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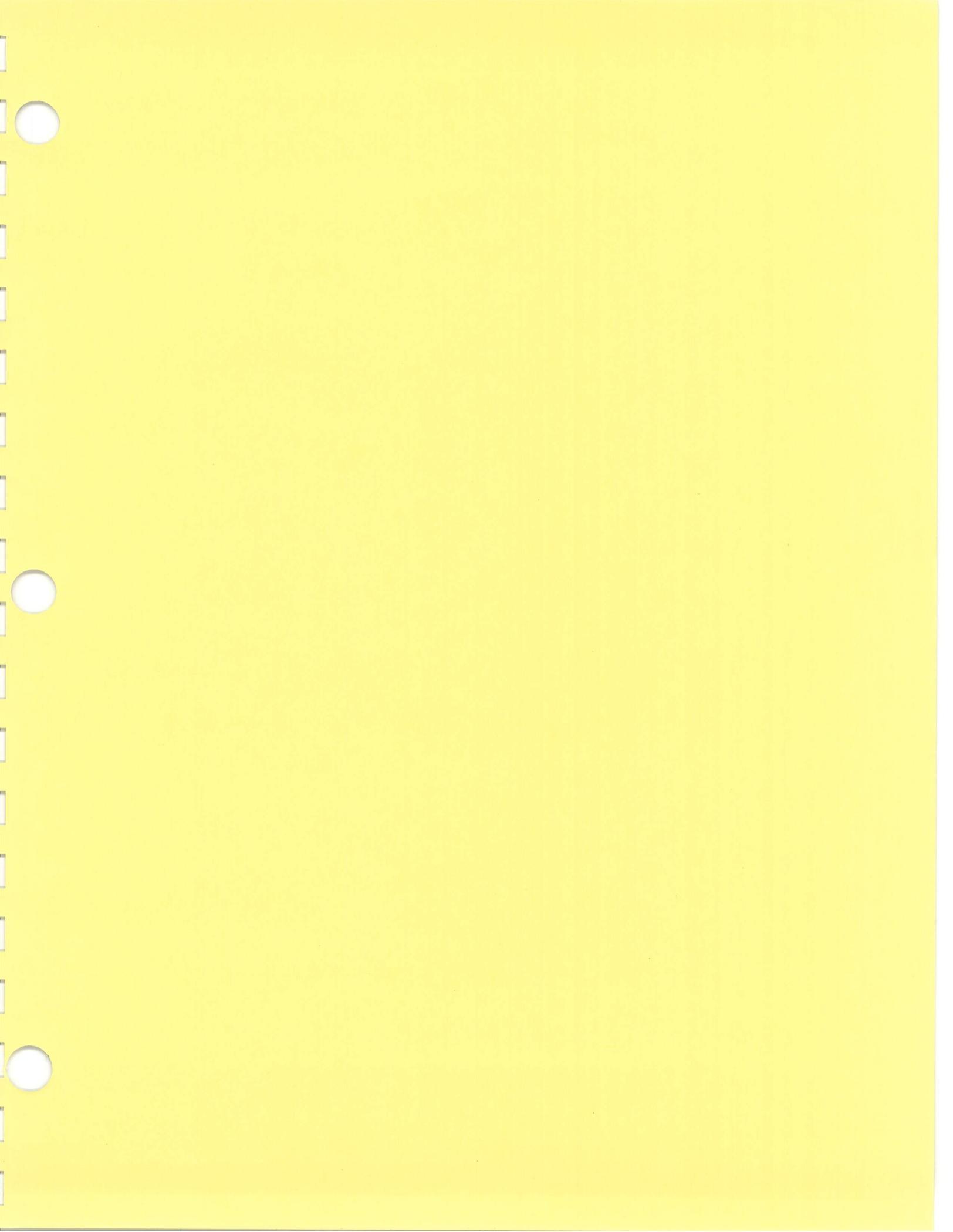
United States
Department of
Agriculture
Forest Service
Nezperce
National Forest

Nezperce National Forest

Gospel Hump

Multipurpose Resource Development Plan





GOSPEL-HUMP MULTIPURPOSE RESOURCE DEVELOPMENT PLAN

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I. INTRODUCTION

A. THE LAW

The Endangered American Wilderness Act was signed into law on February 24, 1978. Section 4 of that Act divided the roadless area generally known as the Gospel-Hump area into three segments. One such segment, of 206,000 acres, became wilderness; another 45,000 acres became available for immediate development; and a third segment of 92,000 acres was set up for "multipurpose resource development."

This third area received much more specific direction in the Act. A multipurpose resource development plan (MRDP) was to be completed for it. Research in watershed, fisheries, and wildlife was to be pursued and used in the planning. The planning was to follow the regulations promulgated under the National Forest Management Act. An advisory committee, with specified membership, was to be appointed by the Secretary of Agriculture for the purpose of tracking both the research and the planning.

This document is the culmination of the foregoing process.

Section 4 of the Endangered Wilderness Act is found in appendix A. Maps delineating the Gospel-Hump area and the MRDP area are shown on page 49.

B. THE ADVISORY COMMITTEE

The Advisory Committee was composed of seven members. As the law required, two members represented the timber industry, two represented environmental groups, and three were concerned local citizens who had an interest in the area. These members were:

Tim Mueller	- Timber Industry
Jack Olson	- Timber Industry
Dennis Baird	- Idaho Environmental Council
Morton Brigham	- Idaho Environmental Council
Jack Marek	- Local Citizen
Herb Blewett	- Local Citizen
Sheila Niemi	- Local Citizen, and Committee Chairperson

This committee put in many long hours preparing for and participating in meetings and field trips. Their services are greatly appreciated, especially considering the many other duties and concerns with which they are involved.

After reviewing all alternatives, listening to research reports, and having been presented with the outputs and effects of each alternative, the committee recommended at their April 3, 1982, meeting that the preferred alternative be alternative G. Of the six members present at that meeting, four favored alternative G. One member voted for alternative E, and the chairperson abstained. The chair indicated a minority report would be prepared. This report, dated April 10, 1982, was received later

In April. It is signed by Brigham, Niemi, and Baird, and very strongly recommends alternative E. The official recommendation made by the committee is alternative G.

