually developing a mine can be quite large.

b. Oil and Gas

Although the potential for oil and gas production on the Forest is unproven, demand for oil and gas leases is expected to remain high for the next few years at a minimum. If production potential is proven, the demand for leases and exploration and production permits would probably increase rapidly and remain high for several decades in the affected areas.

As of October 1984, more than 1.5 million acres of the Forest had been leased for oil and gas. Applications to lease another half million acres were being processed at that time. The Forest's role in processing these applications is to determine whether or not a lease should be issued and, if so, what stipulations need be attached to the lease to protect surface resources and uses. These findings are then forwarded in the form of recommendations to the Bureau of Land Management which has the actual authority for issuing or denying oil and gas leases. Leases for virtually all the remaining available acres are being processed. When existing leases expire, new leases will be based on further environmental analysis.

Oil and gas exploration activity on the Forest has been modest thus far and has consisted mainly of geologic mapping and a variety of reconnaissance level geophysical surveys. Exploratory drilling took place along the eastern boundary of the Forest in 1983-84; further drilling projects may determine whether or not subsequent drilling takes place further west on the Forest.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Leasing, in and of itself, does not affect vegetative productivity. Preliminary exploration such as seismic work should not alter productivity either because of the regulatory controls available. Exploratory drilling would have short-term effects on surface resource productivity in the immediate vicinity of the project. Site reclamation at abandoned wells should lead to restoration of vegetative productivity for most of the area over the long-term. Successful exploratory wells and the field development that may follow could have a marked influence on the surface resource of large areas over the long-term. Perhaps the single most influential aspect would be the road system used to develop and maintain an oil or gas field. Because development of an oil or gas field typically involves a large area rather than a particular spot (such as a mine involves), and because the prospects in this area may be large, the potential for widespread effects on site productivity may be greater for oil and gas exploration and development than that for locatable minerals. Conversely, the effects in any one area may be less intense.

Irreversible and Irretrievable Commitment of Resources -- Leasing for oil and gas does not constitute an irreversible commitment of resources. If field production takes place, however, such a commitment will occur.

Adverse Effects Which Cannot Be Avoided -- Considerations here are similar to those identified for hardrock mineral exploration and development. Differences include the demand that could exist for water during the drilling of deep wells, and the effects on wildlife, water quality, recreation, and visual resources that could result from the road network and-traffic-associated-with-a-producing-field. Here-again, there-are numerous management options available to avoid, mitigate, or compensate for these potential adverse effects. The Forest Service retains considerably more discretionary authority with oil and gas activities than it does with locatable minerals activity; therefore, the opportunities to exercise various management options are actually greater than those for locatable minerals.

Conflicts with Objectives of Other Management Plans, Policies and Controls
Some areas which would generally be managed for uses not dependent on roads could, in fact, be roaded for oil and gas purposes.

Energy Requirements -- Energy requirements should continue to represent a very small portion of the total Forest needs for the next few years. Some energy will be used in monitoring geophysical exploration and possible drilling projects during that period. Should discoveries of economic volumes of oil and gas be discovered, the energy requirements could increase considerably. Because of the large areas that could be involved, the number of individual operation locations, and the number of different operators conducting the work, the energy requirements could be much greater than those associated with the production of locatable minerals.

6. Wilderness Management

The Kootenai Forest manages the 94,400-acre Cabinet Mountains Wilderness, which has the capacity to support 47,000 Recreation Visitor Days a year.

The amount of use reported in 1984 was 18,000 RVDs, with the major recreation use areas sustaining increased degradation from loss of vegetation and soil.

Future wilderness use on the Forest is predicted to reach 25,000 RVDs by the fifth decade. If this use were evenly distributed, the Cabinet Mountain Wilderness could accommodate it. Since use tends to concentrate in a few popular areas, management problems can be expected to intensify.

The Forest has approximately 438,000 acres of potential wilderness, including the 404,000 acres of inventoried roadless area plus the 34,000-acre Ten Lakes Montana Wilderness Study Area (MWSA). In the wilderness alternative (Alt. H), all of the potential wilderness was assigned to that purpose, resulting in a 219,000 RVD capacity. This potential capacity plus the existing wilderness provides a total capacity of 266,000 RVDs, roughly ten times what the demand is expected to be by the fifth decade.

The amount of wilderness in each alternative is dependent on the goals and objectives for that particular alternative.

TABLE IV-37

WILDERNESS ACREAGE (ESTABLISHED AND RECOMMENDED) BY ALTERNATIVE
(Thousands of Acres)

ALTERNATIVE	ESTABLISHED	RECOMMENDED	TOTAL	10 LAKES MWSA STUDY AREA
A	94.4	0	94.4	34.0
B	94.4	63.9	158.3	34.0
C	94.4	81.3	175.7	34.0
D	94.4	63.9	158.3	34.0
E	94.4	186.6	281.0	34.0
F	94.4	0	94.4	34.0
G	94.4	304.9	399.3	34.0
H	94.4	403.7	498.1	34.0
I - CD	94.4	62.9	157.3	34.0
J - PA	94.4	66.5	160.9	34.0
JF - FP	94.4	78.5	172.9	34.0
K	94.4	66.5	160.9	34.0
L	94.4	0	94.4	34.0
M	94.4	0	94.4	34.0
N	94.4	0	94.4	34.0
O	94.4	81.3	175.7	34.0

All of the alternatives exceed the acres required to meet the future demand for wilderness of 25,000 RVDs (50,000 acres). Alternative F gives greatest emphasis to big game habitat improvement and does not recommend any further allocations to wilderness. Alternative I (Current Direction) and Alternative J (Proposed Action) are quite similar in the amount of total acreage proposed, but differ in the locations recommended.

The Proposed Action (Alt. J) recommends additional wilderness on 67,000 acres: Scotchman Peak (24,000 acres), land adjoining the Cabinet Mountains Wilderness (36,000 acres), and land adjoining the Ten Lakes Montana Wilderness Study Area (7,000 acres). The Proposed Action also recommends 26,000 acres within the Ten Lakes MWSA for wilderness. However, because this area has been designated as a "wilderness study area" by Congress, its acreage is not included in the inventoried roadless area totals and is discussed separately. It is not, for example, reflected in the totals in the above table. (For more detail on this area, see the Ten Lakes Report and Proposal when available.)

The Proposed Action (Alt. J) provides wilderness recreation opportunity in excess of the expected demand for wilderness recreation. It recommends that an additional 202,000 acres or 50% of the inventoried roadless area be managed in a roadless condition. This, together with the wilderness proposal of 67,000 acres, the Ten Lakes MWSA proposal of 26,000 acres, and the existing Cabinet Mountains Wilderness (94,400 acres), provides more than enough acreage to support anticipated demand for wilderness recreation well into the future. Highlighting the opportunities available in these additional areas by designation as Wilderness may provide additional dispersion of users and reduce the area specific impacts mentioned above.

The Final Plan (Alternative JF) is the same as the Proposed Action except that an additional 12,000 acres of Wilderness is recommended in the Pellick Ridge portion of the Proposed Scotchman Peaks Wilderness. This area had been designated for other unroaded uses in the Proposed Action because mineral values on a portion of the area were thought to be high. More recent information from exploratory work in the area indicates that the mineral values are moderate.

There are few activities associated with wilderness areas other than maintenance of trails and dispersed camp sites (discussed in the recreation section of this chapter), although the establishment of these areas will, of itself, have effects on other resources and uses. Any activity not in keeping with the intent of the Wilderness Act of 1964 will be prohibited. Timber will not be cut, roads will not be built, and minerals will not be mined unless there already exists a valid mining claim. And after designation as wilderness, the area will be closed to further mineral entry. Few of the areas recommended for wilderness by Alternative J contain such claims.

Because natural fires have been suppressed in past decades, and because much of the Cabinets is in a high precipitation zone with long fire intervals, outbreaks of insect and disease infestations can be expected to occur. Allowing fire to play a more natural role will lessen the frequency and intensity of these infestations. As visitor use increases, there may be an increase in frequency of person-caused fires within the wilderness, particularly if people expand into new camp sites with dense vegetation. The fire action plan for the Cabinet Mountains Wilderness calls for suppression of all person-caused fires.

An increase in wilderness classification is an increase in acres designated to recreation, which can have a positive effect on the local economy by attracting tourists to the area. Where potentially commercial forestland is removed from the regulated timber base, economic activity in the timber sector can be expected to decline.

Wilderness classification benefits cavity-dependent species and threatened and endangered species. In the case of the former, old growth habitat remains undisturbed, although it is possible in time that large areas will be destroyed by fire because of fuel accumulations. The habitat of threatened and endangered species will be enhanced because of the relative lack of disturbance to be expected in a setting that remains roadless.

Wilderness classification can affect PNV either positively or negatively, depending on the value of the commercial timberland within the wilderness. If the timber values on a piece of land are insufficient to offset the cost of harvest and this land is in wilderness, then the effect on PNV can be positive (less costly to manage as wilderness than to harvest). On lands where the timber values are greater than the cost of harvest and are said to have a positive PNV, the effect on PNV would be negative if these lands were placed in wilderness and unavailable for harvest. Generally, assigned wilderness values are insufficient to offset timber values if any positive return can be attained by timber management.

About 245,000 acres of commercial timberland are in the inventoried roadless areas. Of that, about 17% (41,000 acres) is of marginal value (a negative PNV), borne out by the fact that the maximum PNV alternative (Alt. M) allocates about 204,000 acres to timber harvest (indicating that these acres help contribute to increased PNV when designated for timber harvest and the remaining 41,000 acres do not.)

The following table shows the amount of commercial timberland located in proposed wilderness for each alternative. This analysis did not include any timber within the existing Cabinet Mountains Wilderness.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
The establishment of wilderness has some effect on long-term productivity. Although native productivity of resources is maintained and gene pools are protected at maximum levels under wilderness, opportunities to increase productivity through management of timber and wildlife habitat resources are foregone because vegetative manipulation such as timber harvest and wildlife habitat burning are not permitted. Primitive recreation opportunities are maximized as well as maximum protection being given to old-growth timber and its associated wildlife habitat. Threatened or endangered plant and animal species are protected but little can be done to improve their habitat if needed. Natural-appearing landscapes are preserved although buildup of natural fuels may increase risks of wildfire.

TABLE IV-38	
COMMERCIAL TIMBERLAND IN PROPOSED WILDERNESS	
ALTERNATIVE	ACRES
A	0
B	30,400
C	38,700
D	30,400
E	106,700
F	0
G	172,700
H	245,100
I - CD	30,400
J - PA	27,900

JF - FP	34,300

K	27,900
L	0
M	0
N	0
O	38,700

Irreversible and Irretrievable Commitment of Resources - Establishment of wilderness areas effectively commits those areas to wilderness management, although it is possible for Congress to revoke wilderness classification. This event is probably unlikely except under unusual circumstances such as a national emergency. The classification will usually result in an irretrievable loss of the opportunity to manage timber. It also restricts the exploration for and removal of mineral resources unless prior rights were established.

Adverse Effects Which Cannot be Avoided - Management activities permissible in wilderness, when authorized by the 1964 Wilderness Act or wilderness management plans, can cost more than activities in areas without the restrictions. Restrictions apply primarily to mode of transportation, use of mechanized equipment such as chainsaws and removing signs of any intrusion after project completion. When permitted, activities such as mineral exploration, disease and pest control, and fire suppression would be conducted while protecting the wilderness values. Activities such as these in a wilderness setting usually require more time, adherence to more stringent requirements, and more money. The exception is fire suppression, which can be far less costly because of the policy to allow fire to play a more natural role in the wilderness ecosystem.

Conflicts With Objectives of Other Land Management Plans - Wilderness classification can conflict with air quality plans for surrounding areas because of the high quality air standards required in wilderness.

Energy Requirements - Of all areas on the Forest, wilderness makes the least demand on energy use. It is possible that wilderness users will expend

considerable energy in travel to and from wilderness areas, but little additional energy will be used within the area itself.

7. Management of Roadless Areas

The amount of designated roadless area in each alternative is dependent on the goals and objectives of that alternative. There are few activities, other than trail maintenance, associated with unroaded management. Other activities undertaken in roadless areas are discussed elsewhere in this chapter, such as in the section on "recreation" which deals with hunting, fishing, berry picking, etc. Appendix C discusses individual roadless areas.

There are 404,000 inventoried roadless acres on the Forest. (This does not include the 34,000 acres contained within the Ten Lakes Montana Wilderness Study Area-MWSA). In addition, there are approximately 60,000 acres that did not qualify for inclusion in the roadless inventory because individually the parcels were under 5,000 acres in size. Total inventoried roadless acres designated to be retained in a roadless condition (excluding the recommended wilderness) under each alternative are shown in the following table. Similar acres that were not a part of the official inventory are labeled "Other".

: TABLE IV-39 :				
: DESIGNATED (NON-WILDERNESS) ROADLESS AREAS :				
: BY ALTERNATIVE :				
: (Thousands of Acres) :				
: ALTERNATIVE	: INVENTORY	: OTHER	: TOTAL	:
: A	: 211.2	: 60.0	: 271.2	:
: B	: 164.4	: 63.4	: 227.8	:
: C	: 150.8	: 59.0	: 209.8	:
: D	: 155.4	: 63.0	: 218.4	:
: E	: 98.9	: 63.0	: 161.9	:
: F	: 209.0	: 64.0	: 273.0	:
: G	: 53.1	: 48.0	: 101.0	:
: H	: 0	: 54.0	: 54.0	:
: I - CD	: 174.2	: 76.0	: 250.2	:
: J - PA	: 202.1	: 122.0	: 324.1	:
: ----- :				
: JF - FP	: 192.1	: 122.0	: 313.2	:
: ----- :				
: K	: 202.1	: 122.0	: 324.1	:
: L	: 158.6	: 62.0	: 220.6	:
: M	: 199.6	: 61.0	: 260.6	:
: N	: 204.7	: 60.0	: 264.7	:
: O	: 322.4	: 42.0	: 364.4	:
: ----- :				

Alternative O designates the greatest number of total acres to roadless management followed by Alternatives J and K. It should be noted that although Alternative H designated few acres to roadless management, it does propose the maximum amount of wilderness. The Final Plan has fewer acres in "roadless" management because it has more acres in Proposed Wilderness than the Proposed Action.

Another perspective is to look at the inventoried roadless resource and calculate the percentage of the inventoried roadless area that will remain unroaded under each alternative. This perspective includes the recommended wilderness and is shown in Table IV-40.

Alternatives H and O retain the greatest percentage of the inventoried roadless acres in an unroaded state because of their respective emphasis on wilderness and roadless management, Alternative L retains the least percentage because of its' emphasis on timber production.

TABLE IV-40

INVENTORIED ROADLESS AREAS WHICH REMAIN ROADLESS (Thousands of Acres)				
ALTERNATIVE	DESIGNATED ROADLESS	RECOMMENDED WILDERNESS	TOTAL	PERCENT OF INV. RDLS AC.
A	211	0	211	52
B	164	64	228	56
C	151	81	232	57
D	155	64	219	54
E	99	187	286	71
F	209	0	209	52
G	53	305	358	89
H	0	404	404	100
I - CD	174	63	237	59
J - PA	202	67	269	67
JF - FP	192	78	270	67
K	202	67	269	67
L	159	0	159	39
M	200	0	200	50
N	205	0	205	51
O	323	81	404	100

About 245,000 acres of commercial timberland are located within inventoried roadless areas. Of that, 17% or 41,000 acres are of marginal value. These marginal acres are designated for roadless use in most alternatives except D and L. Further discussion of commercial timberland within roadless areas is given in the wilderness portion of this chapter.

Designation of roadless areas to provide for semi-primitive recreation can reduce PNV and have negative effects on the local economy by the Forest if timber harvest is precluded. Businesses and individuals dependent on recreation for income will benefit since this proposed land use would increase

some recreation opportunities. Future options are preserved for wilderness and if the land is productive, timber management options are also retained.

Short-term Use vs. Maintenance and Enhancement of Long-Term Productivity - Designations to unroaded management has some effect on long-term productivity, mainly in terms of opportunities foregone for managing timber and wildlife. The opportunity for semi-primitive recreation is maintained as is old-growth habitat for wildlife needs. Natural-appearing landscapes are preserved, although the risk of wildfire is increased by the build-up of fuels.

Irreversible and Irretrievable Commitment of Resources - The designation of acreage to unroaded management is not irreversible but once the designation is made, a change to a developmental designation must be subjected to an intensive analysis. Such analysis may occur each time the Forest Plan is revised (at least every 15 years). Roadless designation results in an irretrievable loss of the timber resource that is produced but not harvested.

Adverse Effects Which Cannot be Avoided - Roadless designations generally preclude timber harvest. They also limit mineral exploration and development because of access difficulty. Like wilderness, roadless designations require strict requirements for conducting activities, requirements that are designed to protect the qualities inherent in a roadless designation. Restrictions on access and mode of travel are major limitations for conducting activities, often making the activity more expensive to accomplish. Such activities can include wildlife and fish habitat improvements, mineral, oil and gas exploration/development, insect and disease control, and wildfire suppression.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - Resource conflicts can include timber management and mineral exploration and development. Because the allocation results primarily from the desires of the public, there are few, if any, conflicts with local or regional planning efforts outside the Forest. The exception is powerline transmission corridors which are discussed in the next section.

Energy Requirements - Roadless recreation involves few demands for energy. Some energy may be used to maintain recreation facilities (primarily trails).

8. LANDOWNERSHIP, USES, AND AGREEMENTS

a. Landownership and Adjustment

The Forest Landownership Adjustment Plan identifies National Forest and other lands that could be acquired or disposed of through exchange in order to achieve resource objectives or to improve the administration of National Forest lands (Landownership Adjustment Plan, 1979). The reader is also referred to Chapter 3, the section on lands that describes major landholders within Kootenai Forest boundaries and land ownership patterns that need adjustment. Other important references include The Northern Regional Guide (reflecting the 6/10/83 Record of Decision), which provides guidelines on determining which lands should be exchanged, and the Pacific Northwest Long Range East-West Energy Corridor Study, Phase I, Part A - Rocky Mountains (draft, Bonneville Power Administration, 12/77) which

describes "windows" or areas on the Kootenai Forest where corridors could conceivably be created.

The primary method of acquiring land is through an exchange or trade of National Forest lands identified by the agency as desirable for disposition. The adjustment plan is an "ideal" ownership pattern, from the Forest Service standpoint, that may or may not be achieved. Even if the adjustments were to be made in their entirety, they would probably occur over a 20 to 30-year period.

It is important to remember that lands are exchanged, or traded for equal value, not equal acreage.

Reasons for acquiring land can include, among other things:

- a. Protecting and/or enhancing wildlife values including threatened and endangered species.
- b. Protecting and/or enhancing recreation values including wilderness values.

Reasons for disposing of public lands can include:

- a. Disposing of lands no longer in character with typical National Forest holdings, such as acreage bordering urban areas.
- b. Eradicating management problem areas, such as those where National Forest and private land management objectives conflict.
- c. Removing isolated National Forest lands from surrounding private lands for more efficient land management.

About 94,000 acres of private and State land have been identified by the Kootenai as being desirable to acquire, while about 70,000 acres of National Forest land have been identified as being suitable for disposal. The effects of this land adjustment plan, if fully achieved, would occur over a long period of time. The ultimate effect of exchange would be:

- a. Enhanced wildlife habitat, including big game summer and winter ranges, bald eagle and grizzly habitat as well as fisheries and waterfowl habitat.
- b. Enhanced recreation sites and better access to lake fronts and shorelines.
- c. More land coming into private ownership within the urban areas of the Forest (areas A, B, C, and D on the landownership adjustment area map displayed in Chapter 2, Figure II-55). This would result in new lands being made available for local housing or industry, and as new sources of local tax revenues.
- d. The easing of land management conflicts that can occur between National Forest, State, and private corporations.