The Forest Interdisciplinary planning team recommended alternative E, but with two major modifications. One modification put a roadless area, which was excluded from development in alternative E, back into a timber management emphasis. The other modification was to choose fish objectives for all drainages, and control and constrain other activities to reach these objectives.

This was done, and alternative E with the modifications became alternative H. Alternative H was presented to the Advisory Committee again at a meeting on August 19, 1982. At this meeting, one of the big differences arising among committee members was whether or not they accepted the SNOWSED model results. The Forest Interdisciplinary team did not accept the SNOWSED predictions on watersheds and fish habitat, and had indicated this at the April 3 meeting with the committee. At the August 19 meeting, the committee members had in their possession an analysis of the SNOWSED model made by a committee of research scientists (see appendix B). This analysis, in brief, says that the model cannot yet be trusted and needs more work. The committee then asked to see the comparisons between the alternatives still under consideration which had resulted from the watershed/fisheries model the Forest had used. They asked that other resource comparisons also be prepared. A motion was made to review this data and then vote on whether or not to reconsider the recommendation of the committee for alternative G, as made at the April 3 meeting.

This data was sent to each committee member (see appendix C). Three members voted against reconsideration, two voted for reconsideration, and two abstained. Therefore, the recommendation of the Gospel-Hump Advisory Committee for alternative G stands.

Although fully considering the recommendation of the committee, the Forest recommends alternative H as the preferred alternative, and that alternative is presented here as the proposed plan.

Regardless of this disagreement, the committee has been of great help in the design of the preferred alternative. The location and management of roads will be as the committee advised. The management prescriptions used, management area by management area within the plan, were heavily influenced by the Advisory Committee's participation in the planning process.

Again, the Nezperce National Forest Supervisor and his planning staff appreciate the fine work contributed by this committee.

C. SETTING

1. Location

The Gospel-Hump management units are within the Nezperce National Forest and stretch from about 15 miles southeast of Grangeville, Idaho, to the Salmon River. The planning area is broken into three separate units. The largest is located on the breaks of the South Fork of the Clearwater River, and another is found far to the south on the breaks of the Salmon River. A third is located intermediately on the Salmon-Clearwater divide. See maps beginning on page 51.

2. Climate

Climate varies significantly from the steep, warm and dry Salmon River breaks to cool, moist subalpine areas. The Aleutian low and the Pacific high exert a strong control on local climates. This maritime air is borne on prevailing westerly winds. In winter, the maritime influence is noted by greater than average cloudiness, greater frequency of precipitation, and mean temperatures which are above those at the same latitude and altitude in midcontinent. The maritime influence is quite marked as air arrives via the Columbia River gorge with a greater burden of moisture than at lower latitudes. The Aleutian low predominates during winter months, bringing periods of heavy precipitation in the forms of snow and spring rains. The Pacific high predominates during the summer, resulting in relatively hot and dry periods.

Mean annual precipitation measurements are about 18 inches on the Salmon River, 25 inches on the South Fork Clearwater River, and 60 inches in the high country. The general average is approximately 35 inches. Winter snow depths range from light and discontinuous on the lower elevation southerly aspects to depths of 10-15 feet above 7,000 feet.

3. Landform

Landform features typically include very steep mountain sideslopes that fall away into major streams, and rounded ridgetops and divides that were subject to pre-glacial processes such as deep freezing. Frequently, seeps and springs originate in these rounded, gently sloping lands. Interspersed within the study areas is evidence of landforms that were created as the result of alpine, glaciation, fluvial, and colluvial activity.

4. Soils

Soils in this area typically have coarse-textured subsoils that are often capped with a finely textured volcanic ash deposit. The majority of soils are well-drained but small pockets of poorly drained soils occur throughout the more gently sloping terrain.

The more gently sloping lands have soils that typically have a low erosion hazard potential. The very steep lands typically have soils with high erosion hazard and high potential for contributing significantly to stream sedimentation.

5. Wildlife

In general, the wildlife communities within the area have changed from those associated with seral vegetative communities toward those associated with climax forests. In the late 1800's and early 1900's, several wildfires burned through portions of the area. Since that time there has been a steady regrowth of the forest community.

Consequently, conditions have been improving for pileated woodpeckers, goshawks, martins, red-backed voles, and other climax forest-dependent species. Conditions have declined for deer, elk, chipmunks, and other species more suited to intervening seral stages of succession. Elk and deer are the big game species of most concern, although moose and bighorn sheep are more unique and also important.

Bighorn sheep are associated with the steep breaklands and Douglas fir-ponderosa pine communities of the Salmon River Face.

6. Watershed

Many streams drain this area. Johns, Wing, Twentymile, Tenmile, and Indian Creeks and Upper Crooked River are the major drainages. They are mostly fast, clear, and rocky streams and are generally deep within their canyon walls. Johns, Twentymile, and Tenmile Creeks originate within the Gospel-Hump Wilderness, while all other streams begin in the MRDP planning units.

Annual water yield is estimated at 250,000 to 300,000 acre-ft. Spring runoff from snowmelt in April, May, and June accounts for about 60 percent of the total annual water yield. Occasionally, midwinter warm rains or subtropical storms can occur and result in flood flows. Such winter floods occurred in 1955, 1957, 1958, 1964, and 1974. During the summer, flash floods that result from high intensity thunderstorms can occur in small streams, ravines, or dry gulches.

Water quality of all streams in this area can be rated from high to excellent. Generally, all water quality characteristics (pH, dissolved oxygen, temperature, chemical constituents, etc.) indicate pristine water. Past mining activity has affected the sedimentation of a few drainages.

7. Fisheries

Several streams that drain the planning area could support significant runs of steelhead trout and chinook salmon. Crooked River, Tenmile Creek, and Johns Creek are principal streams of concern. All have headwaters within the Wilderness, then pass through the planning area. Native cutthroat trout are found in most streams, with rainbow and brook trout found in a few.

8. Vegetation

Vegetation varies by terrain, soils, aspect, elevation, and other factors. Beginning at the Salmon River and proceeding north, the lower south and southwest slopes are open grass slopes of brome, bluebunch wheatgrass, and Idaho fescue. Near the 4,000-foot elevation, grass types phase into open ponderosa pine types. Mountain mahogany and bitterbrush are common brush species found within both the grass slopes and open pine types. The ponderosa pine mixes with and phases into Douglas-fir stands with increasing elevation, and brush types are more commonly found in the understory. Snowberry, ninebark, chokecherry, willow, and mountain maple begin to appear in the understory. Higher yet, around 6,000 feet, seral types of lodgepole pine again predominate. Approaching the Salmon River-South Fork Clearwater divide, alpine fir, spruce, and whitebark pine become the most common tree species and large, open, wet meadows are common, with sedges, marsh marigold, and numerous high elevation forbs. Menziesia, Labrador tea, and spirea are commonly found brush species near the divide. Continuing north and dropping below the cirque basins common along the north slopes, extensive stands of lodgepole pine with whortleberry and beargrass understories are the rule. Patches of old-growth spruce and alpine fir can be found. Western larch begins to appear. Stringer meadow types can be found along stream bottoms and basins. North of a line between Marble Point, Sourdough Peak, and Nipple Mountain, grand fir overstories with queencup, beardless and beargrass understories begin to appear and become dominant types until the breaks of the South Fork of the Clearwater are approached. Just above and continuing into the breaks, all the western slopes (and the few south slopes that appear) again have old-growth ponderosa pine and Douglas-fir with both grass and shrub understories. Habitat types of the grand fir series continue to the river on the northern and eastern slopes.

9. Range

Portions of four allotments are found within the development area. They are Cove Creek, Big Creek, Blue Ridge, and Ten-Twenty-mile. Cove Creek is now vacant, except for a small outfitter horse permit at Shepp Ranch, and Blue Ridge is in a non-use status and not being grazed. There are 3,606 acres of suitable range. A total of 150 cattle graze the open allotments for a total of 215 animal unit months (a.u.m.'s). Much of the grazing is done outside of the planning unit, thus accounting for the low a.u.m.'s.

10. Minerals

Mineral exploration and development have occurred since the 1860's, when gold was first found in the Florence and Dixie areas. Production is continuing today in the Fivemile drainage of the Orogrande Mining District and the Bullion Mine in the Florence Mining District. Mining activities have quieted down since the 1940's, with little exploration being conducted today. Production has been oriented around gold, silver, copper, lead, molybdenum, and tungsten.

Speculation of large ore bodies exists in the Buffalo Hump, Orogrande and Florence Mining Districts due to records of past production and favorable geologic environments. The source areas for the Buffalo Hump lode veins, the Orogrande low-grade disseminated ore bodies, and the Florence placer deposits are the center of this speculation. The mineral potential will remain uncertain until extensive exploration is conducted.

11. Visual Resource

Viewing is an important resource in the planning area, ranging from common and minimal variety to some very distinctive landscapes.

Areas seen from State Highway 14, the Salmon River, Wildhorse Lake, and Dixie-Mackay Bar roads all have high visual significance. Viewing significance from the Grangeville/Salmon, Crooked River and Warren Wagon roads is moderate. The Santiam and Hungry Ridge roads have a low visual significance and were not inventoried.

With the exceptions of the South Fork Clearwater breaks and the Johns Creek drainage, the northern and western portions of the area contain more moderate gradients with low relief. There is little vegetative pattern variety and few distinctive water or geologic features.

Distinctive landscapes are found in the adjacent Gospel-Hump Wilderness and along the South Fork Clearwater and Salmon River breaks. The Gospel-Hump area contains highly varied terrain with precipitous slopes, major geologic formations, high elevation meadows and lakes, and patches of old-growth timber. The South Fork Clearwater and Salmon River have cut deep gorges in the surrounding mountains and are spectacular geologic features. These two rivers are distinctive water features and support a wide variety of vegetation due to constantly changing exposures and soil and slope conditions.

12. Recreation

Recreational opportunities are in keeping with the essentially roadless nature of the area. Several small undeveloped campsites are located along roads that form the exterior boundaries. Major recreational trails within the area are located at Johns Creek, Gilmore Ranch, Sourdough Peak, and Lost Lake. Major uses include camping, hiking, hunting, fishing, and other backcountry pursuits. Another important activity is off-road vehicle (ORV) use. Snowmobiling in winter is also popular.

Significant recreation attractions are also present along the Salmon River, which is nationally famous for its whitewater boating. Jet boaters, rafters, and kayakers enjoy a long season on the river, generally from March through November. Wintering wildlife are a key attraction for spring recreationists. Several commercial outfitters provide service on the river. The Salmon River has been classified as a wild river from Corn Creek to Long Tom Bar in the Wild & Scenic Rivers system, so it is not a part of this plan. But since it is adjacent, it affects the planning area.

13. Transportation

The area now is essentially roadless. State Highway 14 forms the northern boundary of the area along the South Fork Clearwater. Graveled roads parallel much of the area. Roads that can be driven by most automobiles (depending on weather) reach Sourdough Peak, Wildhorse Lake, and Mackay Bar. In addition, there are many miles of trails within the area.

14. Fire

Fire plays a major role in the ecology of the Salmon River breaks. Large fires occur fairly frequently and maintain grass and forb openings that produce critical winter wildlife feed. Fuels often contain large areas of cheatgrass that cause a high rate of spread on steep slopes. The thick-barked ponderosa pine is often unaffected by the rapidly moving fire. Occasionally, pockets of timber will burn.

Fire plays an important role in maintaining quality wildlife habitat. Periodic fires release nutrients stored in plant tissue, recycling them to the soil. The browse and forb growth that occurs following fire thus is richer in nutrients essential to wildlife.

In the remainder of the area, fires occur less frequently. The last large fires occurred in 1910-1919, but more than 25 percent of the area has not burned since before 1870.