- e. The elimination of costly court cases and other legal problems related to trespass, encroachments, and title claims.
- f. Improved and more efficient National Forest, State, and private administration of lands by consolidating ownerships and lessening the need for cost-share and rights-of-way agreements. Consolidation of private lands would occur primarily in the Wolf Creek and Pleasant Valley area while National Forest consolidation would occur primarily in the Upper Fisher-Vermilion-McGinnis area (areas E and F, respectively, on the land ownership adjustment map).

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Lands which enter private ownership following exchange will be managed as the new owner desires. Lands obtained by the Forest Service through exchange will be managed to maintain or enhance productivity.

Irreversible and Irretrievable Commitment of Resources - Lands entering private ownership through exchange are committed to whatever use the new owner desires. Lands obtained by the Forest Service will be committed to uses defined by the land management plan in effect at the time.

Adverse Effects Which Cannot be Avoided - Individuals who were accustomed to hunting or recreating on National Forest lands that later change to private ownership may not find the same privileges extended to them by the private landowners.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirement - Little or no energy is used in land exchange.

b. Special Uses

The Kootenai administers about 470 special use permits which allow non-Forest activities to take place on Forest land. Most of them (86%) are for roads, water-associated activities, and utilities and communication lines. Others are related to recreation, agricultural, and industrial uses. The large number of permits is due to the fragmented landownership patterns on portions of the Forest and to the sizeable ownership of land by the Kootenai Forest in Lincoln County (73%) and in part of Sanders County. Over time, the number of permits could drop as Forest ownership is consolidated through land exchange.

Special uses produce benefits to whole communities. The Kootenai Forest administers permits for a park and playground just north of Libby, used every day during the summer months for sports events (83 acres); one for the Libby Airport (52 acres); one for a non-profit corporation that operates Turner Mountain ski area (410 acres); another permit for a marina and resort on Lake Koocanusa (65 acres), a school (10 acres), an education center (42 acres), a sanitary landfill (40 acres), and a cemetery (5 acres). Individuals profiting from Forest resources also require special use permits to operate; outfitters and guides and people gathering firewood fall into this category. Special interest groups may also apply

to use federal land. One such permit has been issued for a target range (32 acres).

About 10,500 acres and 750 miles of road are affected by these permits. The effects are often the same as those produced by similar facilities or systems under administration of the Forest. For example, special use roads produce the same kinds of effects as other Forest roads: Timber must be removed, putting the roadbed area out of timber production, at least for the life of the road; soil compaction can occur which could increase runoff potential. Runoff, in turn, can produce sediment in streams, adversely affecting the spawning and rearing of fish unless special measures are taken. The permittee is responsible for keeping these impacts to a minimum during construction and maintenance of roads.

Usually the impacts of these special uses on site are dramatic although they are limited to a very small acreage overall (less than half of one percent of all Forest land). In all cases, the permittee is obligated to work within the constraints of federal, state and local laws. Permit applications are routinely subjected to an environmental analysis prior to issue. Obligations of the permittee are put in writing at the time of issuance and each site is periodically visited to assure compliance.

There are no special use permits for hydropower projects at this time, although there are several proposals being analyzed. Small hydropower projects have the potential of impacting essential habitat for wintering bald eagles and for causing barriers to movement of big game animals and other large mammals. Dams, ditches, and penstocks may result in soil movement and displacement. Since ditches and penstocks remove water from stream channels, lower water levels can reduce or eliminate fish populations, affect riparian vegetation, and create stream channel instability. Vegetation behind dams and in ditch bottoms can be destroyed. If several small hydropower projects were constructed in a general area, they could affect the fisheries resource throughout a drainage. These considerations are important in assessing proposals.

Special uses do contribute to PNV because fees are collected from permittees. These fees do not offset the administrative costs of the program.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - The vegetation on specific sites can be destroyed or suppressed, depending on the use to which the area is put. This effect will last as long as the facility remains there. Diversion of water can lead to changes in the types of vegetation growing in a particular site.

Irreversible and Irretrievable Commitment of Resource - Ditches, roads and other special uses will probably be maintained into the foreseeable future. The vegetation lost because of them is irretrievable.

Adverse Effects which Cannot be Avoided - Construction of ditches and roads will cause removal of vegetation, soil disturbance and accelerated erosion. Some projects may cause an adverse effect on visual quality and wildlife habitat and movement.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None are identified.

Energy Requirements - Some energy will be used by the Forest in monitoring special uses but this will be a minor portion of total Forest use. Construction of new roads or buildings will require considerable expenditure of energy by the permittee.

A large percentage of the acreage involved in land use grants is used for the sole purpose of transporting energy in various forms.

c. Rights-of-Way and Cost-Share Agreements

Road and trail rights-of-way are acquired by the Forest from private or other owners, generally in connection with the Forest's timber program.

Cost-share agreements provide the same opportunity for development of both National Forest and private lands (located within National Forest boundaries) at a reduced cost for both parties by a sharing of construction and maintenance costs and a reduction of road duplication. A total of 186.5 miles of road were constructed in 1984 through right-of-way and cost-share agreements.

Short-term Use vs. Maintenance and Enhancement of Long-term productivity - Although road construction causes impacts, only a relatively small number of acres are affected compared to the number of acres opened up for management through the rights-of-way and cost-share programs. This land would otherwise be generally unavailable for management activities due to high costs involved in alternative access routes. Productivity of the lands can thus be maintained or improved.

Cost-share agreements allow both private landowners and the Forest Service to access lands for timber harvest or for reaching other resources. Costs of roading to both parties is reduced.

Rights-of-way give the Forest an opportunity to manage lands which might otherwise be unavailable. Productivity of those acres can thus be maintained or improved in the future.

Irreversible and Irretrievable Commitment of Resources - Rights-of-way and cost-share agreements can be cancelled although this is unlikely to happen in the foreseeable future. The resulting roads imply an irreversible use and the vegetation removed by the road construction and maintenance constitute an irretrievable loss of that resource.

Adverse Effects Which Cannot be Avoided - Adverse effects of the resulting roads are discussed in the road management section.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - Rights-of-way acquisition is normally undertaken in support of land management plans, and not in conflict with them.

Energy Requirements - Only minor energy use is involved in the access acquisition program. Substantial amounts of energy are expended in the construction of roads on the acquired rights-of-way.

d. Buildings and Other Facilities

The Kootenai Forest maintains seven Ranger Stations, five work centers (administrative sites usually not in use full-time), 38 lookouts, 47 housing units, 132 storage and service buildings, and 21 administrative buildings. Approximately 920 acres have been withdrawn from mineral entry for these sites.

The Forest also leases some buildings for administrative purposes: The Supervisor's Office in Libby, and the Zone III Engineering Office in Troy, respectively. These leased buildings are some of the newer ones to be used by Forest personnel and house the offices for over half of the permanent employees.

Sixty-five buildings were built before 1940. Nineteen are made of log and one building on Squaw Peak is made of stone. All of these structures result in the removal of vegetation and alteration of a natural-appearing landscape. Paving requires the same kind of modification and also tends to concentrate water flow, leading to erosion and possible introduction of sediment into streams.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity - Maintenance of these structures has only minor effect on the physical and biological environments. These effects are also short-lived. The effect that all of these buildings have on all other resources Forest-wide is also minor because of the small acreage involved. Vegetative productivity will be lost during the life of the facilities.

Irreversible and Irretrievable Commitment of Resources - The vegetation lost represents an irretrievable commitment for the life of the facilities.

Adverse Effects That Cannot Be Avoided - Although efforts are made to landscape building sites, the presence of the facilities permanently affects the appearance of what was once a natural, undeveloped setting.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - The energy required for heat and light of the administrative sites is insignificant in relation to the total energy required to implement the land use management alternatives. The amount of energy does not vary among the alternatives.

e. Powerline Corridors

There are eleven electric transmission lines on the Kootenai; an additional one is in the proposal stage. Based on definitions established

by the Utility-Transportation Corridor Study For Montana (November 1981) and the Pacific Northwest Long Range East-West Energy Corridor Study cited above and on guidance provided by Region One (1990 Special Plans and Studies, 10/7/82), areas have been identified where corridors will be excluded. These "Exclusion Areas" are land areas determined to be unavailable for corridor allocation or facility siting because of legal mandates, such as wilderness designation or proposals for the same. The 94,000-acre Cabinet Mountains Wilderness is an exclusion area in all alternatives. The remainder depend on the amount of proposed wilderness under each alternative. The following chart displays the amount of excluded area by alternative.

: TABLE IV-41 :

: AREAS EXCLUDED FROM CORRIDOR PLACEMENT :

: <u>Alternative</u> :	: <u>Thousands of Acres</u> :
: A :	: 94 :
: B :	: 158 :
: C :	: 176 :
: D :	: 158 :
: E :	: 281 :
: F :	: 94 :
: G :	: 399 :
: H :	: 498 :
: I (CD) :	: 157 :
: J (PA) :	: 161 :
:-----:	
: JF (FP) :	: 172 :
:-----:	
: K :	: 161 :
: L :	: 94 :
: M :	: 94 :
: N :	: 94 :
: O :	: 176 :

Areas have also been identified where potential corridors should be avoided. "Avoidance Areas" are those that pose particular land use or environmental problems which would be difficult or impossible to mitigate either because of a conflict with land management objectives or because the area has some special or unique value. The following table displays categories which are considered avoidance areas for utility corridors. The acres for each category by alternative are shown.

TABLE IV-42

AVOIDANCE AREAS
(Thousands of Acres)

<u>ALTER-NATIVE</u>	<u>WILDERNESS STUDY AREA</u>	<u>DESIGNATED ROADLESS</u>	<u>RANGER STATIONS, CAMPGROUNDS ETC.</u>	<u>SPECIAL INTEREST</u>	<u>SENSITIVE VIEWING</u>	<u>TOTAL AVOIDANCE</u>
A	34	270	3	0	0	307
B	34	228	3	0	0	265
C	34	210	3	0	0	247
D	34	218	3	0	0	255
E	34	177	3	0	0	214
F	34	272	3	0	0	311
G	34	101	3	0	0	138
H	34	62	3	0	0	99
I-CD	34	249	3	6	83	375
J-PA	34	326	3	9	21	393
JF-FP	34	326	3	9	21	393
K	34	326	3	9	21	393
L	34	220	3	0	0	257
M	34	261	3	0	0	298
N	34	265	3	0	0	302
O	34	365	3	0	102	504

TABLE IV-43

TOTAL AVOIDANCE AND EXCLUDED AREAS BY ALTERNATIVE
(Thousands of Acres)

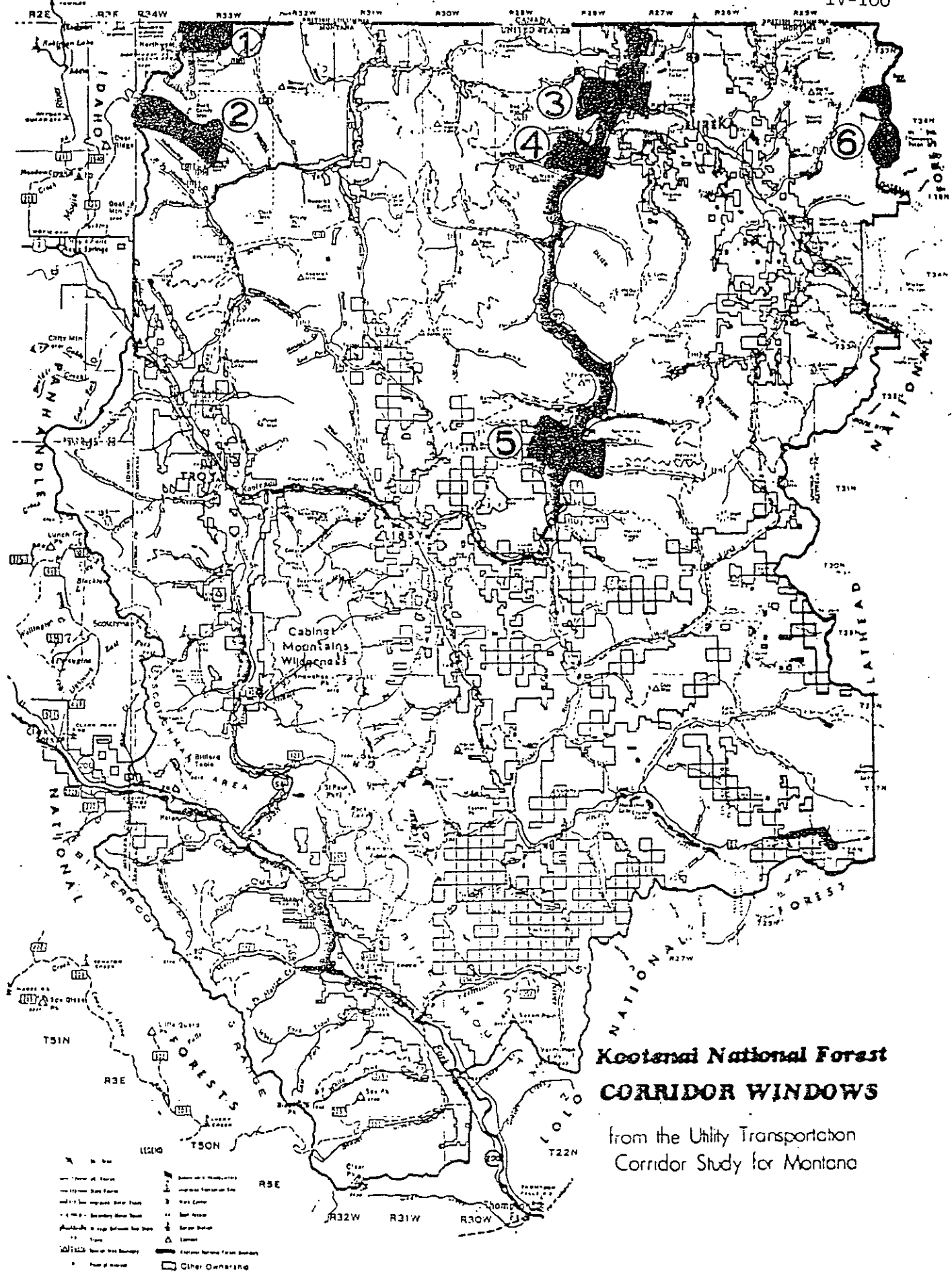
<u>Alternative</u>	<u>Total Excluded Areas</u>	<u>Total Avoidance Areas</u>	<u>Total Avoidance and Excluded Areas</u>	<u>% of Total Forest</u>
A	94	307	401	18
B	158	265	423	19
C	176	247	423	19
D	158	255	413	18
E	281	214	495	22
F	94	311	405	18
G	399	138	537	24
H	498	99	597	27
I(CD)	157	375	532	24
J(PA)	161	393	554	25
JF(FP)	172	393	565	25
K	161	393	554	25
L	94	257	351	16
M	94	298	392	17
N	94	302	396	18
O	176	504	680	30

As can be seen in the display, Alternative O would result in the largest amount of land withdrawn from use for utility corridors. Alternative L would result in the least amount. The Final Plan would result in an increased amount of excluded and avoidance acres compared to the current direction.

Utility corridors are proposed upon need and have points of beginning and end. At the time of proposal, exclusion and avoidance areas will be included in any analysis. Prior to approval of additional new utility transportation corridors, an appropriate analysis will be required to determine the effects of the facility and the supporting road system, and, if approved, a final location for the facility.

The Pacific Northwest Long Range East-West Energy Corridor Study, Phase I, Part A - Rocky Mountains (draft, BPA, December 1977) also identified potential corridor windows. "Windows" are usually short, narrow passageways through constrained areas which are the most feasible locations for linear facilities, considering engineering and/or environmental factors. These engineering factors can be physical or topographic limitations, such as saddles or river crossings, and the environmental factors can include the restrictive allocations associated with the avoidance areas mentioned above, such as allocation for primitive recreation, etc. In the BPA document, six transmission windows were delineated on the Kootenai and are displayed on the accompanying map.

IV-100



The effects of each alternative on the six windows are discussed below:

Window #1 (BPA #R-10, crosses northern foothills of Northwest Peak by following the Canadian border)

Alternatives G and H recommend wilderness for a portion of this window located in the Northwest Peaks Scenic Area. Alternative JF, the Final Plan, recommends that roughly two-thirds of the area be allocated to roadless recreation. The remaining alternatives do likewise, but for a slightly smaller area. The area is located within grizzly management situation 1 (an area containing grizzlies that also has habitat components necessary for grizzly survival). Those portions of the window within recommended wilderness would be excluded in Alternatives G and H. Other alternatives where roadless management is designated create an avoidance situation.

Window #2 (BPA #R-9, follows Spread Creek to its summit then into the Canuck Creek drainage)

As with Window #1, Alternatives G and H recommend a portion of this area for wilderness. Every other alternative contains portions of roadless recreation management, generally in the western end and along the southern edge of the window. In addition, the area is located within grizzly management situation 1. The effects on the window would be the same as those for Window #1.

Window #3 (BPA #R-6, crossing of Lake Koocanusa near Pinkham Creek)

The Rexford Bench Campground is located within the window on the eastern shore of Koocanusa Reservoir, and occurs in each alternative. Visual resource management considerations along the reservoir are also present in each alternative. In addition, Alternatives B, D, F, H, L, and M recommend that a small portion along the eastern shore of the reservoir be allocated to roadless recreation, although Alternative JF (the Final Plan) does not. Every alternative, through designations to visual and/or roadless management, and because of the nearness of Rexford Bench Campground, creates an avoidance situation.

Window #4 (BPA #R-7, crossing of Lake Koocanusa near Pinkham Creek)

This window is also located along Koocanusa Reservoir. As with Window #3, each alternative contains some form of visual resource management. Every alternative except I, J, and K recommends roadless recreation along the eastern edge of Lake Koocanusa. The effects would be similar to those for Window #3.

Window #5 (BPA #R-8, crossing of Lake Koocanusa near Barren Creek)

Koocanusa Marina and McGillivray Campground are located within this window on the east and west shores, respectively, of Koocanusa Reservoir. With the exception of Alternatives I, J, JF, and K, all alternatives recommend a small area for roadless recreation located on the east side of the

Reservoir on the eastern edge of the window. This indicates that all alternatives create an avoidance situation.

Window #6 (BPA #R-5, adjoins Flathead National Forest at the north end of the Whitefish Mountain Range close to Canada)

All but two alternatives recommend 90-95% of the area for roadless recreation. The exceptions are Alternative H which recommends it for wilderness, and Alternative I (Current Direction) which doesn't place any restrictions on the acreage. The area is located within grizzly management situation 1. This indicates that all alternatives create either an avoidance or exclusion situation. This is more restrictive than the Current Direction.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Corridors are kept clear of overgrown vegetation for safety and ease of maintenance of the lines. Trees can and do grow within the corridor right-of-way and are harvested as Christmas trees.

Irreversible and Irretrievable Commitment of Resources - When a corridor is authorized and in place, it is expected to remain so and is, for all practical purposes, an irreversible commitment. Commercial timber production on these sites is irretrievably lost for the life of the corridor. Also, roads and clearing for powerline purposes within a previous roadless area preclude portions of the area for further wilderness and roadless management.

Adverse Effects Which Cannot be Avoided - Corridors pose an impact on the viewing resource because of the straight, uniform line that appears on an otherwise varied landscape. Impacts that occur during construction of the corridor relate to timber removal and road construction and are addressed under those sections.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified except those previously stated for the BPA long range study.

Energy Requirements - Some energy is required to clear the corridor and to keep it free of vegetation. The latter responsibility is that of the company or agency owning or operating the electric transmission lines.

9. RESOURCE PROTECTION

a. Wildfire Suppression

Fire occurrence on the Kootenai Forest over the past 15 years shows a dramatic drop for both person-caused and lightning-caused fires.