15. Insects and Disease

There are no significant outbreaks of insect and disease infestations on the area now, but there was a serious spruce budworm infestation that culminated in 1975. A pine butterfly infestation killed many mature ponderosa pine stands on the Salmon face in 1974. The older stands of lodgepole pine have a high potential to sustain epidemic mountain pine beetle populations, and there are several active pockets of infestation.

D. HISTORY

Recorded history for the Gospel-Hump area began in the 1860's with a gold strike. Miners left the fields in California and Montana to rush to this area because of rich placer strikes.

Florence, Orogrande, Humptown, Dixie, Frog Town, and Callender were all early mining camps. Though none of these townsites is found within the planning area, the miners who fanned out from these communities left ditches, tailings, and cabins in the area as evidence of their passing.

The richest strikes were worked out by 1930. Here and there prospecting still continues, although there is scant evidence of any significant mining since then.

Fire access roads were built by the CCC's in the 1930's and 1940's. A road was built to Sourdough Lookout for fire control purposes, and roads were built along Crooked River, across Penman Hill to Dixie Work Center, from Red River Ranger Station to the town of Dixie, and from Dixie to Mackay Bar.

Forest management plans that have been drawn up every decade since the 1940's call for managing timber within the planning area. The land base contributed to annual yields harvested elsewhere on the Forest, although timber access roads were not built until the 1970's.

When timber-harvest and road-access plans were again reaffirmed in the land-use planning of the 1970's, controversy began. This led to appeals and legislation. The Endangered American Wilderness Act (see appendix A) finally settled this controversy.

E. PLANNING PROCESS

1. General

- a. Issues and concerns were identified,
- b. Criteria was developed to guide the process, evaluation, and the decisions,
- c. Inventories were collected,
- d. The management situation was analyzed,
- e. Alternatives were formulated,
- f. Effects of alternatives were estimated,
- g. Alternatives were evaluated, and
- h. A preferred alternative was selected.

2. Specific

In addition, the more specific requirements of the Endangered Wilderness Act were followed. They include the following steps:

- a. Research was conducted in regard to wildlife, fish, soils, and watershed, and the research results were used in the planning process (1).
- b. An advisory committee was appointed to review and critique both the research and planning activities for the MRDP.
- c. This MRDP is programmed for review by Congress before implementation, it follows both NEPA and NFMA regulations.

This process was followed for the Nezperce NF as a whole so that total Forest Impacts could be judged for each alternative applied in the Gospel-Hump MRDP areas. The portion applying to the Gospel-Hump was excerpted for this report and plan. (The Endangered American Wilderness Act requires compliance with the NFMA regulations and these regulations require the planning to be completed on a total Forest basis.)

The proposed Forest Plan has been published, and is now undergoing review with its Draft Environmental Impact Statement. Copies of the Forest Plan and the DEIS are attached. This document is a subsection of the Forest Plan and summarizes the outputs of the Forest Plan for the Gospel-Hump management areas. The actual method of tracking all outputs and interrelated costs and effects for most resources was done with a linear computer program called FORPLAN. A more detailed explanation of the planning process, FORPLAN, and a comparison of costs, outputs, and effects by alternative is included in the DEIS for the Forest Plan.

II. THE GOSPEL-HUMP MULTIPURPOSE RESOURCE DEVELOPMENT PLAN

A. ALTERNATIVES CONSIDERED

These alternatives apply to the entire Forest as well as to the MRDP.

1. Alternative A

a. Goal

The goal is to produce goods and services consistent with current land management plans.

b. Management Emphasis

The emphasis is that mixture of prescriptions assigned by current land management plans. This direction comes primarily from a Forestwide Multiple Use Plan completed in 1975 and unit plans, which were tiered to the Multiple Use Plan, completed from 1975 through 1978. All forested land not classified for wilderness or wild and scenic rivers is available for timber harvest with standard access methods, i.e., roads. This is the "no-action" alternative required by NFMA regulations.

2. Alternative B

a. Goal

The goal of alternative B was to keep the costs of managing the Forest at the minimum level consistent with following present laws and regulations.

b. Management Emphasis

Emphasis was custodial management. The only activities programed were for fire, insect and disease protection, maintenance of presently constructed access roads and trails, maintenance of present administrative facilities, and administration of present contractual obligations until the contracts expire. This alternative stopped all commodity outputs.

Alternative B was not carried forward as a serious alternative, but was used for comparison purposes. This alternative produces the highest possible outputs of wild anadromous fish.

3. Alternative C

a. Goal

The goal for alternative C is to produce goods and services consistent with managing wildlife and fisheries (wild gene pools) habitat for a full range of hunting and fishing recreational opportunities.

b. Management Emphasis

Specified areas are excluded from new road construction; other areas have limited road construction. Big game summer range habitat will be managed utilizing the North Idaho Elk Coordinating Guidelines to make possible utilization levels of: 100 percent of existing habitat where roads are excluded; 75 percent of existing habitat in areas with limited road construction; and 50 percent of existing habitat in all other areas.

4. Alternative D

a. Goal

The goal for alternative D is to maximize efforts to reduce the Forest's susceptibility to mountain pine beetle epidemics and to harvest mortality.

b. Management Emphasis

Emphasis for the next 5 decades would shift harvest to lodgepole pine areas with a departure from nondeclining yield. All unclassified areas are available for timber resource management with standard access methods, i.e., roads.

5. Alternative E

a. Goal

Alternative E's goal is to emphasize fish and wildlife resources with a specified minimum level of timber production.

b. Management Emphasis

Management emphasis includes the following: Timber harvest must be at least 75MM bd.ft per year. Specified areas would be excluded from new road construction. In other areas, the habitat would be managed utilizing the North Idaho Elk Coordinating Guidelines to make possible the attainment of key big game summer range at 100 percent of existing habitat and regular summer range at 50 percent. Winter range habitat would be managed to support the elk population goals for 1990 that have been set by the State. The wolf pack goal assigned by the Region would be met or exceeded.

6. Alternative F

a. Goal

The goal for this alternative was to achieve all RPA targets. Management emphasis was well mixed, but was a little heavier toward timber management.

b. Management Emphasis

Alternative F was not carried forward as it was infeasible. No solution could be reached that achieved all RPA targets; before feasibility was reached by backing off on one target or another, previously formed alternatives were duplicated.

7. Alternative G

a. Goal

The goal for alternative G is to optimize timber and range production.

b. Management Emphasis

All unclassified areas are available for management of timber resources with standard access methods, i.e., roads.

8. Alternative H

a. Goal

The goal for alternative H is to maintain the highest possible commodity outputs while obtaining a harvestable level of anadromous fish.

b. Management Emphasis

Specific drainages are to be managed for anadromous fish, dispersed recreation, and wildlife. In other drainages, timber management scheduling is guided by fishery and water quality objectives that specify acceptable sediment levels and number of road entries per decade. These values have been translated into the miles of road that can be built per entry per watershed. Thus, this method keeps sediment production, which limits fish habitat, at reasonable levels.

9. Alternative H - Departure 1

(Note: A departure alternative is one that is not constrained by nondeclining yield requirements. In other words, timber yields will fluctuate and the highest yields cannot generally be sustained. Advantages may accrue in the form of higher total timber yields, or other objectives such as pest control can be more easily obtained.)

a. Goal

To obtain RPA timber targets to the extent possible while still providing minimum viable fish populations.

b. Management Emphasis

Primarily a timber management emphasis with fishery constraints.

10. Alternative H - Departure 2

a. Goal

To supply the highest possible commodity outputs consistent with producing a harvestable population of anadromous fish.

b. Management Emphasis

The emphasis is timber management guided by fishery and water quality objectives. The nondeclining yield constraint is removed to allow an increase in harvest while protecting the fishery.

B. THE PREFERRED ALTERNATIVE

1. Introduction

This Gospel-Hump Multipurpose Resource Development Plan is based on alternative H. This alternative and this plan provide for an increase in timber harvest, protect the anadromous fishery, and maintain or improve wildlife habitat. Timber harvest will be kept below the potential long-term sustained yield through the first few decades, but the level of harvest programmed in these decades exceeds historic harvest levels. Long-term sustained yield will be obtained by the fifth decade, and this harvest exceeds the potential harvest calculated by previous plans. The slow increase to potential yield is necessary to protect and maintain fish and wildlife values. A sudden increase to full potential yield would necessitate immediate and extensive road construction. This, in turn, would produce excessive sediment in local streams, and thus damage the fishery. It would also suddenly impact wildlife with the dangers of roads.

2. How to Use the Multipurpose Resource Development Plan

a. General

This plan consists of direction as to what, where, when, and how activities will be conducted.

Management prescriptions indicate what will be done. Standards and guidelines listed with the management prescriptions and within the general Forest direction detail how activities will be done, or, in other words, the quality demanded. The MRDP maps and the accompanying legend sheets locate where activities will be conducted. The schedule of the most significant activities in the first decade follows on page 65. The FORPLAN report on file in the Forest planning records contains all scheduled activities for all decades. This is not reproduced here because of its volume, and because this plan will be revised at least once a decade. The FORPLAN reports are available to interested parties.

b. Management Prescriptions

The management prescription is the basic instrument used to convey management direction. It provides a goal statement, a list of practices that can be applied, and the standards and guidelines applicable to these practices. The Forest management prescriptions applicable to the multipurpose resource development area follow.



GOAL - To provide a level of goods and services consistent with a maintenance level of management for the purpose of protecting anadromous fish habitat.

The production of resource outputs (timber, grazing, recreation, etc.) is permissible as long as these outputs are (1) produced regardless of any management activities on these lands; (2) produced in accordance with controlled resource outputs on adjacent managed lands; or (3) do not count towards the stated objectives or goals of a given resource. In all cases, any production of resource outputs must be compatible with other resource objectives. Management activities include those measures needed to provide for uncontrollable outputs, where these outputs cannot be programed over time; protect the life, health, and safety of the incidental user; maintain special uses and leases; and protect against environmental damage due to causes in excess of natural successional processes.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Cultural Resource Mgmt. (xA02)

Guideline: Protect known sites at a minimal level of inspection.

Dispersed Recreation Mgmt. (xA14)

Guideline: Mitigation measures will be undertaken to offset the effects of overuse when damage to the environment is severe (i.e., erosion control).

Wildlife Habitat Mtce. (xC01c)

Guideline: Maintain the capacity for viable T&E species populations (applies only to suitable acres).

Elk and Deer Winter Range Mgmt. (xC01e)

Guideline: Develop plans and implement projects to meet Forest-wide forage production targets for elk and deer winter range through burning of permanent winter range areas.

Range Resource Mgmt. (xD02-xD04)

Guideline: Maintain existing grazing allotments and provide for protection of sites from heavy overuse. Treat and/or control noxious weed infestations that threaten adjacent lands.

Timber Resource Mgmt. (xE07)

Guideline: Harvesting may occur to accomplish multiple use objectives other than timber production. These include research, public safety, improvement of administrative sites, removal of volume lost through catastrophic mortality (fire), or to control insect and disease epidemics that threaten adjacent suitable lands.

Water Resource Mgmt. (xF04)

Guideline: Administer water use permits as required by State law.

PRACTICES (Continued)

DIRECTION

Mining Law Compliance and Administration (xG01)

Guideline: Provide for review and evaluation of active and proposed minerals activities, including minerals materials and leasable minerals.

Special Use Mgmt. (xJ01)

Guideline: Continuance of all easements, permits, and right-of-way grants.

Access Road Reconstruction (xL10)

Guideline: Road reconstruction is permissible where these roads are necessary to meet the multiple use objectives.

Fire Prevention, Presuppression, and Suppression (xP01)

Guideline: Areas will be protected under the existing Primary Initial Attack Force (P04) and Fire Support and Facilitating Services (P07).



GOAL - To provide a level of goods and services consistent with a maintenance level of management of individual acres within Forest alternatives other than the minimum level benchmark.