TABLE IV-44				
FIRE ORIGIN				
Annual Average Number of Fires				
	<u>1970-1974</u>	<u>1975-1979</u>	<u>1980-1984</u>	
Lightning-caused	107	65	59	
Person-caused	63	53	30	

The acreage burned shows a similar decline over time with two exceptions. In 1979, the person-caused Granite Creek fire burned 3,341 acres, more than the amount burned in any other year between 1975 and 1984. In 1984 the Houghton Creek fire burned a total of about 12,800 acres. Only 2100 acres of that was on Kootenai National Forest land and is included in the data shown here.

TABLE IV-45				
ACREAGE BURNED				
Annual Average				
	<u>1970-1974</u>	<u>1975-1979</u>	<u>1980-1984</u>	
Lightning-caused	911	32	16	
Person-caused	535	788	517	

A study of the fire history over the past 20 years shows that serious fire seasons have occurred every six years, most recently in 1967, 1973, and 1979. This trend is similar to that of other Forests in the area, such as the Idaho Panhandle, and reflects the close relationship of fire incidence to general weather patterns. When there is little or no rain over a long period of time, the incidence of fire goes up. As precipitation increases, the risk of fire drops. This trend does not help land managers to "predict" busy seasons, but it can help to "anticipate" them. Long-range fire forecasting, like long-range weather forecasting, is an inexact science.

The purpose of fire suppression is to minimize damage to valuable resources by controlling and extinguishing fires. Because the extent of fire suppression activities depends on fire starts and weather, there are no differences among alternatives in this regard. Some alternatives can lead to an increased risk of fire, however. Those favoring recreation and timber harvest, for example, create more situations where man-caused fires

can begin because of increased number of people and equipment in the woods.

A fire can be either beneficial or detrimental to an area, depending on the management objectives assigned to it. For example, high intensity fires in areas managed for timber production kill trees and reduce the value of the site. High intensity fires in old-growth timber will eliminate important habitat components for certain species. Although it may remove cover for big game, in the process it may improve food supplies for the same species.

Successful suppression has a favorable short-term effect in areas where timber management is prescribed because it protects the stands from burning. Suppression may also result in the establishment of old-growth forests. Old-growth dependent animals are favored and thermal cover is provided to many wildlife species even though forage is eliminated or suppressed by competition with the conifers.

Fire suppression activities affect fire sites. Fireline construction with handtools or heavy equipment can increase potential for soil erosion. The potential for soil movement is increased by use of heavy equipment on steep slopes or on soils susceptible to erosion. Trees are often cut during fire suppression, increasing soil disturbance and overland flow. In some cases, roads built into remote fires result in "permanent" trails or roads. Fire retardant dropped from air tankers can contaminate small lakes or streams for a short time. Red dyes used in retardants can be seen for a year or two after the fire. Camps developed for large fires can have long-term impacts on the sites unless rehabilitation efforts are undertaken.

Fire exclusion can result in fuel accumulations above natural levels which can lead in time to larger, more destructive fires. Fires in dense, dry fuels consume litter and duff which can affect soil productivity and stability. Stream sedimentation is likely to occur after a hot, litter-and-humus-consuming, fire. Large fires on some types of soil and slopes can result in soil movement and stream siltation. If retardant is used in suppression and happens to fall into streams, water quality is affected. Loss of timber to insects and disease is likely to increase because sources of infestation are not burned.

Fire prevention also includes educational activities and enforcement of fire prevention laws and regulations. The Smokey Bear Fire Prevention Program has helped people, especially children, to become aware of the destructiveness of fire as well as its benefits when used as a management tool. Alternatives favoring increased timber sale volume will require greater fire protection levels to assure that the trees reach rotation age. Conversely, alternatives which produce less timber than the current program require a smaller fire protection expenditure.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
Fire protection activities, in the short-term, will minimize damage to resources such as timber. However, the long-term change in vegetative composition and density may reduce timber productivity unless accompanied by other activities such as timber harvest.

Irreversible and Irretrievable Commitment of Resources - Since the fire suppression program could be curtailed at any time, there is no irreversible commitment of resources, except for funds already budgeted.

Adverse Effects Which Cannot be Avoided - Loss of soil due to construction of firelines will occur despite preventive measures. Buildup of fuels will continue in areas protected by fire suppression.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - Smoke emission due to fire may at times exceed State clean air standards, but the suppression activity itself attempts to reduce this problem.

Energy Requirements - Energy required in the fire suppression program is dependent on the number and kind of fires. In extreme fire years, this use can be a substantial portion of the total energy expended by the Forest.

b. Prescribed (Managed) Fires

Prescribed fires are those which will be managed in accordance with a predetermined set of conditions. Prescribed fires can be either planned or unplanned (such as one caused by lightning), but must achieve some predetermined resource objective.

Prescribed burns are fires set deliberately to meet some management objective. Prescribed fire can be used to burn underbrush in thinned stands as well as slash from logging operations. The reader is also referred to the discussion of slash control in the timber section of this chapter. Some burning is done to prepare sites for planting and to enhance wildlife habitat. Between 1979 and 1983, for example, an average of 11569 acres were burned annually by prescription. Of that, 2366 acres (or 20%) were burned annually to benefit wildlife.

Two fire action plans are in effect on the Kootenai, one for the Cabinet Mountains Wilderness and one for the Troy Ranger District. The action plan for the wilderness calls for suppression of all person-caused fires. Lightning-caused fires will be allowed to burn under certain conditions "as a means of returning fire to the wilderness ecosystem". (Cabinet Mountains Wilderness Fire Management Plan, 1980). The plan for the Troy Ranger District is similar to the wilderness plan in that it considers the important role of fire in the forest ecosystem. Under predetermined conditions, fire may be allowed to function as a natural ecologic agent, responsive to land and resource management objectives. Such objectives may include enhancement of wildlife habitat, maintenance of wilderness characteristics and conditions for primitive recreation, promotion of plant and animal diversity, and creation of a variety of views. An additional benefit of allowing certain fires to burn is the saving of money by not suppressing fires that are achieving desired results and are not endangering life, property, and resources.

The effect of the managed fire program will depend on factors such as the amount of fuel (vegetative material) available for burning, proximity of the fuel to valuable resources, and current weather conditions. The time, intensity, and size of managed fires will also vary greatly, depending on the desired results.

Clearcutting creates the heaviest amount of slash and therefore has the potential for the greatest negative effect on the environment if fire intensity becomes too high, leading to nutrient loss and other soil damage. Low intensity fires are preferred and can produce significant beneficial effects such as nutrient cycling, plant stimulation through basal and rhizomatous sprouting, and seedbed preparation. Although selective harvests create slash conditions difficult to treat, the amount of fuel is usually less than that following clearcutting, reducing the risk of long-term negative effects.

Water quality is affected by fuel treatment through exposure of mineral soil to erosion. Through overland flow and mass movement, sediment is introduced into streams. Untreated fuels introduced into stream channels also compromise water quality as they decay and reduce the amount of oxygen available to aquatic life. Water temperature is also increased with removal of streambank vegetation, affecting fish habitat.

Prescribed fire affects wildlife habitat by changing vegetative types. Vegetation is removed and for a short time forage is reduced as are obstructions to movement. New growth follows quickly, providing increased forage for big game. Hiding and thermal cover can be reduced as well, but the amount can be controlled by the harvesting method used.

Prescribed fire creates short-term visual impacts, with foreground viewing experiencing the greatest impact. Visual scars will remain until new growth appears, a period ranging from one to five years.

Air quality can be affected by prescribed burns which add suspended particulates to the air. Burning results in smoke concentrations in local valleys during stable atmospheric conditions. The Kootenai Forest works closely with the State Airshed Group and the Montana Cooperative Smoke Management Plan in scheduling burns so that smoke produced can be easily dispersed into the atmosphere. The federal Clean Air Act established wildernesses as Class I air quality areas. Protection of air quality is therefore a major consideration in fuels management programs adjacent to the Cabinet Mountains Wilderness.

The reader is referred to the timber section of this chapter and the discussion displaying the amount of acres scheduled for burning over a 50-year period by alternative.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The act of allowing a fire to burn can have a long term effect on the kind of vegetation and animals occupying the area. A future generation of the overstory (trees or shrubs) may be entirely destroyed. Some of the present overstory, especially shrubs, is completely removed. The native productivity is not destroyed and, in fact, may be temporarily enhanced by the availability of the minerals in the ash.

Productivity of a site can be substantially reduced if there is a large loss of surface soils due to wind or water erosion following fire. On some soil types, burning can produce water repellant soils, resulting in a loss of site productivity.

Irreversible and Irretrievable Commitment of Resources - If the fire is allowed to burn, the consumed material is irretrievable.

Adverse Effects Which Cannot be Avoided - The aftermath of the fire will remain visible for a short time. Soil is bared and water quality may be reduced by the accelerated erosion. Smoke will be generated into the atmosphere.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None identified. The Kootenai Forest works closely with the State to assure compliance with its clean air standards and with those of the Clean Air Act.

Energy Requirements - Some energy will be consumed in monitoring the planned fire. This will be a minor amount compared to the energy needed to suppress such fires and a minor portion of the total Forest use.

c. Insect and Disease

The mountain pine beetle has infested lodgepole pine stands throughout the Kootenai Forest. About 120,000 acres of infestation were surveyed in 1982, and the infestation has been increasing in size each year. This, coupled with the large amount of high-risk lodgepole pine (2,000 MMBF), represents a significant potential for timber volume loss. The assumption is that all of this timber will be affected by the beetle within the first decade of the Forest Plan. About half of this volume will not be salvageable, representing an average annual loss of approximately 109 MMBF. For details on the extent of the infestation refer to Chapter III.

Timber harvest is the primary means of removing the beetle-infested trees and controlling the spread of the insect. (There are no plans for use of pesticides on the Forest under any alternative.) The relatively low market value of lodgepole pine often requires that capital investment roads be built in order to harvest the dead and dying trees. The amount of lodgepole projected to be harvested varies by alternative according to the intent of the alternative and the budget required for implementation.

: TABLE IV-46 :
:: PROJECTED ANNUAL TIMBER HARVEST OF LODGEPOLE PINE :
: WITHIN THE FIRST DECADE :
:

: <u>Alternative</u>	: <u>Millions of Board Feet</u>	:
: A	: 69	:
: B	: 70	:
: C	: 72	:
: D	: 67	:
: E	: 64	:
: F	: 56	:
: G	: 59	:
: H	: 51	:
: I-CD	: 77	:
: J-PA	: 75	:
: -----		:
: JF-FP	: 78	:
: -----		:
: K	: 79	:
: L	: 32	:
: M	: 93	:
: N	: 85	:
: O	: 75	:

Alternatives M, and N had high lodgepole pine yields in the first decade because they permit large timber harvest programs and high budgets. Alternative L harvested considerably less lodgepole pine in decade one because its goal involved harvesting the high producing acres (mixed conifers) as early as possible in order to regenerate to faster growing stands; harvest of lodgepole pine is thus delayed until a later period.

Alternative H did not allow any harvesting in inventoried roadless areas, some of which contain lodgepole pine. Alternative F had a goal of providing for big game (elk), so it only called for the harvest of lodgepole that contributed to that goal. Alternatives I, J, JF, K, and O had visual quality goals which reduced the per acre harvest levels in some areas, making the lower volume per acre lodgepole competitive. The remaining alternatives reflect a combination of factors, primarily related to availability and economics.

Water yields may increase in those watersheds where significant mortality occurs. In some cases, increased water yields could restrict harvesting activities in unaffected portions of the drainage in order to minimize the effects of the insect-caused mortality on stream channel stability and downstream water uses. Water yield will decline as new stands are established and begin to grow. The time it takes to establish new stands will vary from ten to thirty years or more, depending on actions taken to establish them.

Tree loss in streamside areas could affect fisheries by blocking fish passage, increasing water temperature and reducing stream channel stability.

Epidemic insect infestations create openings in the forest canopy that affect big game species. In areas where there are large acreages of closed canopy, a mosaic of openings will improve available forage. However, in areas where sufficient forage is available or excessive amounts of openings are created, cover will decrease below desired management levels for big game.

Fuels build-up is greatly increased in insect-infested areas. The risk of wildfire increases proportionally in these areas, particularly where the infestation area is large. This increased risk persists for several decades unless measures such as prescribed burning are initiated to break up the fuel concentration.

Control actions for insect and disease problems frequently involve silvicultural treatments to develop timber stand conditions that are unfavorable to the pest. Such treatments can include planting tree species resistant to a particular pest or favoring such species in intermediate thinnings. Another method is to maintain high stand vigor throughout the stand's growing cycle by maintaining stocking levels where individual tree growth rates are high.

In the case of the mountain pine beetle, it may be possible to slow the insects' spread by harvesting high risk stands prior to beetle invasion. The activities and effects of harvesting are discussed in the timber and road sections of this chapter. Another option is to thin moderate or low risk stands to increase tree vigor and alter site conditions within the stand, making trees less susceptible to attacks for a time. All of these options require roads. The rate at which these stands can be treated silviculturally is dependent largely on the fishery/water quality objectives of each alternative.

Recent developments in control involve the use of artificial pheromones which disrupt the insects' reproductive cycle. In the case of mountain pine beetles, certain trees are baited with an artificial pheromone that attracts large numbers of beetles from the surrounding area. At the proper time, the trees are harvested and removed while the beetles are still in them. Traps, baited with the pheromones, can also be used to collect and dispose of insects without harvesting any trees. These actions do not eliminate the risk of infestations, but reduce the risk to specific areas for a period of time.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
The application of appropriate silvicultural methods to control insects and disease increases the long-term productivity of the Forest from the standpoint of recoverable resources.

Irreversible and Irretrievable Commitment of Resources - Timber killed by insects and not harvested represents an irretrievable loss of that resource. The loss of other resources such as fisheries habitat is also considered foregone until such time as vegetation recovers along

streamsides. Effects of roads required to harvest the lodgepole are discussed under the roads section.

Adverse Effects Which Cannot be Avoided - Insects and diseases will continue to play a significant role in the Forest ecosystem. Effects of management to reduce the risks of fire and continued timber loss are the same as those associated with timber harvest.

Conflicts With Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - The pest management activities require no energy above that required in a normal timber sale program, except that needed to place pheromones in timber stands as a control measure.

10. Cultural Resources

The major purpose of the Forest's cultural resource management program is to locate and protect cultural resources in keeping with the intent of various Federal and State laws. The Forest consults with the State Historic Preservation Office and the federally-sponsored Advisory Council for Historic Preservation routinely in assessing historic finds and ways in which to protect them.

There are many historic and prehistoric sites within the Kootenai Forest boundaries, and it is likely that many more sites will be discovered as inventories are completed for areas previously unexamined. An example of a prehistoric site is the Kootenai Falls area which has both archeological and religious significance to the Confederated Kootenai-Salish Tribe. Other prehistoric sites can take the form of camps, trails, rock art, cambium-peeled trees, quarries, burial grounds, etc.

Among historic sites; mining, logging, and public resource administrative sites are the most abundant. They include sites of hardrock and placer mining and ore processing, logging camps, railroads and log chutes, lookouts and guard stations. Transportation and homesteading are represented by remnants of early highways, railroad beds, bridges, and trails. Abandoned dwellings, homestead survey monuments, graves, cemeteries, and irrigation systems reflect the homesteading era. The early fur trade is most often represented by the remains of trade goods, such as glass beads. Evidence of later fur trapping and trade includes trappers' cabins, caches, and trap sets. Missionary activities are most obvious from written accounts of those who passed through the Kootenai region than by any physical evidence.

Since 1972, the Forest has been systematically inventorying the cultural resources on the Forest. To date, over 400 prehistoric and historic sites have been located. One site on the Forest, the Kootenai Falls Cultural Resource District, has been listed on the National Register of Historic Places. The Libby-Jennings Cultural Resource District and the Yahk Historic Mining District have been determined eligible for nomination. (If a number of sites are associated thematically or physically in a given area, they can be treated as a single unit or "District" for purposes of nomination to the National Register.)

In conjunction with construction of Libby Dam, an extensive archeological survey was done along the reservoir. Since that time the U.S. Corps of Engineers has developed a management plan for mitigation, involving some excavation and some preservation of mostly prehistoric sites. The Forest Service and The Corps are presently negotiating over future management of these sites and the responsibility of each agency for them.

Numerous other sites have been deemed potentially eligible including several old lookouts. If any of these sites become affected by Forest projects, a determination of eligibility and recommendation for mitigation are made with the assistance of the State Historic Preservation Office and the Advisory Council on Historic Preservation.

Vandalism is, and probably will continue to be, an increasing problem on the Kootenai, highlighting the need to protect these sites and any other new sites discovered. Public information efforts and cooperative law enforcement actions will be used to counteract this problem.

There are no differences among alternatives with regard to satisfying laws concerning archeological sites because the laws will be obeyed in all alternatives. The alternatives with larger timber outputs and roading programs will however generate a higher risk of losing some cultural resources simply because more ground is disturbed. It is less risky to avoid ground disturbance than to mitigate the effects of such disturbance. In addition, protection of the cultural resource will have little effect on the PNV of the Forest since so few acres are involved. Some timber may not be harvested near identified cultural sites but this volume will be insignificant. Maintaining inventoried cultural sites is very important for preserving historical and religious ties with the past, and is considered an important component of net public benefits.

In all alternatives, an inventory of sites where ground-disturbing activities are planned will be required. If a site is found before or during this activity, it will be documented and evaluated for possible preservation. The Kootenai/Salish Tribe will be consulted if a site appears to have religious or historical significance.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

Even though cultural surveys will be made prior to ground-disturbing activities, these surveys may not always be successful in finding a cultural resource prior to the time the activities are scheduled to begin. Should an inadvertent discovery happen, the ground-disturbing activity will be delayed while the area is re-inventoried and mapped. Results of the re-inventory may show that the activity should be diverted away from the site or that appropriate mitigation should be done prior to resuming the activity. This can cause delay of the project and, if the area is determined to be significant and to warrant complete preservation, the long-term vegetative productivity of the site will be affected. The effect on the total timber resource, however, will be minor.

Irreversible and Irretrievable Commitment of Resources - Since the commitment to protect cultural resources is irreversible in the foreseeable

future, the harvestable vegetation growing on protected sites represents an irretrievable loss of that resource.

Adverse Effects Which Cannot be Avoided - Some ground-disturbing activities could inadvertently enter and disturb some cultural resource sites despite the care and intensity of surveys prior to the beginning of these activities. Adverse effects will be mitigated in compliance with FSM 2360.1 and 36 CFR 800.

Conflicts with Objectives of Other Land Management Plans, Policies, and Control - The Kootenai Forest works cooperatively with the State Historic Preservation Office and the Kootenai-Salish Tribe; no conflicts exist between the agencies. In compliance with the American Indian Religious Freedom Act, the Kootenai Forest and Tribe have also entered into a formal agreement concerned with communication about and protection of possible religious sites.

The management of the cultural resource should have little effect on other planning efforts within Kootenai Forest boundaries.

Energy Requirements - Managing the cultural resource will require little energy expenditure. Some travel will be necessary in the surveys and some energy may be used in protecting sites that are discovered.

11. Human and Community Development

With roughly 73% of the land in Lincoln County in federal ownership, it is not surprising that activities of the Kootenai Forest play a significant role in the economy of the area. In 1981 the manufacturing (mostly timber) and Federal Government (mostly Forest Service) sectors accounted for 1,969 jobs in Lincoln County. Using an economic base multiplier of 2.41 (Haugen, 1983) indicates that these sectors were linked to 4,745 of the 6,643 total jobs in the county in 1981. This relationship has not changed much since 1981. Thus it can be said that over 70% of the jobs in Lincoln County directly or indirectly exist because of the wood products industry. Sanders County is in a similar situation.

In 1984, in keeping with executive branch direction to reduce the number of government employees to help trim the federal deficit, the Forest Service cut back on employment. The Kootenai Forest developed an objective to reduce its permanent workforce by 20%. To minimize the impact on the local communities, the agency was given two years to reach that level. The reduction has been accomplished.