This prescription differs from the definition of the minimum level benchmark for the Forest in that the production of resource outputs (timber, grazing, recreation, etc.) is permissible as long as these outputs are (1) produced regardless of any management activities on these lands; (2) produced in accordance with controlled resource outputs on adjacent managed lands; or (3) do not count towards the stated objectives or goals of a given resource. In all cases, any production of resource outputs must be compatible with other resource objectives. Management activities include those benchmark measures needed to provide for uncontrollable outputs, where these outputs cannot be programmed over time; protect the life, health, and safety of the incidental user; maintain special uses and leases; and protect against environmental damage due to causes in excess of natural successional processes.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Cultural Resource Mgmt. (xA02)

Guideline: Protect known sites at a minimal level of inspection.

Dispersed Recreation Mgmt. (xA14)

Guideline: Mitigation measures will be undertaken to offset the effects of overuse when damage to the environment is severe (i.e., erosion control).

Wildlife Habitat Mtce. (xC01c)

Guideline: Maintain the capacity for viable T&E species populations (applies only to suitable acres).

Range Resource Mgmt. (xD02-xD04)

Guideline: Maintain existing grazing allotments and provide for protection of sites from heavy overuse. Treat and/or control noxious weed infestations that threaten adjacent lands.

Timber Resource Mgmt. (xE07)

Guideline: Harvesting may occur to accomplish multiple use objectives other than timber production. These include research, public safety, improvement of administrative sites, removal of volume lost through catastrophic mortality (fire), or to control insect and disease epidemics that threaten adjacent suitable lands.

Water Resource Mgmt. (xF04)

Guideline: Administer water use permits as required by State law.

PRACTICES (Continued)

Mining Law Compliance and Administration (xG01)

Special Use Mgmt. (xJ01)

Access Road Construction (xL02-xL10)

Fire Prevention, Presuppression, and Suppression (xP01)

DIRECTION

Guideline: Provide for review and evaluation of active and proposed minerals activities, including minerals materials and leasable minerals.

Guideline: Continuance of all easement, permits, and R/W grants.

Guideline: Major and minor access road construction is permissible where these roads are necessary to meet the multiple use objectives on adjacent lands.

Guideline: Areas will be protected under the existing Primary Initial Attack Force (P04) and Fire Support and Facilitating Services (P07).



GOAL - To provide a level of goods and services consistent with a maintenance level of management for the Forest represented by the custodial benchmark.

This prescription excludes the production of controllable outputs following the expiration of existing contracts or permits. Management activities include those measures needed to provide for uncontrollable outputs, where these outputs cannot be programmed over time; protect the life, health, and safety of the incidental user; maintain special uses and leases; and protect against environmental damage due to causes in excess of natural successional processes.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Cultural Resource Mgmt. (xA02)

Guideline: Protect known sites at a minimal level of inspection.

Dispersed Recreation Mgmt. (xA14)

Guideline: Mitigation measures will be undertaken to offset the effects of overuse when damage to the environment is severe (i.e., erosion control).

Wildlife Habitat Mtce. (xC01c)

Guideline: Maintain the capacity for viable T&E species populations (applies only to suitable acres).

Water Resource Mgmt. (xF04)

Guideline: Administer water use permits as required by State law.

Mining Law Compliance and Administration (xG01)

Guideline: Provide for review and evaluation of active and proposed minerals activities, including minerals materials and leasable minerals.

Special Use Mgmt. (xJ01)

Guideline: Continuance of all easements, permits, and right-of-way grants.

Fire Prevention, Presuppression, and Suppression (xP01)

Guideline: Areas will be protected under the existing Primary Initial Attack Force (P04) and Fire Support and Facilitating Services (P07).



GOAL: Provide suitable habitat for all old-growth dependent species.

PRACTICES

DIRECTION

Dispersed Recreation (xA14)

General Forest-wide direction applies.

Guideline: Manage for semi-primitive, nonmotorized recreation.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking level in 5 years.

Timber Sale Preparation and Administration (xE06a)

Standard: Harvest will be deferred until replacement stands reach the old-growth category in the 10th decade. Harvest will be by clearcut or shelterwood. Firewood cutting will not be allowed except after or as a part of harvest.



GOAL: To provide suitable habitat for old-growth dependent species (replacement stand).

PRACTICES

DIRECTION

General Forest-wide direction applies.

Dispersed Recreation (xA14)

Guideline: Manage for semi-primitive, nonmotorized recreation.

Timber Stand Improvement (xE05)

Guideline: Manage under minimum intensity with minimum stocking level control.

Timber Sale Prep. and Admin. (xE06a)

Standard: No harvest will be allowed in the first 15 decades. Firewood cutting must be prohibited during this same period.



GOAL: Manage riparian areas to protect and where applicable enhance riparian dependent resources.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Dispersed Recreation
Management (xA14)

Guideline: Manage for roaded natural appearing, semi-primitive motorized or non-motorized recreation.

Wildlife and Fish Management (xC01)

Standard: Resolve conflicts and site deterioration generated by livestock and timber harvest in favor of riparian dependent resources.

Guideline: Design grazing and timber harvest systems to promote recovery of degraded riparian areas (may necessitate temporary exclusion of livestock or new range improvements).

Wildlife and Fish Improvement (xC04,
xC05)

Standard: Maintain or improve riparian area characteristics (soil and channel stability, water quality, and composition and structure of plant communities) by design of grazing and timber systems, investment in improvements, or cultural practices that are specific to affected resources.

Range Resource Planning & Inventory
(xD01)

Guideline: Range analysis and plans generally for light to moderate grazing utilization in riparian area. Use grazing system that provides best coordination on site-specific basis.

Range Resource Management (xD02)

Guideline: Maintain existing grazing permits; administer allotments to provide protection of the grazing resource and riparian zone. Annually inspect minimum of 30 percent of allotments including all problem allotments. Some riparian areas may sustain moderate to high intensity grazing or no grazing to be determined on a site-specific basis. In areas of moderate and high intensity grazing management, prescriptions G-2 and G-3 will apply. Administer all allotments to protect timber resources.

Range Forage Improvement (xD03)

Guideline: Maintain forage production and carrying capacity by cultural practices. Control new infestations of noxious weeds.

PRACTICES (Continued)

DIRECTION

Range Structural Improvement & Maintenance (xD05, xD06)

Guideline: Maintain at least existing levels of improvements with standard practices. Permittees maintain improvements to Forest Service standards.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels within 5 years following regeneration harvest. In areas of suitable deer and elk winter range, reforestation may be limited to natural regeneration to provide a prolonged period of browse production for wildlife.

Timber Sale Preparation & Admin. (E06a)

Standard: Some riparian areas may sustain regulated timber harvests while others will be unregulated for timber harvesting. Suitability will be determined on a site-specific basis. On areas regulated for timber management, final harvest will occur at or after culmination of m.a.i. merchantable cubic feet. Encourage management which will ensure multi-storied or multi-layered conditions.

Guideline: Harvest units within riparian areas should not exceed 2-5 acres in size. Limit harvests to 10 percent of the riparian areas within a watershed in any 10-year period.

Local Road Construction & Reconstruction (xL10)

Guideline: Mitigation measures should reduce sediment from road construction by 70 percent

The following practices have no specific Standards or Guidelines:

Timber Resource Planning & Inventory (xE01)

Compartment Prescriptions (xE03a)

Silvicultural Activity Review & Evaluation (xE03b)

Site Preparation (xE04c)

Water Resource Improvement & Maintenance (xF05)

Trail Construction & Maintenance (xL21)

Treatment of Activity Fuels (xP11)



GOAL: Manage timber through a minimum level of stocking control per acre (final harvest and regeneration); use *clearcut* harvest type.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Dispersed Recreation Management (xA14)

Guideline: Manage for semi-primitive motorized recreation.

Range Resource Management (xD02)

Guideline: Administer allotments to protect timber resources.

Range Forage Improvement & Maintenance (xD03)

Guideline: Restrict range forage improvement to areas where regeneration has been established.

Range Structural Improvement & Maintenance (xD05)

Guideline: Improve structures for protection of regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels within 5 years following regeneration harvest.

Timber Sale Preparation & Administration (xE06a)

Standard: Final harvest will occur at or near culmination of m.a.i. merchantable cubic feet.

Guideline: Initiate final harvest no earlier than:

1. Existing stands

- a. Sawtimber - 70 years
- b. Poletimber
 - PC 3 - 110 years
 - PC 4 - 80 years
 - PC 5 & 6 - 80 years
- c. Seedling/Sapling
 - PC 3 & 4 - 110 years
 - PC 5 & 6 - 110 years

2. Regenerated Stands

- PC 3 - 150 years
- PC 4 - 120 years
- PC 5 & 6 - 120 years

Local Road Construction & Reconstruction (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent.

The following practices have no specific Standards or Guidelines:

Timber Resource Planning & Inventory (xE01)

Compartment Prescriptions (xE03a)

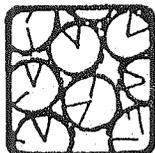
Silvicultural Activity Review & Evaluation (xE03b)

Site Preparation (xE04c)

Water Resource Improvement & Maintenance (xF05)

Soil Resource Improvement (xK05)

Treatment of Activity Fuels (xP11)



T-9

GOAL: Manage timber through a minimum level of stocking control per acre (final harvest and regeneration); use *shelterwood* harvest type.

PRACTICES

(Same as T-8)

DIRECTION

(Same as T-8)



GOAL: Manage timber at a minimum level through a salvage thinning prior to final harvest; use *clearcut* harvest type.

PRACTICESDIRECTION

General Forest-wide direction applies.

(Note: This prescription applies only to existing sawtimber condition class.)

Dispersed Recreation Management (xA14)

Guideline: Manage for semi-primitive motorized recreation.

Range Resource Management (xD02)

Guideline: Administer allotments to protect timber resources.

Range Forage Improvement & Maintenance (xD03)

Guideline: Restrict range forage improvement to areas where regeneration has been established.

Range Structural Improvement & Maintenance (xD05)

Guideline: Improve structures for protection of regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels within 5 years following regeneration harvest.

Timber Sale Preparation & Administration (xE06a)

Standard: Final harvest will occur at or near culmination of m.a.i. merchantable cubic feet. Salvage thin once prior to final harvest.

Guideline: Remove salvageable dead and anticipated mortality that will not remain merchantable until final harvest is scheduled. Initiate final harvest no earlier than:

1. Existing stands
 - a. Sawtimber - 70 years

Local Road Construction & Reconstruction (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent.

The following practices have no specific Standards or Guidelines:

Timber Resource Planning & Inventory (xE01)

Compartment Prescriptions (xE03a)

Silvicultural Activity Review & Evaluation (xE03b)

Site Preparation (xE04c)

Water Resource Improvement & Maintenance (xF05)

Soil Resource Improvement (xK05)

Treatment of Activity Fuels (xP11)



GOAL: Manage the landscape to meet the visual quality objective (VQO) of retention (R) with minimum intensity timber management; use *shelterwood* harvest type.

PRACTICESDIRECTION

Manage for Retention VQO. See USDA For. Serv., Ag. Handbook 462.

Dispersed Recreation Management (xA14)

Guideline: Manage for roaded natural-appearing recreation type.

Range Resource Management (xD02)

Guideline: Administer allotments to protect the visual resource.

Range Structural Improvement & Maintenance (xD05)

Guideline: Create and/or maintain structural improvements for the protection of regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels within 5 years following regeneration harvest except where long-term vista points are to be maintained.

Timber Sale Preparation & Administration (xE06a)

Standard: Final harvest will occur at or near culmination of m.a.i. merchantable cubic feet.

Guideline: Initiate final harvest no earlier than:

1. Existing stands

- a. Sawtimber - 70 years
- b. Poletimber
 - PC 3 - 110 years
 - PC 4 - 80years
 - PC 5 & 6 - 80 years
- c. Seedling/Sapling
 - PC 3 & 4 - 110 years
 - PC 5 & 6 - 110 years

2. Regenerated Stands

- PC 3 - 150 years
- PC 4 - 120 years
- PC 5 & 6 -120 years

Shelterwood harvest is 3-stage. Retain 2-5 old growth trees/acre after last overstory removal. Regeneration cut leaves 40-50 percent crown closure. Don't remove overstory until regeneration is 20 ft. tall.