A number of people work for the Kootenai Forest who are paid by other agencies or authorities. The largest is the volunteers program, authorized by the Volunteers in the National Forests Act. In 1984, 85 people including campground hosts worked for the Kootenai Forest under this authority. Fifty-two other people worked for the Forest in 1984 under other authorities, such as the Youth Conservation Corps, the Senior Community Service Employment Program, and the State-sponsored Adult Work Experience and Youth Employment Program. More discussion on this point is provided in Chapter III.

These special programs and the regular employment program benefit the local economy, but of themselves have little effect on the biological environment of the Forest.

The timber section of this chapter and Chapter III discusses the economy of Lincoln and Sanders Counties.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity
The goal of all Kootenai Forest personnel is to maintain the Forest's long-term productivity within the constraints defined by law and agency policy.

Irreversible and Irretrievable Commitment of Resources - None identified.

Adverse Effects Which Cannot Be Avoided- Reduction in the workforce means reduction in some of the services to the public. This loss can be compensated for in part by lengthening the time frame needed to accomplish certain projects, contracting out some of the work traditionally done by employees, training more volunteers, and eliminating from long-range plans some of the projects previously scheduled.

Conflicts with Objectives of Other Land Management Plans, Policies, and Controls - None identified.

Energy Requirements - Energy use by this group was not estimated because it is such a small portion of the total energy consumed on the Forest.

12. Range Management

Livestock grazing on the Kootenai is limited by the nature of available range (transitory), the lack of over-wintering facilities, the remoteness of the available range, and the expense of providing adequate water and range developments.

Although grazing is a relatively small program on the Kootenai, it is important to the individual rancher. Local ranches usually turn cows out on public lands from mid-May to mid-October, over-wintering them on private lands in the valley bottoms or marketing them prior to winter.

Riparian areas are usually grazed first because they provide shade and escape from flies in addition to providing water and forage. Where excessive grazing occurs, vegetation is reduced, leading to soil compaction, overland flow, and soil erosion. In time, streambanks break down, (Platts, 1978), affecting the fisheries resource, creating streambottom disturbance and increasing turbidity.

Seeded roadsides are also favorite grazing areas. Cows will follow the road system into timber harvest units unless some barrier discourages them. Through their wanderings knapweed is spread. The Kootenai Forest is working with the County Extension Service to reduce the amount of knapweed.

Livestock use around recreation areas can lead to conflicts, resulting from increased numbers of flies and manure on trails or around campsites. Fences to control livestock movements may also limit movement of wildlife and people traveling through the area.

Range management to control these effects in riparian areas and elsewhere takes various forms. Structures on the Forest placed to control grazing include 51 cattleguards (useful in keeping cattle away from high elevation areas where elk are grazing and in keeping cows out of areas where young trees are taking hold), 37.2 miles of range fence, and 73 water developments such as stock ponds, constructed to draw cows away from streamsides and decrease their impact on riparian zones.

The following table displays the amount of potential livestock forage by alternative. Because livestock use on the Kootenai is not expected to significantly exceed the current level of about 13,000 AUM's, the supply appears to more than adequately meet the demand over the long-term. (Although grass may be available in abundant quantity, in many cases it may not be available in the locale where cows can be cheaply herded or left to fend for themselves. If a rancher has to truck cows a long distance several times over the course of a summer, the benefits of a grazing allotment are diminished.)

: TABLE IV-47

: POTENTIAL LIVESTOCK FORAGE
: (Thousands of AUM's per Year)

:	Alternative																
:	Dec-																
:	ade	A	B	C	D	E	F	G	H	I	PA	FP					
:											J	JF	K	L	M	N	O
:	1	20	20	19	18	19	15	19	19	19	18	18	18	21	19	20	20
:	3	30	30	30	37	29	21	28	27	27	29	29	31	41	30	30	32
:	5	43	43	42	48	41	29	39	37	30	38	38	38	50	46	45	40

The level of AUMs by decade is directly related to the creation of transitory range through timber harvest. As the number of acres treated vary, so do the AUMs.

No significant competition between cattle and elk is expected to occur at the 13,000 AUMs per year level.

The grazing program adds to the PNV of the Forest. However, total contribution to PNV is less than one percent under any alternative. The average annual budget on the Kootenai Forest for range improvements from 1979 - 1984 averaged \$8,000, mainly for materials. Ranchers assist by providing labor on some improvement efforts. This figure is not expected to change appreciably because of anticipated constant levels of AUM use.

Short-term Use vs. Maintenance and Enhancement of Long-term Productivity

The grazing of livestock on the Forest will have little effect on long-term productivity. A few areas near watering places and sources of salt will continue to be overused, affecting the vegetative pattern of the immediate area. Trampling or feeding on conifer seedlings occurs in a few localized areas, but is insignificant Forest-wide.

Irreversible and Irretrievable Commitment of Resources - Forage grazed by livestock is a commitment of that resource as well as the space allocated to livestock grazing, but is not irretrievable or irreversible.

Adverse Effects Which Cannot be Avoided - Conflicts will remain where heavy livestock use occurs in regenerated stands, riparian zones, along trails, and around campsites. However, many of the adverse effects of cattle grazing can be reduced or eliminated through proper allotment management.

Conflicts with Other Land Management Plans, Policies, and Controls - None identified.

Energy Required - Energy required by the Forest in livestock management is not great. Some is needed to monitor the resource and to maintain facilities. This will not be a significant portion of total energy use on the Forest. Permittees will also use energy in transporting and managing livestock.

REFERENCES

- Arno, Stephen F. Forest Regions of Montana, USDA Forest Service, Research Paper INT-218, April 1979.
- Aune, K. and Stivers, T. Rocky Mountain Front Grizzly Bear Monitoring and Investigation. Annual Report. Montana Department of Fish, Wildlife, and Parks. Helena, MT. 1983. 180 pp.
- Bennett, K.A. Effects of slash burning on surface soil erosion rates in the Oregon Coast Range. Corvallis, OR: U.S. Department of Agriculture, Forest Service, Siuslaw National Forest. 1982.
- Bethlahmy, N. Effect of exposure and logging on runoff and erosion. Res. Pap. INT-61. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Experiment Station, 1967. 7 p.
- Bonneville Power Administration. Pacific Northwest Long Range East-West Energy Corridor Study, Phase I, Part A. Draft. December 1977.
- Christner, J. and Harr, R.D. Peak streamflows from the transient snow zone, Western Cascades, Oregon. Presented at the Western Snow Conference, April 20, 1982, Reno Nevada.
- Cole, D.M., and Schreiner, E.G.S., compilers. Impacts of Backcountry Recreation: Site Management and Rehabilitation--An Annotated Bibliography. Gen. Tech. Rep. INT-121. Moscow, ID: U.S.D.A., Intermountain Experiment Station, 1981. 58 p.
- Dyrness, C.T. Mass soil movement in the H.J. Andrews Experimental Forest. Res. Pap. PNW-42. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Experiment Station, 1967. 12 p.
- Flowers, P.J.; Brickell, J.E.; Green, A.W.; Hyde, J.F.C., III; Jackson, D.H.; Raettig, T.L.; Schuster, E.G.; Wood, W.L. Montana's Timber Supply: An Inquiry Into Possible Futures. Res. Bull. INT-40. U.S.D.A., Forest Service, Intermountain Research Station, Ogden, Utah. 1987. 22 p.
- Fredriksen, R.L. Erosion and sedimentation following road construction and timber harvest on unstable soils in three small western Oregon watersheds. Res. Pap. PNW-104. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Experiment Station. 1970, 15 p.
- Froelich, H.A. Soil compaction from logging equipment: Effects on growth of young ponderosa pine. J. Soil and Water Conservation 34(6):276-278. 1979a.
- Froelich, H.A. The effect of soil compaction by logging on forest productivity. Final Report to U.S. Department of Interior, Bureau of Land Management, Corvallis, OR: Oregon State University, School of Forestry, 1979b.

Froelich, H.A., Azevedo, P.C., and Lysne, D. Predicting soil compaction on forested land. Final Project Report under Cooperative Agreement No. 228 to the U.S. Forest Service Pacific Northwest Forest and Range Experiment Station. Corvallis, OR: Forest Engineering Department, Oregon State University. 1980.

Glassy, J. and Svalberg, T. Effects on intense dozer pile burns on soils on the Kootenai National Forest. Unpublished manuscript, April 1981.

Glassy, J. and Svalberg, T. Effects of intense dozer-pile burns on soils of the Kootenai National Forest. Libby, Mt: U.S. Department of Agriculture, Forest Service, Kootenai National Forest. 1982.

Harr, R.D. Practices and streamflow in western Oregon. PNW-49. 1976.

Harr, R.D. Effects of timber harvest on streamflow in the rain-dominated portion of the Pacific Northwest, in Proceedings of a Workshop on Scheduling Timber Harvest for Hydrologic Concerns, USDA, Forest Service, Portland, OR: 45 pp. 1979.

Harr, R.D. Some characteristics and consequences of snowmelt during rainfall in western Oregon. J. Hydrology 52, 277-304, 1981.

Harr, R.D. and Berris, S.N. Snow accumulation and subsequent melt during rainfall in forested and clearcut plots in western Oregon. Presented at Western Snow Conference, 1983.

Harvey, A.E., Larsen, M.J., and Jurgensen, M.F. Ecology of ectomycorrhizae in Northern Rocky Mountain Forests. In: Environmental Consequences in Timber Harvesting in Rocky Mountain Coniferous Forests. U.S. Department of Agriculture, Forest Service General Technical Report INT-90. Ogden, UT: Intermountain Forest & Range Experiment Station. 1980. 526 pp.

Harvey, et al. Organic reserves: Importance to ectomycorrhizae in forest soils of western Montana. Forest Science 27:442-445, 1981.

Johnson, D.R., Miller, D., and Peek, J. Guidelines for Human Activity Within the Range of Mountain Caribou, Southern Selkirk Mountains. Miss. Publ. No. 3, Forest, Wildlife, and Range Experiment Station: Moscow: University of Idaho. 1977. 7pp.

Konizeski, D. The Montanans' Fishing Guide. Missoula, MT: Mountain Press Publishing Co., 1982. 310 pp.

Kootenai National Forest references. See second reference list below.

Lyons, J.L. Field tests of elk/timber coordination guidelines. Research paper INT-325. Int. Forest and Range Exp. Station. 1984. 10 pp.

McClellan, B.R. Relationships between hole-nesting birds, forest snags, and decay in western larch-Douglas fir forests of the Northern Rocky Mountains. Missoula, MT: University of Montana, Ph.D. Thesis, 1977. 498 pp.

- McGregor, M.D., R.D. Oakes and H.E. Meyer, Status of Mountain Pine Beetle Northern Region 1982, USDA Forest Service Northern Region, S&PF Report No. 83-16, June 1983.
- Megahan, W.F. Logging, erosion, sedimentation--Are they dirty words? J. For. 70(7):403-407, 1972.
- Megahan, W.F. Nonpoint source pollution from forestry activities in the western United States: results of recent research and resource needs. Conf. on U.S. Forestry and Water Quality: What course in the 80's? Proceedings, Water Pollution Control Federation.
- Megahan, W.F., and Kidd, W.J. Effects of logging roads on erosion and sediment deposition from steep terrain. J. Forestry 70(3):136-141. 1972.
- Pacha, R.E. Effects of dispersed recreation on water quality. In: Interior West Watershed Management Symposium, April 1980, Spokane WA. Edited by Baumgartner, Pullman, WA: Washington State University, 1980. 161-168.
- Pfister, Robert D., B.L. Kovalchik, S.F. Arno and R.C. Presby, Forest Habitat Types of Montana, USDA Forest Service, General Technical Report INT-34, May 1977
- Platts, W.S. Streamside management to protect bank-channel stability and aquatic life. In: Interior West Watershed Management Symposium, April 1980, Spokane, WA. Edited by Baumgartner, Pullman, WA: Washington State University, 1980. 245-255.
- Rice, R.M. A perspective on the cumulative effects of logging on streamflow and sedimentation, in Proceedings of the Edgebrook Conference, July 1980. Spec. Pub. 3268, Univ. Calif. Div. Agric. Sci, 1981. 36-46.
- Rice, R.M., Rothacher, J.S., and Megahan, W.F. Erosional consequences of timber harvesting: An appraisal. In: Proceedings on National Symposium on Watersheds in Transition. Water Resource Assoc. Series 14: 1972. 321-329.
- Ruediger, W. and Mealey, J. Coordination Guidelines for Timber Harvesting in Grizzly Habitat. Kootenai National Forest, 1978.
- Smith, D.M. The Practice of Silviculture, 7th ed. John Wiley & Sons, Inc., 1962.
- Thompson, John, Insect and Disease Aerial Surveys, USDA Forest Service Region One 3420 Memo to Forest Supervisors, November 26, 1984.
- Troendle, Charles A. and Charles F. Leaf, "Hydrology", in An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources, Chapter III, USEPA, EPA-600/8-80-012, August 1980.
- Tunnock, Scott, Oscar J. Dooling and Steve Kohler, Montana Pest Conditions and Program Highlights 1983, Report 84-2, May 1984, USDA Forest Service

Wenner, Lambert N. Minerals, People, and Dollars: Social, Economic, and Technological Aspects of Mineral Resource Development, USDA Forest Service Region 1, Report R1-84-08, August 1984.

KOOTENAI REFERENCES

Analysis of Alternatives, Kootenai National Forest, December 1981.

Analysis of the Management Situation, Kootenai National Forest, September, 1981.

CALDAT, Regional Economic Input/Output Computer Model.

Cabinet Mountains Wilderness Interim Fire Management Plan, Kootenai National Forest, 1980.

Christensen, Alan. Procedure for Identification of Elk Summer Range and Development of Coefficients. Kootenai National Forest Planning Record.

Criteria for the Analysis of the Management Situation, Volume 4, Kootenai National Forest, February 1981. Contains coefficient development assumptions and rationale for: Fisheries, fuel (energy), insects and disease, landownership adjustment, minerals and oil and gas, recreation, sediment, timber, and wildlife (elk).

Cumulative Effects Analysis Process - Grizzly Habitat Component Mapping. Kootenai National Forest, 1982.

Fire Management Action Plan (Draft), Kootenai National Forest, September 1981.

Forest Wildlife Habitats: A Basic Handbook for Land Managers. Kootenai National Forest, December 1981.

Haugen, Jerry J. Economic Base Study Lincoln County Montana, Kootenai National Forest, November 14, 1983.

Kootenai National Forest Proposed Plan (Draft). Kootenai National Forest, September, 1982.

Montana Outdoor Recreation Plan, Volume II. Planning Region 10, 1974.

Oil and Gas Lease Applications - Environmental Assessment, Kootenai National Forest, June 1980.

Oil and Gas Leasing Environmental Assessment Draft (Nonwilderness), Kootenai National Forest, August 1982.

Olsen, W.L. Kootenai Logging Cost Study, Kootenai National Forest, January 1980

Proceedings of Our National Landscape, USDA Forest Service, April 1979.

Recreation Opportunity Inventory and Evaluation, USDA Forest Service,
Northern Region, 1974.

Ruediger, W. and Mealey, J. Coordination Guidelines for Timber
Harvesting in Grizzly Habitat, Kootenai National Forest, 1978.

Ten Lakes Montana Wilderness Study Act Report and Proposal (Draft),
Kootenai National Forest, September 1982.

Tolle, T., Rost, M., Park, J. and Collett, L. Unpublished findings,
USDA, U.S. Forest Service, Kootenai National Forest, 1976

White, B. Minerals in the Forest Plan. Kootenai National Forest
Planning Record, August 1980.

Wildlife Coefficients: Procedure for Identification and Allocation of
Old Growth, Kootenai National Forest Planning Record.

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CHAPTER V
LIST OF PREPARERS

This Chapter outlines the personnel that were involved in the preparation of the Environmental Impact Statement and the Forest Plan document.

V. LIST OF PREPARERS

The following list includes all the individuals who contributed to the preparation of this Environmental Impact Statement and to the development of the Kootenai National Forest Plan. An asterisk (*) following a name indicates that the individual no longer holds the noted position.

Abbreviations: BA - Bachelor of Arts BS - Bachelor of Science
 MA - Master of Arts MS - Master of Science
 MF - Master of Forestry

INTERDISCIPLINARY PLANNING TEAM

<u>Name</u>	<u>Job Title</u>	<u>Degree</u>	<u>Years of Experience</u>
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Jerry Haugen	Operations Research	MS	13
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Rich Kimberlin	Fire Staff Officer	BS	20
Lou Kuennen	Soil Scientist	MS	20
Paul Leimbach	Planner/Core Team Leader	BS	25
John Lloyd *	Fisheries Biologist	MS	12
Steve Marshall *	Geologist	BA	8
Larry Meshew *	Hydrologist	MF	11
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Ken Briggeman	Timber Staff Officer
Larry Cron	Lands, Minerals, Recreation Staff Officer
John DeYoung	Administrative Staff Officer
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Mary Ann Jones *	Supervisory Office Automations Assistant
Patricia Johnson *	Cartographic Technician
Erma Kaeding	Cartographic Technician
June Kreitler	Computer Assistant
Frank Lamb	Computer Assistant
Glenda Larson	Offset Press Operator
Linda Nelson	Computer Specialist
Michele Nuss	Cartographic Technician
Carol Rowberry	Offset Press Operator
Bobbi Russell	Supervisory Computer Programmer
Lance Schelvan •	Visual Information Specialist
Sally Suk *	Computer Assistant

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CHAPTER VI

CONSULTATION WITH OTHERS

This chapter describes the process that was used to involve the public in the resolution of the Issues that were presented in Chapter I, and how their involvement helped to determine the Final Forest Plan.

VI. Consultation with Others

A. Introduction

This chapter describes how public comment was solicited and analyzed for use in the resolution of the Issues presented in Chapter I. It also discusses the type, amount, origin and intensity of the public comment received. The chapter is organized as an addendum to Appendix A of the Draft EIS, and discusses the public involvement and consultation that has occurred since then. Appendix A, of the Draft EIS, discusses the Public Consultation that occurred up to then.

Copies of all the actual comments received from the public during the review period, and the Forest response, are included in Appendix E.

B. Consultation between the Draft and Final EIS

The Draft EIS was distributed to the public and the Environmental Protection Agency on July 3, 1985. Notice of the Availability of the Draft EIS was published in the Federal Register on July 19, 1985. As requested by several letters, the public comment period was extended from October 15, to November 1, 1985 to allow for additional review time. During the period, July 3 to November 1, public meetings were held in Libby, Noxon and Kalispell, Montana, to answer questions and clarify any misunderstandings. Meetings were also held, upon request, with various interested organizations and involved government agencies.

As a result of the public review, 290 responses were received; most of which were in written form. These responses were stratified, using the Content Analysis process, and are summarized in this document.

The most repeated concerns were brought forward and identified as "Public Review Issues." They are presented in this document along with the proposals for their resolution. In addition, other comments which were considered important and substantive are also displayed.

1. Summary of What the Public Said

A large segment of the responding public was unhappy with the Proposed Forest Plan as presented in the DEIS. This segment was polarized into two general groups: (1) those that felt that the Proposed Action was biased on the side of development; such as timber harvesting and road construction at the expense of wilderness, water quality, old-growth timber, and fisheries, and (2) those that felt that the Proposed Plan favored wilderness, roadless areas and wildlife (including the grizzly bear) at the expense of people, timber harvest and jobs, and minerals and oil/gas.

Within this general polarized situation was some common ground. There was general agreement that the timber harvest levels experienced over the last decade are acceptable and/or should not be reduced (173 mmbf/yr). General concern was also expressed about the "realism" involved in the Proposed Plan's budget requirement (a projected 22% increase) and what will be "sacrificed" if a budget shortfall occurs.

Common ground was also observed in the area of water quality and fisheries. The public asked us to insure that these resources receive adequate protection.

An important challenge to the timber-yield tables used in the Forest Forplan model was also received which required an in-depth review to insure that the model represents reasonably expected timber yields.

C. Perspective on the Public Input

The input received can be characterized as "normal" in terms of the types of inputs, locations of respondents and the types of respondents. There were 290 inputs received and these carried 303 signatures. There were no petitions or form letters received.

1. Organized Input

One interest group (Montana Wilderness Association) provided its members with pre-addressed post cards and encouraged them to respond favoring a variety of additional wilderness and roadless areas and other preferred resource positions. 108 of these post cards were received.

Another interest group (Montana Women in Timber) provided pre-addressed response forms and a sheet of suggested comments. Their members were encouraged to select from the list of comments, write them on the response form and submit the form. Concerns suggested generally favored increased levels of timber harvest and opposed any additional Wilderness designations. 45 of these forms were received.

2. Geographical Distribution

The major geographical sources of comments were as follows:

Libby	- 25%	Kalispell	- 25%
Missoula	- 8%	Heron	- 4%
Columbia Falls	- 4%	Troy	- 3%
All Others	- 31% (less than 2% in each location)		

The sources of comments by State are as follows:

Montana	- 87%	Idaho	- 3%
Washington	- 3%	Colorado	- 2%
All Others	- 5% (1% or less in each location)		

From this distribution it was determined that there was no great interest or organized input drives except among people who are likely to work or recreate in the Forest. In general, the people commenting on the Draft Plan are those most likely to be directly affected by it.

3. Type of Input

As already noted, there were no form letters or petitions received. About 98% of the inputs came in the form of individual letters (including post cards and response forms). There were five inputs received at the open house held in the Supervisor's Office and two telephoned inputs.

The investment of time that an input requires is often an indicator of the interest level of the commentor. Petitions require almost no time investment and a form letter requires very little. A thoughtful letter requires the largest investment and indicates a relatively high interest level. There were 12 individual letters that expressed more than 10 comments. There were 37 individual letters that expressed only one comment. This demonstrated that the level of interest of the commentors was quite high. Even among those who used a pre-addressed postcard or suggested comments, most elected to express several comments.

4. Issues Raised

The major issue categories which were addressed in the input are displayed in the following Table VI-1. Percentages do not total to 100% because most commentors addressed more than one issue.

Table VI-1

Kootenai National Forest

Major Issue Categories as expressed by the Public
during the Draft EIS Review Period

ISSUE	INPUTS	% of All Inputs
Wilderness and Roadless	204	70%
Timber Harvest	147	51%
Miles of Roads (Road Building)	126	43%
Wildlife (including Old-Growth)	108	37%
Soil and Water	97	33%
Plan and DEIS Concerns	61	21%
Economics	59	20%
Threatened & Endangered Species	40	14%
Road Closures	30	10%
Monitoring & Evaluation	26	9%
Fisheries	19	7%
Minerals, Oil & Gas	19	7%
Recreation	16	6%
Viewing	13	4%
Land Ownership	9	3%
Fire	5	2%
Insects & Disease	5	2%
Grazing	4	1%
Unique Areas of Special Interest	4	1%
Plant and Animal Diversity	2	1%
Cultural Resources	1	<1%

D. Intensity and Direction of the Public Input

The following paragraphs will discuss each of the major issue categories and their sub-issues, in turn, and will provide details as to the intensity of public comment with regard to each point. The indicator of intensity will be the number of inputs (cards, letters, phone calls etc.) that contained the comment. Since there were very few inputs with more than one signature, the intensity in terms of signatures would be essentially the same. The number of inputs is not additive in any category because most inputs addressed several facets of individual issues as well several issues.

1. Wilderness and Roadless Areas

The Wilderness and roadless area issues generated the most public interest with 204 inputs (70%) dealing with the issue. All of the cards sent in by members of the Montana Wilderness Association involved this issue. Even when the impact of this organized campaign is removed the issue drew 96 inputs which amounts to 53% of the remaining inputs, and resulted in the most intense of all the Public Issues.

a. Site Specific Proposals (Pro-Wilderness)

About 116 of the inputs included site specific proposals for additional Wilderness or support for proposals included in the Draft Forest Plan. The following proposals are listed in order of their public popularity:

- Pellick Ridge, Napoleon, Star and Hamilton Gulch additions to the Scotchman Peaks proposal (102 inputs)
- Trout Creek (88 inputs)
- Ten Lakes including Mt. Wam (76 inputs)
- Support of Cabinet Mountain Additions (70 inputs)
- Kootenai side of Tuchuck and Thompson-Seton (59 inputs)

In addition the following proposals were mentioned in three or fewer inputs: Entire Grave Creek drainage, South end of East Cabinet Front, Berray Mountain, McKay Creek, Green Mountain, Government Mountain, Chippewa, Rock Creek, Galena, Willard- Lake Estelle, Cube Iron, Deep Creek (in Thompson-Seton)

b. Site Specific Proposals (Anti-Wilderness)

There were seven inputs that opposed specific Wilderness or roadless area proposals contained in the Draft Forest Plan. Two inputs opposed the Ten Lakes proposal and two opposed the additions on the East Cabinets. Other proposals that were opposed include the following: the area between Leigh Creek and Treasure Mountain, upper Rock Creek, area just east of Bull Lake, the roadless areas along Rock Creek, Scotchman, Pellick Ridge, and Trout Creek.

c. Generally in Favor of More Wilderness

There were 65 inputs containing general statements in favor of Wilderness. The key words and phrases associated with these inputs are: "strengthen, protect, preserve", "keep Montana wildlands wild", "Montana can prosper from Wilderness by attracting tourism, hunting, fishing etc.", "KNF only has 4% Wilderness", "can provide a healthy volume of timber and conserve wild resources", "keep Montana special", "enough land is designated for logging", "preserve for future generations".

"Preserve for future generations" was a thought expressed in 24 inputs. About 18 inputs said there simply wasn't enough Wilderness and that the system should be expanded. Ten inputs made a blanket statement in support of the MWA position and seven sought to preserve all of Montana's roadless areas.

d. Generally Opposed to Wilderness

There were 47 inputs expressing general opposition to Wilderness. Key words and phrases were: "we don't need any more", "will restrict timber supply", "too few people use Wilderness", "no tax values", "waste of trees", "unfair to handicapped", "reduces FS flexibility", "multiple-use

is best". Concerns related to restrictions in timber supplies were expressed in 20 inputs. Eleven inputs favored Alternative N because it included no additional Wilderness. The Western Environmental Trade Association (WETA) feels that an aggressive management program rather than additional set-asides will provide a balanced use of the land.

e. Roadless Areas

There were 11 inputs that generally favored the roadless area concept for additional areas on the Forest. There was no general opposition to this idea. There were 49 inputs supporting site specific roadless designations. About 45 of these supported roadless designation for Roderick Mountain, Northwest Peaks, Robinson Mountain, Canyon Peak (Galena) and an upgrade to MA 29 for Cataract. Other areas mentioned were, additions to Trout Creek, Grizzly Peak, Gold Hill, LeBeau, Lower Fire Lakes, Smokey Lake, the western flank of Ketowke Mountain, Elk Mountain from Brush Creek to Bowen Lake, Leigh Creek to West Fork Fisher (upgraded to MA 29), and Allen Peak. Those generally opposed to the Wilderness concept did not express opposition to roadless area management or to specific roadless area proposals except as noted in the paragraph "Site Specific Proposals (Anti-Wilderness)" above.

f. Other Comments about Wilderness and Roadless Areas

There were 9 inputs proposing some alterations in designations:

- Boyd Hill Cemetery area removed from timber management
- Trap Trees on flanks of Mt. Wam could be MA 2
- Northwest Peaks should continue as a Scenic Area
- Several areas should be changed from MA 2 to MA 29 (Upper Vermillion, West side of Government Mtn., Dry Bench area on the Bull River, Mt. Vernon, entire east side of the Cabinets, Mt. Pend Oreille)
- Trout Creek roadless but not Wilderness
- Thompson-Seton should be MA 2, if not Wilderness
- Big Creek needs protection

There were also eight inputs suggesting changes in management direction. Some inputs suggested that mining interests need not be accommodated in the Scotchman or Cabinet Mountain areas or any other Wilderness. The Cabinet Wilderness direction was said to be too vague and subject to changes by individual rangers. One input expressed concern about the distribution of visitors in Wilderness areas and another was concerned about continued encouragement of snowmobile use in the Ten Lakes Area.

2. Timber Harvest

Concerns about timber harvest were expressed in 147 inputs (51%) making this issue the second most intense based upon public feedback. Commentors were fairly evenly split between those who favored no increase in harvest (45 inputs) and those who did (40 inputs). A major block of inputs (53 inputs) requested further analysis of a situation calling for historic sale levels (173 MMBF) coupled with 15 MMBF of salvage and a budget of \$20,000,000.

a. Opposed to Increased Timber Harvest

The comments in this category are listed below in order from most to least intense:

- 217 MMBF is too high (11 inputs)
- Excessive emphasis on timber without consideration of the forest as a whole (7 inputs)
- Do not increase harvest, much timber offered is not sold (6 inputs)
- Sales should be greatly reduced (4 inputs)
- Less or no clearcutting; Plan is a sellout to timber interests; What is lost can not be regained (3 inputs each)
- 35% increase in harvest is unacceptable; timber is important, but Kootenai should not have a high quota to offset diminishing supplies elsewhere (2 inputs each)

Other comments in this category were generally opposed to logging or the way in which the Forest Service handles the timber resource.

b. Favors Continued or Increased Timber Harvest

One major comment in this category (11 inputs) expressed the belief that Wilderness proposals were decreasing timber volumes by removing lands from the suitable base thus timber harvesting could be increased if less Wilderness were proposed. Another comment (11 inputs) supported the notion that the Kootenai should increase harvest levels to offset declines on adjacent Forests. Other comments in order by intensity are:

- Timber industry is important for jobs/taxes/schools (7 inputs)
- Maximize the suitable acres and manage them intensively (6 inputs)
- Meet the needs of industry and maintain historic position in the region (4 inputs)
- Timber volumes too low, RPA goals not met; make 300 MMBF available; Proposed Action is biased toward non-timber interests; departure may be necessary for LPP (3 inputs each)
- Get back to raising timber; Can easily get 239 or 248 MMBF; maintain if not increase volume; industry should not have to give up their base supply (2 inputs each)

The remainder of these comments generally encouraged more harvest (251 MMBF with 109 MMBF LPP and 250 MMBF were mentioned) apparently linked to concerns of local economic stability.

c. Other Comments about Timber

There were many other comments related to management practices, none of which involved more than 5 inputs each. In general these comments addressed the following points: salvage more LPP, be more careful in sale implementation (soil/water perspective), more selective cutting, timber values in the plan are too high, longer rotation age, protect small planting contractors, focus sales in areas of existing roads, shorter rotations (especially LPP), free wood permits, no chemicals, more shelterwood cuts, leave seed trees for snags, harvest sawlogs and chips concurrently, etc.

3. Miles of Roads (Road Building)

Road mileages called for in the Plan were mentioned in 126 inputs, making it the third most intense issue. For the most part road building is opposed due to its negative impacts upon other resources. There were 115 inputs expressing opposition to road building. There were 99 inputs that simply asserted that there was too much road building. Sediment caused by roads and attendant degradation in water quality were addressed in 13 inputs. Nine inputs asserted that roads should not be built where profits from the timber sale do not cover the cost. Six inputs opposed degradation of the roadless resource and three inputs noted that roads don't help wildlife. One commentator wondered how snags could be preserved with roads everywhere.

The 5 inputs favoring road construction noted management uses, recreation uses and access to private lands.

There were 15 inputs containing specific comments about roads. Seven inputs spoke to road standards and maintenance while five mentioned specific road construction plans. There were a couple of other inputs addressing site-specific road concerns.

4. Wildlife (Including Old-Growth Timber)

The major issue here was concern about old growth timber stands and their associated wildlife species. There were 96 inputs favoring more old growth and one opposed to old growth. Three inputs noted that the Draft Plan sufficiently handled old growth and one suggested a worst-case analysis of old-growth management.

Other wildlife concerns involved a perceived need for more consideration for wolf, caribou, sheep and goats (5 inputs) and concern about roads disturbing wildlife (5 inputs). One input wanted additional elk security (refer to the road closure issue below) and another wanted less elk security. There were 11 inputs with proposed changes in management direction or land designations.

5. Soil and Water

The soil and water issue was the next most intense with 97 inputs expressing various concerns. Overall 86 inputs included comments indicating a need for more water quality protection and 15 inputs had specific suggestions. The largest concern was for protection of riparian and streamside habitats (71 inputs). Nineteen inputs were concerned about the EPA rating and the legal requirements for water quality. Fourteen inputs expressed concern about fish and wildlife impacts and 12 were generally concerned about sedimentation of streams.

6. Plan and DEIS Concerns

This category was for comments related to the actual documents themselves and the planning process in general. With 61 related inputs it became the sixth most intense issue category. In general these are procedural comments related to the commentor's perceived need for an additional fact or figure on some specific page in the document. In addition this category includes 25 inputs which opposed the Proposed Action for a number of reasons: general principles (9 inputs), prefers other alternatives (4 inputs), rerun the Proposed Action with different values (4 inputs), all alternatives increase timber and budget (3 inputs), etc.

The most critical comments in this category in terms of their substance (not intensity) are the following:

- Inadequate range of alternatives
 - no alternative for maximizing both wilderness and fish/wildlife
 - 15 alternatives all with timber above the 10 year average
 - No high amenity alternative
 - Alternatives should include a variety of levels of new road construction and development
 - All alternatives call for significant budget increases
 - Alternatives fail to examine timber sales levels above 262 MMBF
 - No alternatives used shorter rotations explored in the benchmarks
 - No uneven-aged management alternative
- Forestwide standards are too general
- Commercial thinning is not always practical
 - doubt that the Kootenai has the expertise to log 1/3 of the commercial thinning proposed
- Plans to increase the cut from 175 MMBF ignores the current state of the timber industry
- Projected timber supply is based upon proposed utilization standards which are not currently feasible (economically)
- Timber yield tables over-estimate harvestable volumes
- Over-estimated timber values had a major effect upon FORPLAN

7. Economics

The comments in this category are concerned first with economic impact (jobs and community stability) and second with efficiency (timber values, budget levels etc.). There were 29 inputs expressing concern about loss of jobs

caused by added Wilderness and/or reductions in timber harvest. There were 18 inputs concerned about economic stability including suggestions for diversification (tourism, computer schools, industry, oil/gas development etc.). Two inputs asked that the Forest service explore ways of making timber associated contracts more available to small local contractors. One input suggested guaranteed profits and cost-plus contracts for timber purchasers.

On the efficiency side there were 10 inputs expressing concern about the values used in the plan. Five inputs suggested that returns to the government and jobs created were exaggerated. Five inputs asked for consideration of the consequences of budgets lower than those displayed in the plan.

There were 9 inputs promoting the notion that the Forest should generate a profit through timber sales by avoiding below cost sales.

8. Threatened and Endangered Species

There were 40 inputs expressing comments on threatened and endangered species. All related to grizzly bear. Twenty inputs favored managing for grizzly bear and generally expressed concern about various aspects of the Forest Plan that appeared to conflict with this viewpoint. The conflicting activities that were mentioned included the following: timber harvest, roading, removal of cover, ORV use and road use. The US Fish and Wildlife Service found that the proposed plan is not likely to jeopardize the grizzly bear.

There were 14 inputs generally opposed to grizzly bear management. Nine inputs suggested that grizzly management is excessive, bears should not affect other uses and the State (FW&P) should manage the bears. Most of the remaining inputs simply indicated that bears are undesirable or they involved no conflict with other uses and should not be any problem. Plum Creek Timber Company, Inc. noted that they were not interested in granting grizzly bear easements and suggested that certain MA 14's be eliminated.

There were 11 inputs providing specific suggestions for land designation or management changes.

9. Road Closures

There were 30 inputs with comments on road closures. Fifteen favored road closures and four opposed road closures. Ten were concerned about the methods of road closures with six opposed to gates and four suggesting that more funding was needed for enforcement. Five inputs included specific recommendations regarding road closures.

10. Monitoring and Evaluation

There were 26 inputs addressing the monitoring and evaluation portion of the Plan. About 23 of these inputs noted that funding was insufficient and the activities were not adequately described. Areas of concern were water quality, grizzly, other wildlife, fisheries and timber. Other area of monitoring that were mentioned as being needed were conflicts between livestock and wildlife and affects upon adjacent landowners. One commentor wondered who was going to monitor the districts to be sure the plan was being followed.

One commentor suggested that the plan include an education program to increase public awareness of rules and regulations. Another commentor doubted that monitoring water quality in MA 18 would be necessary.

11. Fisheries

There were 19 inputs on the fish issue and all of them indicated a concern for potential damage to fisheries. Twelve inputs noted that the plan shows little regard for fisheries and is probably illegal. Eight were concerned about roads damaging streams. Four were concerned about the cutthroat fishery. One indicated that the decline in trout fishing is due to too many fishermen. One commentor had specific comments on fish management in the Wilderness.

12. Other Issues

The other issues listed in the previous section on "Perspective on the Public Issues" (VI.C.) displayed relatively low intensities of public interest. Some of the more substantive comments in these other areas are as follows:

- Inadequate analysis of mineral, oil and gas potential (8 inputs)
- Noxious weeds should be addressed (2 inputs)
- The Nature Conservancy identified three plants and five animals on the Forest which should be given some consideration (1 input)
- The State Historical Preservation Officer suggested broader consideration of cultural resources in several areas of the plan (1 input)

13. Summary of the Intensity and Direction of the Public Input

The new DEIS, released in July, 1985, presented six Major Issue Groups which were considered to be the greatest public concern. These public concerns were the result of the Public Response Analysis of the original DEIS issued in November, 1982.

Those six Issue Groups were:

- Timber Production and the Associated Road Construction, including the Harvesting of Mountain Pine Beetle-Infested Lodgepole Pine and the Effect on Water Quality and Fisheries.
- Wilderness and Roadless Management, including the Effect on Minerals, and Oil/Gas Exploration.
- Wildlife and Fish Production, including the Recovery of the Grizzly Bear, Old-Growth Timber-Dependent Species, and Riparian Areas.
- Local Economic Effects, including providing for more Economic Diversity such as Recreation Tourism.
- Visual Quality Protection and the Effect on Timber Harvest.
- Minerals and Oil/Gas Exploration and Development, including the Question of Access as a Result of Roadless or Wilderness Designation.

Other Issues were:

- Landownership Adjustments, especially in Identified Grizzly Bear Habitat and Roadless Areas.

The results of the latest Public Response Analysis, verify most of the above Issue Groups and add several more. The new Public Issues are:

- The Adequacy of the Monitoring And Evaluation Plan.
- Concern for the Economic Values in the Plan, especially the Timber Values and a potential Budget Shortfall.

E. Synopsis of the Forest Plan Major Public Review Issues

The following are the major issues identified during the Public Review period, in order of the times the issue was expressed. They were determined to be the most important items to resolve in the Final Forest Plan and were the basis for formulating a final resolution strategy which is described in Section F, next.

1. Wilderness

Wilderness should be designated in the Scotchman Peak, Trout Creek, Ten Lakes, Cabinet Additions, Tuchuck and Thompson-Seton Roadless Areas. Pellick Ridge should be added to the KNF wilderness proposal for Scotchman Peak. Conversely, there should be no more wilderness designated on the KNF to insure an adequate timber supply and provide for jobs and Mineral, Oil/Gas exploration.

2. Timber Harvest Levels

The total timber harvest levels projected are too high in comparison with the historical harvest levels and will require too many roads at the expense of Water Quality, Roadless Areas, Fisheries, and Wildlife, including the Grizzly Bear. The projected harvest levels are out of proportion with such recently observed events as the "Timber Buy Back", the local and regional changes in sawmilling capacity, imported lumber from Canada, and anticipated Budgets as the result of Federal Deficit Reduction Programs currently evolving. Conversely, the projected timber harvest level is a reduction in recently experienced Sell levels and timber supplies will be inadequate by the end of the first decade because of declining supplies on the adjacent National Forests (Lolo, Flathead and Idaho Panhandle) and on adjoining private timberlands.

3. Road Construction

The Plan projects too much road construction which will have serious effects on water quality, fisheries, wildlife and roadless areas.

4. Old-Growth Timber

Old-Growth Timber has only been designated to provide for a minimum viable population and does not insure against natural hazards, such as fire, windthrow, etc.

5. Water Quality

The projected increase in the miles of roads will have a significant adverse effect on water quality because of potential increased sediment delivery to streams. This water quality degradation will effect fisheries, recreation use, the quality of life, and will probably be "illegal" (according to some of the public).

6. Economics, Part I - Effects on the Local Economy

Jobs may be lost because of a decline in timber harvest due to an increased emphasis on wildlife, including the grizzly bear, and additional wilderness and roadless areas. A more diversified economy is desired which includes more tourism, timber-related manufacturing, mining, and oil and gas development.

7. Economics, Part II - Unrealistic Economic Values and Budgets

The economic values used in the Proposed Plan are not realistic (too optimistic), especially the timber values in relation to other values such as recreation and wildlife. Also, the budget necessary to carry out the Proposed Plan is too optimistic in relation to recent economic events, such as the "Timber Buy-Back", Federal Deficit Reduction Programs, and Canadian imports.

8. Grizzly Bear Recovery

It's important to manage for the recovery of the grizzly bear because it has as much right to live in peace as the rest of us, and it can be a barometer to indicate how well we are managing for all the resources. Conversely, People and bears do not mix, and managing for the recovery of the bear is excessive and will effect other uses such as mining, logging and recreation.

9. Road Closures

Road closures are needed to insure security for big game, including the grizzly bear, and for recreation solitude. The funding is inadequate to enforce the necessary road closures. Conversely, more road closures are not needed because it restricts peoples use of the forest. People need to be able to get out and get wood, pick berries, hunt or just go for a Sunday drive. The roads are built with public funds and should be left open for public use. No more Gates!

10. Monitoring and Evaluation

The Monitoring and Evaluation (M&E) Plan is vague and the projected funding for M&E is not adequate to insure that the Plan's objectives will be reached.

11. Fisheries

The amount of new roads will undoubtedly contribute to sediment levels and reduced water quality which will impact the fish habitat and cause a decline in the fishery resource. The Plan does not display an adequate emphasis on the fish resource and may be illegal.

F. Proposed Resolution of the Major Public Issues

This section displays the major public issues as interpreted by the Kootenai National Forest and the approach taken to try to resolve them.

1. Wilderness

a. Issue

Whether or not to add any more wilderness, and if so, where and how much? This is the most polarized of all the Issues and the most intense. The areas mentioned the most are: Scotchman Peak and Trout Creek.

b. Background

The opponents of wilderness fear loss of jobs because of potential resource opportunities foregone. The wilderness that has been recommended in the DEIS has not, to the best of our knowledge to date, precluded any significant timber, or known minerals or oil/gas resources. This has been the decision criteria used to date. The KNF wilderness recommendations are similar to the Governors recommendation except for Pellick Ridge in the Scotchman Peak Roadless Area.

c. Decision Space

The Pellick Ridge portion of Scotchman Peak is the key to consensus on any additional wilderness on the Kootenai. Its history of public support is well documented in both Rare I and II and in the public comment on the Proposed Plan.

The KNF eliminated Pellick Ridge because of a combination of timber and mineral resources, and to provide a more manageable topographic boundary. The majority of Pellick Ridge was designated to roadless or non-developmental resource uses because of economic and/or environmental constraints.

The Governor's Task Force used a similar resource criteria on Pellick Ridge but compromised on the topographic boundary criteria in order to recommend as large a wilderness as possible. The Montana Congressional Delegation in June, 1984, recommended a proposal similar to the Governor's recommendation.

d. Discussion

Reanalyze the information on mineral potential in the Star Gulch area to ensure that the values are still significant enough to offset the potential wilderness value. If the mineral information appears less favorable, be willing to accept a less manageable boundary to achieve as large an addition as possible to the Wilderness System without other resource conflicts.

e. Resolution

Add 12,000 acres of wilderness on Pellick Ridge, in the Scotchman Peak Roadless Area, at the expense of having to manage a less desirable wilderness boundary. The mineral potential in the Star Gulch area was found to be less than previously thought based on more recent drilling information. This addition would be consistent with our previous criteria of not precluding significant resource options and would be an administrative inconvenience and not a resource tradeoff. This proposal would be consistent with the recommendations of the Governor and the Congressional Delegation. It would also coincide to a greater extent with the Montana Wilderness Association recommendation. No other wilderness additions (or deletions) are considered necessary to resolve the Wilderness Issue on the Kootenai Forest.

The Trout Creek area was re-examined but the high potential for elk management plus some mineral potential led to the decision to retain a designation which would permit management of the elk habitat while also providing mineral exploration opportunities. This is consistent with the Governor's recommendation.

2. Timber Harvest Levels

a. Issue

Whether or not to increase the potential timber harvest over the historical level and, if so, how much? This is the second-most polarized Issue on the Kootenai and is similar to the Wilderness Issue in its intensity.

b. Background

The Issue revolves around the proposed timber sell and potential harvest level. One side fears that the proposed sell (and possible harvest) is too high, both budgetarily and environmentally; while the other side fears that timber jobs may be jeopardized in the future when the economic outlook for timber may improve. The timber Issue is also closely linked to the Road Construction, Water Quality, Fisheries, Old-Growth Timber and Economics Issues. These other issues are results of the level of timber harvest.

c. Decision Space

The actual timber sell level has averaged about 198 mmbf/yr (1973-1984), compared to an actual harvest level of 173 mmbf/yr for the same period. These figures include salvage volumes and are on the existing Utilization Standards (the sell level was calculated prior to the Timber Buy-Back program). The volume of timber presently under contract (after Timber Buy-Back) is about 613 mmbf or about three years sell. The average actual budget for the 1980-1982 fiscal years was \$24.6 million/yr. The actual road construction mileage for the same period was 155 miles/yr.

The above combination of factors is presently calculated as causing a reduction in the catchable fish populations of the streams on the Kootenai.

The Proposed Action, in the Forest Plan document of the Draft EIS, projected a 16% increase in the historic timber sell level to 233 mmbf/yr, including salvage. This would require a budget increase of 22% and a road construction increase of 62%. Projected fish losses would increase 2% but these figures are rough estimates.

d. Discussion

Because of the existing calculated fish losses that are presently occurring and the amount of timber volume under contract, it would be prudent to consider a reduction in the historic timber sell levels; especially when future budget levels appear to be on a decline. But, because of the high dependency of the local communities on timber-related employment, a reduction could have significant local effects. In contrast, an increase in the actual timber harvest level is calculated to aggravate a potentially undesirable fish resource situation. It appears then, that a compromise is warranted and a continuation of the present course of action is recommended. This would result in an Allowable Sale Quantity close to the historic sell level of 198 mmbf/yr, which is 202 mmbf/yr, similar to the Proposed Plan (Alt.J).

In order to offset any potential fish losses, the Monitoring and Evaluation Plan will be strengthened to ensure that water quality is not degraded and fish habitat is protected. This also includes reducing the total miles of road needed, reducing the number of miles built per year, and reducing the road standard (road widths and amount of excavation).

e. Resolution

The Allowable Sale Quantity will be maintained in the first decade, similar to the DEIS. The rate of projected fish loss will not improve, but the roughness of the fish-loss calculations warrant the risk-taking in this resource area rather than in the local economy factor. The unknowns relating to the amount of actual timber harvest that may occur in the next decade could result in a smaller calculated fish loss.

3. Road Construction

a. Issue

How to build fewer miles of new road and reduce the impacts of road construction while providing access for resource management and use. This is the third-most intense issue and has been the most consistent issue since the beginning of the Forest Planning process in April, 1979.

b. Background

The public has expressed a desire for a lower total road mileage and a slower rate of road construction. The fear of damage to a variety of resources such as, roadless, soil, water, fisheries, wildlife, etc., leads to the opposition to roads.

c. Decision Space

Part of this issue was addressed by an I.D. Team (Resolution Committee) after the original DEIS in November, 1983. Given a regulated timber base acreage to be accessed, the committee concluded that the current and anticipated match of logging equipment, timber, and topography eliminated the possibility of substantial reductions in road mileage. This leaves reduction of the regulated (or suitable) timber acreage as the only direct way to reduce total road mileage projections.

Removal of the 40,000 acres in the timber base that are over 60% slope would reduce the estimated road needs by less than 100 miles. To effect a reduction in road miles in the order of 1000 miles would require removal of all 60%+ slopes and about 103,000 acres in the slope zones between 40 and 60%. This is about 10% of the total regulated base. Removal of MA 13 from the regulated base would reduce the base by 92,500 acres and significantly reduce anticipated road needs (500 to 800 miles).

Recent developments in National budgeting policies strongly indicate that reduced capital investment budgets can be expected in the future. A constrained capital investment budget and recent pressure to reduce the number of below-cost sales may have the effect of spreading the schedule of road construction out over several decades beyond that predicted in the DEIS, and reduce the immediate impacts of roading on all resources. Recent evidence has indicated that the effort to reduce road costs and road mileage appears to be producing results. The miles of road construction per million board feet of timber harvested has been declining. If this trend continues, the amount of roads actually built at the 5-year Forest Plan review period will be less than projected in the Final EIS.

d. Discussion

Attempt to reduce the regulated timber base with the least amount of effect on timber harvest and the maximum effect on road construction. For example, remove steep lands and lower productivity lands from the regulated base by designating to other uses such as winter range, roadless, etc. (Most of the steep and lower productivity lands were removed from the regulated base after the previous public comment period). Analyze the effect of removing the Old-Growth Timber designation (MA 13) from the regulated base. Use timber scheduling to spread out the rate of road building by forcing lower budget levels, especially in the first decade.

e. Resolution

The reduction in the timber base needed to resolve the Old-Growth Timber issue will reduce the total miles of road needed (See the Old-Growth Timber Issue). Thus the objections of the public can be, at least partly satisfied. Limited budgets and adjusted harvest schedules may spread the construction out to the fourth or fifth decade and reduce immediate impacts, another area of expressed concern. The result of limited budgets may reduce the amount of Mountain Pine Beetle-infested Lodgepole Pine that will be scheduled in the first decade.

4. Old-Growth Timber

a. Issue

The primary issue is the amount and management of old growth timber stands.

b. Background

The Proposed Forest Plan (Alt. J) called for a minimum of 8% of the Forest's acreage below 5,500 feet to be in an Old-Growth condition at all times. This was accomplished in the Plan through designation of about 92,000 acres in MA 13, which was in the regulated base, 40,000 acres in other non-harvest designations, and via constraints which delayed harvest of other lands so that sufficient acreage will have stands at least 250 years old.

The public generally wanted more old-growth timber, citing the following: (1) our contention that 8% was sufficient for a minimum viable population of dependent species and pointing out that there is considerable risk in keeping these species at the brink of extinction in this area, (2) a lack of faith in the Forest Service's ability to manage old growth as regulated timber on a 250-year rotation.

Suggestions involved increasing the percentage of old growth to 10, 12, 15 or 20% or more to reduce the risk of error in what a minimum requirement is, and moving MA 13 out of the regulated base.

c. Decision Space

The decision space for this issue is closely linked to the timber and road construction issues. Removing MA 13 from the regulated base would reduce road miles on the order of 500 to 800 miles. Adding acres to MA 13 and making it unregulated would decrease the amount of roads needed, plus reducing first decade timber harvest levels proportional to the decrease in the suitable timber base.

Increasing the percentage of old growth in the regulated base would delay the harvest of these "high net return" stands and reduce harvest levels similar to the example stated above. It would also do nothing for the concern people have about extremely long-term management of these stands.

The total amount of old-growth timber presently available that meets the wildlife criteria for timber-dependent species is 11% of the Forest land base below 5,500 feet elevation.

d. Discussion

Attempt to resolve this issue with the least effect on timber volume and the most effect on total road mileage. First, remove the existing MA 13 acres from the regulated base. If road mileages and budgets still appear too high, add additional old-growth timber acres. Attempt to achieve a minimum of 10% of the Forest total acres below 5,500 feet elevation to reduce the Public's concern for "minimum acres."

e. Resolution

The amount of MA 13 was increased to insure that 10% of the Forest land below 5,500 feet elevation will have old-growth characteristics and was also removed from the suitable (regulated) timber base. The effect of implementing this resolution will be a reduction in total road construction needs on the order of 500 miles and improved assurance that sufficient old growth will be available to maintain populations of dependent wildlife species. This is consistent with the stated purpose of the Proposed Action and the Final Plan to retain options for the future.

5. Water Quality

a. Issue

The issue is degradation of water quality by road construction and logging and its effect on fisheries.

b. Background

The EPA cited potential damage to water quality as a major problem with the Proposed Forest plan. The public input on this issue was unanimous in asking for protecting water quality. The indicator of water quality used in the Draft EIS was calculated fish numbers. The fishery issue is directly related to the water quality issue. Since ground disturbance caused by road construction and logging is the primary controllable cause of water quality reduction, this issue is also linked to the timber and road construction issues.

Recent court decisions have declared that use of best management practices (BMP's) does not by itself satisfy the Clean Water Act. Rather, the judgement of whether the requirements of the act are met is based upon the resulting quality of the water. Thus, the monitoring and evaluation issue becomes linked to the Water Quality issue.

c. Decision Space

Any reductions in the timber harvest and/or road construction levels will help resolve this issue. The estimating procedures used to project fish numbers are rough. Thus it is difficult to predict impacts of changes in management direction with much accuracy. The actual decision space for this issue is limited by the fact that water quality must meet applicable standards. The flexibility lies in the way in which this is accomplished.

Reductions in actual road construction and timber harvest levels would help protect water quality. Specification of best management practices and careful monitoring of those practices, as well as resulting water quality can help meet the requirements of the Act.

d. Discussion

Attempt to reduce the total amount of road construction and timber harvest. In order to be sure that water quality standards are met it will be necessary to specify additional monitoring of water quality as well as processes to prevent degradation from occurring and to stop it when it is found.

Definition of best management practices and their inclusion in the Plan and sale contracts will go a long way toward preventing damage from occurring if monitoring processes insure that these BMP's are actually carried out on-the-ground. As the court has stated, BMP's do not solve the problem. Thus direct monitoring of water quality and provisions to stop offending activities and rehab any damage will be necessary.

e. Resolution

Add requirements to the Monitoring and Evaluation Plan to insure that water quality standards are not violated and be prepared to alter or stop activities found to be seriously degrade water quality. The commenting public probably will not be satisfied fully until actual implementation of these activities are seen to work on-the-ground.

6. Economics, Part I - Effects on the Local Economy

a. Issue

What level and mix of resource opportunities should be provided to ensure a minimum of disruption in local historic job categories, and to provide for future economic diversity?

b. Background

The Issue revolves around the natural concern for jobs and community stability. Lincoln and Sanders Counties are resource- dependent areas which have unemployment levels that consistently exceed the State Unemployment Average. The recent recession has been particularly difficult in the timber-dependent job categories, and recent industry reorganizations and plant modernizations have further reduced job opportunities. Approximately 50% of the timber harvested on the Kootenai is transported to sawmills in Flathead County or Boundary County, Idaho. Recently, local community efforts have been started to help diversify the timber-related dependency. Recreation Tourism has been one of the resource areas explored. Minerals exploration has also been encouraged.

c. Decision Space

The historic timber harvest level on the Kootenai has been about 173 mmbf/yr. Maximum allowable timber harvest levels in the first decade have been calculated at about 262 mmbf/yr. This increased harvest level would require a 45% budget increase, and a road construction increase of 103% over the last ten-year average. Serious concerns have been raised by the EPA on the potential water quality effects of our recent Proposed Plan which projected timber harvest and road construction levels of plus 36% and plus 57%, respectively. Existing timber volume under contract is about 613 mmbf which is about a three-year sell.

Recent mineral exploration has resulted in discoveries that are currently evolving toward two mine developments which could provide employment for about 15-30 years for 650-700 people. Exploration is still occurring and several locations rate high to very high for future economic discoveries. Potential withdrawals from mineral entry could range from a 26% decline to a 133% increase, depending on the amount of wilderness recommendation. The Proposed Plan recommended a 1% increase in potential mineral withdrawal.

The big-game animals on the Kootenai include all the huntable species except Antelope. The elk population could expand 40-100%, depending on the emphasis and expenditure given to its management. Trophy-hunting exists and the potential for its expansion is good.

Currently, about 26% of the Kootenai is roadless and undeveloped and the least possible amount to remain roadless is 16%. The Proposed Plan projects 23% to remain roadless and undeveloped including existing and proposed wilderness.

d. Discussion

Provide for as many options for economic development and diversity as possible, both in the historic resource-dependent categories of timber and minerals, and in the recreation-tourism categories such as hunting, outfitting, fishing, camping, etc.

Achieve this by, (1) providing a timber sale level that provides for a continuation of the historic sale levels, and (2) by providing mineral exploration opportunities wherever the potential is determined to be high. Keep potential mineral withdrawals as low as possible.

Give emphasis to big-game management that provides for a complete spectrum of hunting opportunities. This includes everything from trophy animals to meat hunting; to provide a basis for a recreation industry, including outfitting, campgrounds, retail sales of hunting supplies and equipment, etc.

Give emphasis to maintaining and improving the existing and potential stream and lake fisheries to provide for recreational and commercial fishing opportunities.

Retain the highest possible amount of roadless and undeveloped land, consistent with the above-mentioned timber and mineral objectives, to provide for wilderness and roadless recreation opportunities which could contribute to the recreation industry similar to that stated above for big-game hunting.

e. Resolution

Retain the timber program defined in the Proposed Plan which allows for the historic sell level of the last ten years. This will provide for historic timber harvest levels which should provide stability in timber-dependent jobs. If the recent declining trends continue in the miles of road built per million board feet, this will reduce the effect on water quality and fisheries and help maintain recreational attractions.

An increase of about 12,000 acres of recommended wilderness on the Scotchman Peak Roadless Area to provide for as large a wilderness as possible, while still providing for timber and mineral options. This will provide for a large wilderness in Northwest Montana and Northeast Idaho which desires additional recreational business opportunities.

No additional mineral withdrawals where the potential is high, allowing for future mineral exploration and potential development.

7. Economics, Part II - Unrealistic Economic Values and Budgets

a. Issue

How to accommodate more recent and up-to-date economic information in a Final Proposed Plan.

b. Background

The economic values, such as timber revenues, were derived from a period that were more favorable than those presently being experienced. This raised anxieties about "bias" favoring timber.

In addition, no alternatives were constrained to meet any pre-determined Budget Level, except the Current Direction (or Current Program). Anxiety was expressed about what would be "sacrificed" in the event that a budget shortfall was experienced.

c. Decision Space

The reason for the unconstrained budget levels was to evaluate the resource potentials, including the necessary budgets to produce those potentials. Because of the high resource capability and potential on the Kootenai, budget increases of 20% to 69% were calculated and presented. These large increases produced anxieties about the realism of expecting budget increases of these magnitudes, especially in light of the recent developments occurring regarding Federal Deficit Reductions.

d. Discussion

Utilize more recent Timber Price information supplied by the Regional Office (PP&B) to obtain a more up-to-date revenue picture. In addition, run the Final Forest Plan with a constrained budget level that is about 5% to 10% above what we used for the Current Program.

e. Resolution

The Final Forest Plan was developed using the same Economic data as the Proposed Plan. A new set of Economic information including lower base timber prices, slower rates of real price increases, and lower road costs, were tested and found to have a small effect upon the resolution of the other issues. The elimination of commercial thinning as a regular practice reduced first decade budget needs.

8. Grizzly Bear Recovery

a. Issue

How to recover the Grizzly Bear and still meet needs for jobs and recreation.

b. Background

The previous DEIS, in November, 1982, received a Jeopardy Opinion from the U.S. Fish & Wildlife Service. Since then, replanning has lead to a Non-Jeopardy Opinion, received in June, 1985. The replanning includes the principle that every acre of identified grizzly habitat will be managed to provide maintenance and support for the grizzly bear. In the case of Situation 1 Grizzly Habitat, management direction clearly gives preference to the bear in the event of any conflict with a proposed development.

c. Decision Space

The law is clear that the Kootenai must manage for the recovery of the grizzly. What is not so clear, is where conflicts between basic laws arise. For example; conflicts between the T & E Act and the 1872 Mining Law.

d. Discussion

Continue to promote, and co-operate in, all possible activities that may lead to the rapid recovery of the bear. This includes studies that may reveal information on the habitat needs of the bear and augmentation studies.

Continue to promote and utilize the Cumulative Effects Analysis Process to insure adequate protection of the bear while allowing legitimate, environmentally sound, resource development proposals to proceed.

Continue to work with other Agencies (such as the State Dept. of Fish, Wildlife & Parks) to keep the Public informed and involved on all new changes in grizzly bear strategy and management practices.

e. Resolution

Manage all identified habitat acres supportive of and compatible with the grizzly bear. No one can predict for sure when or if the bear will be recovered. It is anticipated that the recovery of the bear will be controversial, at least until local economic conditions change for the better.

9. Road Closures

a. Issue

How to achieve more road closures with fewer people, less money and a sometimes hostile public.

b. Background

This issue primarily concerns recreation use and is intense with some sectors of the public because of the restrictions on lifestyle and recreation opportunity. Examples are: Older folks, not as physically capable as others, and motorized recreationists (trail bikers, 4-wheelers, snowmobilers, etc.). Others support additional road closures because of the positive effects they perceive, such as wildlife security and recreation solitude. Examples are: hikers, horseback riders, cross-country skiers, etc. Hunters can be found on both sides of the issue.

c. Decision Space

The Proposed Plan required a significant increase (57%) in the miles of road needing road closures. Most of the road closures are the method for managing for a particular end result such as grizzly bear recovery, elk, or roadless recreation. Some road closures are for public safety (washouts) or resource protection (fire closures).

Some options are available to provide for a range of recreational opportunities; some motorized - some nonmotorized. This would be consistent with the goal of providing for local recreational-economic opportunities. For example, suggestions have been received from the Backcountry Horsemen on roads that could be closed to provide readily-accessible horseback riding trails for groups. Suggestions have also been received from the Libby Sno-Cats, a snowmobile club, for areas that could be improved for snowmobile use. This could attract snowmobile groups.

d. Discussion

Analyze all land designations for options to improve recreational opportunities consistent with the basic management area prescription. Use all available methods, including yearlong closures, seasonal closures or

no closures except during breakup, emergencies, etc. Utilize the expertise and manpower of interested groups to help reduce costs of planning and enforcement.

e. Resolution

Roads will be closed gradually, over time, to maintain public access at about the current level. As new roads are built they will be closed after the timber sale is completed. Gates or other movable barriers will normally be used on roads requiring seasonal closures to reduce the cost of opening and closing. Priorities for road management will be in grizzly bear habitat, big-game winter range, domestic watersheds, and riparian areas when manpower and funding is limited.

10. Fisheries

a. Issue

How to reduce the projected decline in the Stream-Fishery without impacting the local economy.

b. Background

The projected rate of decline in the stream-fishery is estimated at about 3% in the first decade and worsening to 7% by the third decade. This rate of decline correlates to the historical timber harvest and road construction levels of 173 mmbf/yr and 155 miles/yr, respectively, for the last ten years. Natural causes such as flooding are also contributory to the decline.

c. Decision Space

Preliminary straight-line projections indicate that a timber harvest level of 125 mmbf/yr and a road building rate of 110 miles/yr would reduce the rate of fish decline to zero. This would be a reduction of about 28% for timber and 30% for road construction, respectively, compared to the average for the last ten years. The Proposed Forest Plan estimated 217 mmbf/yr timber harvest and 244 mile/yr of road building. These are increases of 25% and 62%, respectively. (The road building projections were based on a 5-year period of active road construction. Recent experience indicates that this road-building rate is declining. See item 2. in this section). Existing timber volume under contract is 613 mmbf.

Strong Public Concern has been expressed for the protection of water quality, and the EPA and Governors Task Force have expressed serious reservations about the increased level of road construction and timber harvest proposed in the DEIS.

d. Discussion

Because of the projected decline in stream fisheries it would appear to be prudent to attempt a reduced timber sell level during the life of the plan, especially when viewed in light of the amount of timber under contract. But, because of the local timber-dependent economies, any reductions below historic levels would be considered an economic hardship. It is proposed that an Allowable Sale Quantity no lower than the historic sell level be provided. (The historic sell level for the 10-year period of 1974-1983 is 198 mmbf/yr.)

In addition, increased emphasis be given to the Monitoring and Evaluation Plan to ensure that timber sale activities meet State Water Quality standards. Emphasis also needs to be given to the maintenance and improvement of the stream fishery habitat. This should provide an insurance against any further declines in fish numbers as well as provide for possible improvement in the future.

e. Resolution

Timber sale offerings will remain as described in the Proposed Plan to provide for economic stability while providing no increase in the calculated rate of decline of the stream fisheries. This should provide for an annual timber harvest rate that at least meets historic harvest levels. (The historic harvest level for the 10-year period of 1973-1984 is 173 mmbf/yr)

11. Monitoring and Evaluation Plan

a. Issue

How to ensure that Forest activities are carried out in a manner that meets the intent of the Forest Plan.

b. Background

The public comment indicated very little faith that the Monitoring and Evaluation (M&E) Plan would be adequately funded to accomplish the work outlined (which they also thought was already too vague to begin with). Serious reservations were expressed, especially in the case of water quality and fisheries, and old-growth timber. It appears that some of the concern may have emerged from insufficient footnoting to explain that the funding expressed in the Proposed M&E Plan was only that needed IN ADDITION to what was already being spent on similar work, e.g. stream channel stability investigations, etc. Reservations were also expressed about the degree of latitude or variance that could occur before any corrective action would be considered necessary.

c. Decision Space

The Monitoring and Evaluation Plan is a management control tool that is used to insure that intended actions achieve intended results. It can be designed and structured to be as flexible or inflexible as desired. It is also a highly visible portion of the Forest Plan document which can be pinpointed by the public.

d. Discussion

Reanalyze the Monitoring and Evaluation Plan to achieve a practical control vehicle that is cost effective and builds public confidence. Focus in on the indicators that will yield the most useful and timely information to insure that undesirable effects do not occur before effective action can be taken.

e. Resolution

The Monitoring and Evaluation Plan was reanalyzed and critiqued to insure that a practical control tool would be the result. See the M & E Plan in the Final Forest Plan document.

12. Direction for Development of a Final Forest Plan as Determined by a Review of the Public Input Analysis.

The basic strategy used in resolving the above-mentioned public issues is outlined below. Details on the actual final analysis and results can be found in the Addendum to Chapter II and the Addendum to Appendix B in this document package.

- (1) Reassure that the Forest FORPLAN model does represent reasonably expected timber yields. This was done to ensure that the FORPLAN model is not biased.
- (2) Reanalyze the wilderness issue on Pellick Ridge, in the Scotchman Peak roadless area, to ensure that the latest known mineral information is considered for any final wilderness recommendation.
- (3) Reanalyze the amount of old-growth timber that can be provided for wildlife diversity. This was done with the intention of reducing the overall need for roads to also help resolve that issue as well as help resolve the water quality and fisheries issues.
- (4) Reanalyze the amount of timber harvest that can reasonably be expected. This involved a reduction in the amount of commercial thinning that can be reasonably expected during the life of the Forest Plan. (Commercial thinning is proving to be an uncommon practice on-the-ground.)

- (5) Analyze attempts to reduce the projected budget level. This was done to help resolve the concern about possible inadequate budgets in the future.
- (6) Reanalyze the Monitoring and Evaluation Plan to strengthen the Water Quality monitoring standards. This was done to ensure that it was a practical management control tool to ensure that water quality will meet State standards.

The goal during all the above-mentioned analysis was to maintain timber harvest levels similar to those presented in the Proposed Plan (Alt. J) to ensure local economic stability.

These analyses indicated the "real" decision space available on the KNF for resolving the Issues raised during the public review period. Other on-the-ground land designation changes were also analyzed, such as roadless and timber designations, but they were localized and had a *minor economic* effect on the total Forest Value, although they were important concerns to some of the public. The premise was that if all of the above issues could be reasonably resolved, then the net public benefit would be the highest possible of all the alternatives presented in the Draft EIS.

GLOSSARY

ACRE EQUIVALENT: A unit of habitat related to fish or wildlife habitat improvement projects. Acre equivalents are based on the acres of habitat that are influenced by an acre of habitat actually modified by the 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 range land outputs or achieve administrative or environmental quality objectives.

ADMINISTRATIVE FACILITIES: Those facilities, such as Ranger Stations, work centers and cabins, which are used by the Forest Service in the management of the National Forest.

AIRSHED: Basic geographic units in which air quality is managed.

AIR QUALITY: Refers to standards for various classes of land as designated by the clean air act, P.L. 88-206: Jan. 1978.

Class I Lands: Wilderness

Class II Lands: National Monuments, Primitive areas, Preserves, Recreation areas, Wildlife refuges, Lakeshores, Seashores

Class III Lands: All other lands

AFFECTED ENVIRONMENT: The biological and physical environment that will or may be changed by actions proposed and the relationship of people to that environment.

ALLOWABLE SALE QUANTITY: The quantity of timber that may be sold from the area of suitable land covered by the Forest Plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity."

ALTERNATIVE: A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decisionmaking. An alternative need not substitute for another in all respects.

AMENITY VALUES: Resource use for which market values (or proxy values) are not or cannot be established.

ANALYSIS AREA: One or more capability areas combined for the purpose of analysis in formulating alternatives and estimating various impacts and effects.

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 MONTH (AUM): The quantity of forage required by the equivalent of a 1,000 pound mature cow for one month.

ANNUAL FOREST PROGRAM: The summary or aggregation of all projects for a given year that, for a given level of funding, make up an integrated (multi-functional) course of action on a Forest planning area.

APPROPRIATE SUPPRESSION RESPONSE: The planned strategy for suppression action (in terms of kind, amount, and timing) on a wildfire which most efficiently meets fire management direction under current and expected burning conditions. The response may range from a strategy of prompt control to one of containment or confinement.

AQUATIC ECOSYSTEM: A stream channel, lake or estuary bed, the water itself, and the biotic communities that occur therein.

ARTERIAL ROADS: Roads comprising the basic access network for National Forest System administrative and management activities. These roads serve all resources to a substantial extent, and maintenance is not normally determined by the activities of any one resource. They provide service to large land areas and usually connect with public highways or other Forest arterial roads to form an integrated network of primary travel routes. The location and standards are often determined by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually they are developed and operated for long-term land and resource management purposes and constant service.

AUM: See Animal-Unit Month.

AVERAGE ANNUAL CUT: The volume of timber harvested in a decade, divided by 10.

BASE SALE SCHEDULE: A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity.

BENEFIT-COST RATIO: Measure of economic efficiency, computed by dividing total discounted primary benefits by total discounted economic costs.

BEST MANAGEMENT PRACTICES (BMP'S): 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. BMP's can take several forms. Some are defined by State regulation or memoranda of understanding between the Forest Service and the States. Others are defined by the Forest interdisciplinary planning team for application Forest-wide. Both of these kinds of BMP's are included in the Forest Plan as Forest-wide standards. A third kind are 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 BMP's 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 BMP's are outlined in the Soil and Water Conservation Practices Handbook (FSM 2509.22) and are required.

BIG GAME: Those species of large mammals normally managed as a sport hunting resource.

BIG GAME SUMMER RANGE: Land used by big game during the summer and fall months.

BIOLOGICAL GROWTH POTENTIAL: The average net growth attainable in a fully stocked natural forest stand.

BIG GAME WINTER RANGE: The area available to and used by big game through the winter season.

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.

BOARD FOOT/CUBIC FOOT CONVERSION: The mathematical ratio of the board feet contained in one cubic foot of timber. This ratio varies with tree species, diameter, height and form factors.

BROWSE: Twigs, leaves, and young shoots of trees and shrubs on which animals feed; in particular, those shrubs which are utilized by big game animals for food.

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 conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from 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: Investment in facilities such as roads and structures with specially-appropriated funds.

CARRYING CAPACITY: The limit of an ecosystem's ability to sustain use:
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.

CAVITY-DEPENDENT SPECIES: Those species of wildlife which rely on dead or unsound wood in which to develop holes for nesting, resting, or other important life functions. Included in this group are those species which do not develop holes or cavities themselves, but that use holes or cavities abandoned by other species.

CFR: Code of Federal Regulations.

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 PLANT: The final or stable biotic community in a developmental series.

CMAI: See Culmination of Mean Annual Increment.

COEFFICIENT (COST, VALUE, YIELD): The numeric units used to include costs, values, and outputs in the analysis model used in the formulation of the Forest Plan.

COLLECTOR ROADS: Roads constructed to serve two or more elements but which do not fit into the other two road categories (arterial or local). Construction costs of these facilities are prorated to the respective element served. These roads serve smaller land areas and are usually connected to a Forest arterial or public highway. They collect traffic from local Forest roads or terminal facilities. The location and standard are influenced by both long-term multi-resource service needs and travel efficiency. Forest collector roads are operated for constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

COMMERCIAL TIMBER SALES: The selling of timber from National Forest lands for the economic gain of the party removing and marketing the trees.

COMMODITIES: Resources with commercial value; all resource products which are articles of commerce, such as timber, range forage and minerals.

COMMON MATERIALS: See Minerals, Common Variety

COMPENSATION: In the context of a threatened or endangered species, this relates to replacement in kind for habitat elements that may be temporarily or permanently removed from that species use.

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.

CONSTRAINT: A confinement or restriction on the range of permissible choices.

CONTAIN: To surround a fire, and any spot fires therefrom, with control lines 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 therefrom, and any interior islands to be saved; burn out any unburned area adjacent to the fire side of the control line; and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions.

CORD: A unit of gross volume measurement for stacked roundwood based on external dimensions; generally implying a stack measuring four feet by four feet vertical cross-section and eight feet long, containing 128 stacked cubic feet of wood.

CORRIDOR: A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries.

COST: The negative or adverse effects or expenditures resulting from an action. Costs may be monetary, social, physical or environmental in nature.

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 specific 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.

COST-SHARE: Refers to the process of cooperating in the joint development of a road system. The document executed through this process, called "Road Right-of-Way Construction and Use Agreement," specifies the terms of developing the transportation system for a specified land area.

COVER/FORAGE RATIO: The ratio of tree cover (usually conifer types) to foraging areas (natural openings, clearcuts, etc.)

CRITICAL FIRE SEASON: See Fire Season

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 geographic area which can be occupied by the threatened and endangered species.

CUBIC FOOT: The amount of wood volume equivalent to a cube 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 it's 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 it's corresponding age.

CULTURAL RESOURCES: 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.

CUTTING CYCLE: For a crop or stand, the planned interval of time between the beginning of one cutting period and the beginning of the succeeding cutting period.

DEMAND: The amount of output that users are willing to take at a specific price, time period, and conditions of sale.

DEVELOPED RECREATION: Recreation that occurs where improvements enhance recreation opportunities and accommodate intensive recreation activities in a defined area.

DEVELOPED RECREATION SITES: Relatively small, distinctly defined area where facilities are provided for concentrated public use, i.e., campgrounds, picnic areas and swimming areas.

DISPERSED RECREATION: That portion of outdoor recreation use which occurred outside of developed sites in the unroaded and roaded Forest environment i.e., hunting, backpacking and berry picking.

DIVERSITY: The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

ECONOMICS: The study of how limited resources, goods, and services are allocated among competing uses.

ECOSYSTEM: A complete, interacting system of organisms considered together with their environment (for example; a marsh, a watershed, or a lake.)

EDAPHIC: The influence of soils on living organisms, particularly plants, including man's use of the land for plant growth.

EFFECTS: Physical, biological, social and economic results (expected or experienced) resulting from achievement of outputs. Effects can be direct, indirect and cumulative.

EFFICIENCY (ECONOMIC): The usefulness of inputs (costs) to produce outputs effects when all costs and benefits that can be identified and valued are included in the computations. Economic efficiency is usually measured using present net value, though use of benefit-cost ratios and rates-of-return may sometimes be appropriate.

ELK HIDING COVER: Vegetation, primarily trees, capable of hiding 90 percent of an elk seen from a distance of 200 feet or less.

ELK SECURITY COVER (EFFECTIVE ELK SECURITY COVER): Elk hiding cover modified by open roads. The greater the density of open roads within an area, the less effective is the hiding cover in providing security for elk.

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.

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 ASSESSMENT: A concise public document for which a Federal agency is responsible that serves to: (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) Aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary; (3) Facilitate preparation of an environmental impact statement when one is necessary.

ENVIRONMENTAL IMPACT STATEMENT, DRAFT (DEIS): A detailed written statement as required by Sec. 102(2)(C) of the National Environmental Policy Act (NEPA).

ENVIRONMENTAL IMPACT STATEMENT, FINAL (FEIS): The final version of the public document required by NEPA (see above).

EPHEMERAL STREAMS: Streams that flow only as a direct response to rainfall or snowmelt events. They have no baseflow.

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.

EVEN-AGED MANAGEMENT: The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged Forests are characterized by a distribution of the 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 does not usually 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.

EXTRACTIVE USE: Use of natural resources that removes them from their natural setting.

FIRE MANAGEMENT DIRECTION: Fire management standards, guidelines, and practices based upon land and resource management objectives. Fire management direction is used to define the kind, level, and timing of fire protection and use activities, including the appropriate suppression strategies, which efficiently meet management objectives for each management area for the range of expected fire behavior conditions.

FIRE SEASON: Critical Fire Season is when the Energy Release Component (ERC) exceeds 39 for the past four days and the Burning Index (BI) is 30 or greater, or the 1,000 hour time lag fuel moisture is below 16 percent. Noncritical Fire Season is when the ERC is less than 39 for the past four days and the BI is less than 30, and the 1,000 hour time lag fuel moisture is equal to or greater than 16 percent.

FLOOD PLAIN: The lowland and relatively flat area adjoining inland waters, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

FORAGE: All browse and nonwoody plants available to livestock or wildlife for feed.

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 non-forest use. Lands developed for non-forest 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. The term "occupied" when used to define forest land, will be measured by canopy cover of live forest trees at maturity. The minimum area for classification of forest land will be 1 acre or greater. Unimproved roads, trails, stream and clearings in forest areas are classified as forest if they are less than 120 feet in width.

FOREST SUPERVISOR: The official responsible for administering the National Forest System lands in a Forest Service Administrative unit, which may consist of one or more National Forests or all the Forests within a State.

FOREST SYSTEM ROAD: A road wholly or partly within or adjacent to and serving the National Forest System and which is necessary for the protection, administration and utilization of the National Forest System and the use and development of its resources.

FOREST-WIDE MANAGEMENT GUIDELINES: An indication or outline of policy or conduct dealing with the basic management of the Forest. Forest-wide management guidelines apply to all areas of the Forest regardless of the other management prescriptions applied.

FSH: Forest Service Handbook.

FSM: Forest Service Manual.

FUELS: Include both living plants; dead, woody vegetative materials; and other vegetative materials which are capable of burning.

FUELS MANAGEMENT: Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

FUELS TREATMENT: The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

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.

GOAL: A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed.

GOODS AND SERVICES: The various outputs, including on-site uses, produced by forest and rangeland resources.

HABITAT TYPE: An aggregation of all land areas potentially capable of producing similar plant communities at climax.

HIDING COVER: Trees of sufficient size and density to conceal animals from view at 300 feet.

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.

INDIRECT EFFECTS: Secondary effects which occur in locations other than the initial action or significantly later in time.

INSTREAM FLOWS: The minimum water volume (cubic feet per second) in each stream necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality, recreational opportunities and other uses.

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 resource 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.

INTERDISCIPLINARY (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.

INTERAGENCY GUIDELINES: A document which was developed in the Yellowstone grizzly bear ecosystem and which identifies important, specific management measures regarding the conduct of multiple use activities in grizzly bear habitat and parameters for identifying the sensitivity of grizzly bear habitat to human activities. Previously known as the "Yellowstone Guidelines".

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.

INVENTORY DATA: Recorded measurements, facts, evidence, or observations on Forest resources such as soil, water, timber, wildlife, range, geology, minerals, and recreation which was used to determine the capability and opportunity of the Forest to be managed for those resources.

LAND EXCHANGE: The conveyance of non-Federal Land or interests to the United States in exchange for National Forest System land or interests in land.

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 that facilitate planning.

LEASABLE MINERALS: See Minerals, Leasable.

LISTED SPECIES: This refers to species recognized as threatened or endangered under the Federal Endangered Species Act of 1973.

LOCAL ROADS: Roads constructed and maintained for, and frequented by, the activities of a given resource element. Some uses may be made by other element activities, but normally maintenance is not affected by such use. 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. Forest local roads may be developed and operated for constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

LOCATABLE MINERALS: See Minerals, Locatable.

LONG-TERM SUSTAINED-YIELD TIMBER CAPACITY: The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives.

M: Thousand

MA: See Management Area

MAUM: Thousand Animal Unit Months.

MBF: Thousand Board Feet

MM: Million

MMBF: Million Board feet

MMCF: Million Cubic feet

MANAGEMENT ACTION: Any activity undertaken as part of the administration of the Forest.

MANAGEMENT AREA (MA): An aggregation of capability areas which have common management direction and may be noncontiguous in the Forest. Consists of a grouping of capability areas selected through evaluation procedures and used to locate decisions and resolve issues and concerns.

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 and guidelines for attaining them.

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.

MANAGEMENT PRESCRIPTION: Management practices and intensity selected and scheduled for application on a specific area to attain multiple-use and other goals and objectives.

MATURE TIMBER: Individual trees or stands of trees that in general are at their maximum rate in terms of the physiological processes expressed as height, diameter, and volume growth.

MAXIMUM MODIFICATION: A visual quality objective that permits human activity to dominate the landscape. Such activity, however, should appear as a natural occurrence when viewed as background.

MEAN ANNUAL INCREMENT (MAI): The total volume increase in a tree or stand of trees up to a given age, divided by that age.

MINERAL ENTRY: The filing of a mining claim on Federal land to obtain the right to mine any locatable minerals it may contain. Also the filing for a mill site on Federal land for the purpose of processing off-site locatable minerals.

MINERAL WITHDRAWAL: A formal designation by the Secretary of Interior which precludes entry or disposal of mineral commodities under the mining and/or mineral leasing laws.

MINERAL EXPLORATION: The search for valuable minerals.

MINERAL PRODUCTION: The extraction of mineral deposits.

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 MANAGEMENT REQUIREMENTS: Standards for resource protection, vegetative manipulation, silviculturist 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).

MINING CLAIMS: A geographic area of the public lands held under the general mining laws in which the right of exclusive possession is vested in the locator of a valuable mineral deposit. Includes lode claims, placer claims, mill sites and tunnel sites.

MITIGATE: To lessen the severity.

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.

MODIFICATION (VQO): See Visual Quality Objective (VQO).

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.

MOUNTAIN PINE BEETLE: A species of Bark Beetle that spends the major portion of their life cycle in a tree's cambium layer. Through a combination of the insect feeding on the cambium layer and the introduction of fungi which stop the resin flow, the tree is girdled and killed.

MULTIPLE USE: The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

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 the management of units of the National Forest System is consistent with the principles of multiple use and sustained yield.

NET VALUE CHANGE (Also Net Resource Value Change.): The sum of the changes in resource values on a land area that results from increases (benefits) and decreases (damages) in resource outputs as a consequence of fire.

NONCRITICAL FIRE SEASON: See Fire Season.

NON-INTERCHANGEABLE VOLUME: Older dead timber harvested from suitable timberland.

NONSTOCKED: A stand of trees or aggregation of stands that have a stocking level below the minimum specified for meeting the prescribed management objectives.

NO-SURFACE OCCUPANCY (NSO) STIPULATION: A mineral lease clause which, if attached to a mineral lease, prohibits the lessee from constructing roads, well pads or otherwise occupying the land surface unless, upon site-specific review, it is determined by the authorized officer that the requirements of the stipulation can be modified if other less stringent mitigation is determined to be sufficient to protect the other resources.

OBJECTIVE: A concise, time-specific statement of measurable planned results that respond to pre-established goals. An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals.

OFF-ROAD VEHICLE: Any vehicle capable of being operated off an established road or trail such as motorbikes, 4-wheel drives, and snowmobiles.

OLD-GROWTH TIMBER: A distinct successional stage in the development of a timber stand that has special significance for wildlife, generally characterized by: (1) large diameter trees (often exceeding 20" dbh) with a relatively dense, often multilayer canopy, (2) the presence of large, standing, dead or dying trees, (3) down and dead trees, (4) stand decadence associated with the presence of various fungi and heartrots, (5) an average age often in excess of 200 years and (6) a basal area ranging from 150 to 400 square feet per acre.

OPTIMUM: The greatest level of production that is consistent with other resource requirements as constrained by environmental, social and economically sound conditions.

OUTPUT: A good, service, or on-site use that is produced from forest and rangeland resources. Definitions of Forest and rangeland output definitions, codes and units measure 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 - RVD's.

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 uppermost canopy of the forest when there is more than one level of vegetation.

OVERTHRUST BELT: A complex geologic feature, extending from Alaska to Mexico which resulted from compressional stresses within the earth, and which is characterized by abundant thrust faults. This zone passes through and includes all of western Montana.

PARTIAL RETENTION (VQO): See Visual Quality Objective (VQO).

PATENTED MINING CLAIMS: 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.

PERENNIAL STREAMS: Streams that flow continuously throughout most of the year.

PLAN OF OPERATIONS: A written plan describing mining and mineral processing activities that will likely cause a significant surface disturbance. The plan is prepared by those engaged in activities, such as prospecting, exploration or mining, in the National Forest. This plan must be approved by a Forest Officer.

PLANNED IGNITIONS: Fires started by a scheduled, deliberate management action.

PLANNING AREA: The area of the National Forest System covered by a Regional Guide or Forest Plan.

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.

PLANNING PERIOD: One decade. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits.

PLANNING RECORDS: Documents and files that contain detailed information and decisions made in developing the Forest Plan. Available at the Forest Supervisor's Office.

POLETIMBER TREES: Live trees of commercial species at least five inches in diameter at breast height but smaller than sawtimber size, and of good form and vigor.

POLICY: A guiding principle upon which is based a specific decision or set of decisions.

PRECOMMERCIAL THINNING: The selective felling, deadening, 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 BURNING: The intentional application of fire to wildland fuels in either their natural or modified state under such conditions as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further certain planned objectives (i.e., silviculture, wildlife management, etc.).

PRESCRIBED FIRE: A wildland fire burning under preplanned specified conditions to accomplish specific planned objectives. It may result from either a planned or unplanned ignition.

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.

PRESERVATION (VQO): See Visual Quality Objectives (VQO).

PRIMITIVE RECREATION SETTING: A classification of the recreation opportunity spectrum that characterizes an essentially unmodified natural environment of a size or remoteness that provide significant opportunity for isolation from the signs and sounds of man and a feeling of vastness of scale. Visitors have opportunity to be part of the natural environment, encounter a high degree of challenge and use a maximum of outdoor skills but have minimum opportunity for social interaction.

PRIMITIVE ROADS: Roads that came into existence with little regard for grade or drainage control, or were abandoned facilities from some prior use. They are sometimes created merely by repeated driving over an area. Such roads are rarely, if ever, maintained and then only by users. These roads are single lane, usually with native surfacing, and sometimes passable with four-wheel drive vehicles only, especially in wet weather.

PUBLIC ACCESS: Usually refers to a road or trail route over which a public agency claims a right-of-way available for public use.

PUBLIC ISSUE: A subject or question of widespread public interest relating to management of the National Forest System.

RANGER DISTRICT: Administrative subdivision of the Forest supervised by a District Ranger.

REAL DOLLAR VALUE: A monetary value which compensates for the effects of inflation.

RECEIPTS: Money collected from timber stumpage, livestock grazing, campgrounds, special use permits, and oil and gas lease rentals and royalties, and returned to the federal treasury.

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 CAPACITY: The number of people that can take advantage of a recreation opportunity at any one time without substantially diminishing the quality of the experience sought after.

RECREATION EXPERIENCE LEVEL: A concept used in recreation management to delineate the range of opportunities for satisfying basic recreation needs of people. A scale of five experience levels ranging from "primitive" to "highly developed" is planned for the National Forest System.

RECREATION OPPORTUNITIES: The combination of recreation settings, activities, and experiences provided by the Forest.

RECREATION OPPORTUNITY SPECTRUM: A system for planning and managing recreation resources that recognizes recreation activity opportunities, recreation settings, and recreation experiences along a spectrum or continuum.

RESPONSIBLE LINE OFFICER: The Forest Service employee who has the authority to select and/or carry out a specific planning action.

ROS CLASSES: Recreation Opportunity Spectrums which are identified as follows:

Primitive (PRIM) - Area is characterized by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of man-induced restrictions and controls. Motorized use within the area is not permitted.

Semi-Primitive Non-Motorized (SPNM) - 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 are subtle. Motorized use is not permitted.

Semi-Primitive Motorized (SPM) - Area is characterized by a predominantly natural or natural-appearing environment of moderate-large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.

Roaded Natural Appearing (RNA) - Area is characterized by predominantly natural appearing environment with moderate evidences of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in the construction standards and design of facilities.

Rural (R) - Area is characterized by substantially modified natural environment. Resource modification and utilization practices are primarily to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of man are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.

RECREATION TYPES: The different recreation types identified as follows:

Developed Recreation - The type of recreation that occurs where modifications

(improvements) enhance recreation opportunities and accommodate intensive recreation activities in a defined area.

Dispersed Recreation - That type of recreation use related to and in conjunction with roads and trails that requires few if any improvements and may occur over a wide area. Activities tend to be day-use oriented and include hunting, fishing, berry picking, off-road vehicle use, hiking, horseback riding, picnicking, camping, viewing scenery, snowmobiling, and many others.

RECREATION 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.

REGIONAL FORESTER REGULATIONS: The official responsible for administering a single Region of the Forest Service. Refers to the Code of Federal Regulations for implementing the National Forest Management Act, 36 CFR, Part 219.

RESOURCE ELEMENT: A collection of activities from the various operating programs required to accomplish the Forest Service mission and which fulfill statutory or Executive requirements. There are seven resource elements: Recreation, Wilderness, Wildlife and Fish, Range, Timber, Water, and Minerals.

RESEARCH NATURAL AREA: An area in 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; commercial and general public use is not allowed.

RETENTION (VQO): See Visual Quality Objectives (VQO).

RIGHT-OF-WAY: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project facility passing over, upon, under, or through such land.

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.

RIPARIAN ECOSYSTEM: A transition between the aquatic ecosystem and the adjacent upland terrestrial ecosystem. It is identified by soil characteristics and by distinctive vegetative communities that require free or unbounded water.

ROAD MAINTENANCE LEVELS: Road maintenance levels are as follows:

Level 1 - Basic custodial care as required to protect the road investment and to see that damage to adjacent land and resources is held to a minimum. The road is not normally open to traffic.

Level 2 - Same basic maintenance as Level 1 plus logging out, brushing out, and restoring the road prism as necessary to provide passage. Route markers and regulation signs are in place and useable. Road is open for limited passage of traffic, which is usually administrative use, permitted use, and/or specialized traffic.

Level 3 - Road is maintained for safe and moderately convenient travel suitable for passenger cars. Road is open for public travel, but has low traffic volumes except during short periods of time (e.g. hunting season).

Level 4 - At this level, more consideration is given to the comfort of the user. Road is usually surfaced with aggregate or is paved and is open for public travel.

Level 5 - Safety and comfort are important considerations for these roads which are open to public traffic and generally receive fairly heavy use (100 Average Daily Traffic or more). Roads have an aggregate surface or are paved.

ROADED-NATURAL APPEARING RECREATION SETTING: A classification on the recreation opportunity spectrum where timber harvest or other surface use practices are evident. Motorized vehicles are permitted on all or parts of the road system.

ROADLESS AREA REVIEW AND EVALUATION (RARE) II: A comprehensive process, instituted in June 1977, to identify roadless and undeveloped land areas in the National Forest System and to develop alternatives for both wilderness and other resource management.

ROTATION: The planned number of years between the formation or generation of trees and their harvest at a specified stage of maturity.

RURAL RECREATION SETTING: A classification on the recreation opportunity spectrum that is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high.

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.

SALVAGE HARVEST: The cutting of trees that are dead, dying, or deteriorating (e.g., because they are overmature or materially damaged by fire, wind, insects, fungi, or other injurious agencies) before they lose their commercial value as sawtimber.

SAWTIMBER: Trees containing at least one 8-foot piece with a 5.6 inch diameter, inside bark, at the small end and meeting regional specifications for freedom from defect. Softwood trees must be at least 8 inches in diameter at breast height (DBH) for all species except Lodgepole Pine which is 7 inches DBH

SCENIC EASEMENT: A legal interest in the land of another which allows the easement holder specified uses or rights without actual ownership of the land; in this case, control of the use of land adjacent to public highways, parks, and rivers. It may provide something attractive to look at within the easement

area, an open area to look through to see something attractive beyond the easement itself, or a screen to block out an unsightly view beyond the easement area.

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.

SEED-TREE CUTTING: The removal in one cut of most of the mature trees from an area, leaving only a small number of desirable trees to provide seed for regeneration.

SEEDLING/SAPLING: A size category for forest stands in which trees less than 5 inches in diameter are the predominant vegetation.

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.

SEMI-PRIMITIVE RECREATION SETTING: A classification on the recreation opportunity spectrum that characterizes a predominately natural or natural appearing environment of a moderate to large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum onsite controls and restrictions may be present, but are subtle.

SENSITIVE SPECIES: Those plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations.

SERAL: A biotic community which is developmental; a transitory stage in an ecologic succession.

SHELTERWOOD CUTTING: The removal of a stand of trees through a series of cuttings designed to establish a new crop with seed and protection provided by a portion of the stand.

SILVICULTURAL SYSTEM: A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of Forest thereby produced.

SITE PREPARATION: A general term for a variety of activities that remove competing vegetation, slash, and other debris that may inhibit the reforestation effort.

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.

SNAG: A standing dead tree usually greater than 5 feet in height and 6 inches in diameter at breast height.

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.

STAGNATION: A condition where plant growth is markedly reduced or even arrested through, e.g., competition, state of the soil, or disease.

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.

STIPULATIONS: Requirements that are part of the terms of a mineral lease. Some stipulations are standard on all Federal leases. Other stipulations may be applied to the lease at the discretion of the surface management agency to protect valuable surface resources and uses.

STOCKING: A measure of timber stand density as it relates to the optimum or desired density to achieve a given management objective.

STREAM ORDER: A measure of the position of a stream in the hierarchy of tributaries. (Stream as referenced here refers to perennial streams.)

First-order streams - are unbranched streams, that is they have no tributaries.

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.

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.

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 and 219.14) 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.

SUPPLY: The amount of an output that producers are willing to provide at a specific price, time period, and conditions of sale.

SUPPRESSION (FIRE SUPPRESSION): Any act taken to slow, stop, or extinguish a fire. Examples of activities include fireline construction, backfiring, and application of water or chemical fire retardants.

SUSTAINED-YIELD OF PRODUCTS AND SERVICES: The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land.

SYSTEM ROADS: See Forest System Road.

TARGET: A quantifiable output assigned to the Forest.

TEMPORARY ROADS: Those roads needed only for the purchaser or permittee's use. The Forest Service and the purchaser or permittee must agree to the 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.

THERMAL COVER: Cover used by animals to ameliorate chilling effects of weather; for elk, a stand of coniferous trees 40 feet or taller with an average crown closure of 70 percent or more.

THREATENED AND ENDANGERED SPECIES (T & E): Any species, plant or animal, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its' range. Threatened species are identified by the Secretary of the Interior in accordance with the 1973 Endangered Species Act.

TIMBER: A general term for the major woody growth of vegetation in a forest area.

TIMBER BASE: The lands within the Forest that are suitable for timber production.

TIMBER PRODUCTION: The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use.

TIMBER STAND IMPROVEMENT (TSI): All noncommercial intermediate cuttings and other treatments to improve composition, condition, and growth of a timberstand.

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.

TREE OPENING: An opening in the Forest cover created by the application of even-aged silvicultural practices. The Northern Regional Guide established size limitations and guidelines to determine when cut areas are no longer considered openings.

UNDERSTORY: The trees and other woody species which grow 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 application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are described as follows:

Individual Tree Selection Cutting - The removal of selected trees from specified size and age classes over the entire stand area in order to meet a predetermined goal of size or age distribution and species composition in the remaining stand.

Group Selection Cutting - The removal of small groups of trees to meet a predetermined goal of size distribution and species in the remaining stand.

UNPLANNED IGNITION: A fire started at random by either natural or human causes, or a deliberate incendiary fire.

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 administrative sites.

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.

UTILIZATION STANDARDS: Standards guiding the use and removal of timber. They are measured in terms of diameter at breast height (d.b.h.) and top of the tree inside the bark (top d.i.b.) and the percentages of "soundness" of the wood.

VIEWING SIGNIFICANCE: Areas of visual quality described as follows:

High Viewing Significance - Includes those forest lands that are easily viewed from primary through-highways (year-long), and primary recreation areas including high-use water bodies, vista points, communities, permanent residential areas, summer homes, and major trail corridors.

Moderate Viewing Significance - Includes those forest lands readily visible from major secondary roads, trails, streams, water bodies, secondary recreation areas, and other areas of public use.

Low Viewing Significance - Lands that have a high visual absorption capability, or lands that are viewed from local and collector roads.

VISUAL QUALITY OBJECTIVE (VQO): A desired (inventoried) level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape described as follows:

Preservation - In general, human activities are not detectable to the visitor.

Retention - Human activities are not evident to the casual Forest visitor.

Partial Retention - Human activities may be evident, but must remain subordinate to the characteristic landscape.

Modification - Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in middle-ground or background.

Maximum Modification - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Enhancement: A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists.

WALLOW: A depression, pool of water, or wet area produced or utilized by elk or moose during the breeding season.

WATERSHED BASIN: Land area which collects and discharges its surface water through one outlet.

WATER YIELD: The measured output of the Forest's streams.

WATER YIELD INCREASE: Additional water released to the Forest streams as a result of Forest management activities.

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.

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 so as to preserve its natural conditions which: (1) generally appear to have been affected primarily by forces of nature with the imprint of man's activity substantially unnoticeable, (2) has outstanding opportunities for solitude or a primitive and confined 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 STUDY: An analysis to determine an area's appropriateness, cost, and benefits for addition to the National Wilderness Preservation System.

WILDFIRE: Any wildland fire not designated and managed as a prescribed fire within an approved prescription.

WINDOW: A term used to describe an area of land, usually short and narrow, that might be suitable as a transmission line corridor if constraints are not too limiting. Constraints may be physical, such as a river crossing, or environmental, such as designation of the area for primitive recreation. Six such windows were identified on the Kootenai Forest by the Bonneville Power Administration.

WITHDRAWAL: An order removing specific land areas from availability for certain uses.

YARDING: The operation of hauling timber from the stump to a collecting point.

FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KOOTENAI NATIONAL FOREST

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