PRACTICES (Continued)

DIRECTION

Local Road Construction &
Reconstruction (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent.

Treatment of Activity
Fuels (xP11)

Guideline: Foreground: handpile and burn 60 percent; underburn 40 percent. Middleground and background: top and scatter 40 percent, underburn 40 percent, and YUM 20 percent.

The following practices have no specific Standards or Guidelines:

Range Forage Improvement & Maintenance (xD03)

Compartment Prescriptions (xE03a)

Silvicultural Activity Review & Evaluation (xE03b)

Site Preparation (xE04c)

Trail Construction & Maintenance (xL21)



GOAL: Manage the landscape to meet the VQO of Partial Retention with minimum intensity timber management; use *clearcut* harvest type.

PRACTICES

DIRECTION

Manage for Partial Retention; see USDA For. Serv., Ag. Handbook 462.

Dispersed Recreation Management (xA14)

Guideline: Manage for roaded natural-appearing recreation type.

Range Resource Management (xD02)

Guideline: Administer allotments to protect the visual resources.

Range Forage Improvement & Maintenance (xD03)

Guideline: Restrict range forage improvement to areas where regeneration has been established.

Range Structural Improvement & Maintenance (xD05)

Guideline: Improve structures for protection of regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels within 5 years following regeneration harvest except where long-term vista points are to be maintained.

Timber Sale Preparation & Administration (xE06a)

Standard: Final harvest will occur at or near culmination of m.a.i. merchantable cubic feet.

Guidelines: Initiate final harvest no earlier than:

1. Existing stands
 - a. Sawtimber - 70 years
 - b. Poletimber
 - PC 3 - 110 years
 - PC 4 - 80 years
 - PC 5 & 6 - 80 years
 - c. Seedling/Sapling
 - PC 3 & 4 - 110 years
 - PC 5 & 6 - 110 years
2. Regenerated Stands
 - PC 3 - 150 years
 - PC 4 - 120 years
 - PC 5 & 6 - 120years

PRACTICES (Continued)

DIRECTION

Local Road Construction & Reconstruction (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent and to screen roads from Sensitivity Level 1 viewpoints.

Treatment of Activity Fuels (xP11)

Guideline: Foreground: dozer pile 50 percent, broadcast burn 40 percent, handpile and burn 10 percent. Middleground and background: dozer pile 60 percent and broadcast burn 40 percent.

The following practices have no specific Standards or Guidelines:

Timber Resource Planning & Inventory (xE01)

Compartment Prescriptions (xE03a)

Silvicultural Activity Review & Evaluation (xE03b)

Water Resource Improvement & Maintenance (xF05)

Soil Resource Improvement (xK05)

Trail Construction and Maintenance (xL21)



GOAL: Manage the landscape to meet the VQO of Partial Retention with minimum intensity timber management; use *shelterwood* harvest type.

PRACTICES

DIRECTION

(Same as V-8)

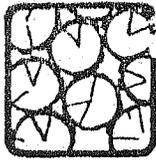
(Same as V-8 except for practice xP11 (see below) and add to xE06a as below.)

Timber Sale Preparation & Administration (xE06a)

Guideline: Shelterwood harvest is 2-stage. Regeneration cut leaves 30-40 percent crown closure. Remove overstory when regeneration is 20 feet tall.

Treatment of Activity Fuels (xP11)

Guideline: Foreground: handpile and burn 60 percent; underburn 40 percent. Middleground and background: top and scatter 40 percent, underburn 40 percent, and YUM 20 percent.



GOAL: Maintain existing deer and elk winter range to produce permanent winter forage.

PRACTICES

DIRECTION

Dispersed Recreation Management (xA14)

General Forest-wide direction applies.

Guideline: Manage for semi-primitive motorized recreation during summer.

Habitat Access Controlled by Closures (C15)

Standard: Close all roads during winter to protect wildlife habitat.

Elk and Deer Winter Range Management (xC01e)

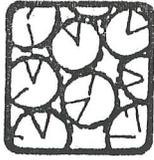
Guideline: Develop plans and implement projects to meet Forest-wide forage production targets for elk and deer winter range.

Range Resource Planning (xD01)

Guideline: Forage production will be allotted to domestic use once wildlife targets have been met.

The following practices have no specific Standards or Guidelines:

Trail Construction & Maintenance (xL21)



GOAL: Maintain existing deer and elk winter range to produce winter forage and cover; minimum intensity timber management; use *clearcut* harvest type.

PRACTICES

DIRECTION

Dispersed Recreation Management (xA14)

Guideline: Manage for semi-primitive motorized recreation during summer.

Elk & Deer Winter Range Management (xC01e)

Guideline: Develop plans and implement projects to meet Forest-wide forage production targets for elk and deer winter range.

Habitat Access Controlled by Closures (xC15)

Standard: Close all roads during winter to protect wildlife habitat.

Range Resource Management (xD02)

Guideline: Administer allotments to protect timber resources.

Range Forage Improvement & Maintenance (xD03)

Guideline: Restrict range forage improvement to areas where regeneration has been established.

Range Structural Improvement & Maintenance (xD05)

Guideline: Improve structures for protection of regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Standard: Reforestation will be limited to natural regeneration to provide a prolonged period of browse production for wildlife.

Site Preparation (xE04c)

Standard: A specific practice will be selected to stimulate browse production for wildlife.

Timber Sale Preparation & Administration (xE06a)

Standard: Final harvest will occur at or near culmination of m.a.i. merchantable cubic feet.

Guideline: Initiate final harvest no earlier than:

1. Existing stands
 - a. Sawtimber - 70 years
 - b. Poletimber
 - PC 3 - 110 years
 - PC 4 - 80 years
 - PC 5 & 6 - 80 years
 - c. Seedling/Sapling
 - PC 3 & 4 - 110 years
 - PC 5 & 6 - 80 years

PRACTICES (Continued)

DIRECTION

2. Regenerated Stands

- PC 3 - 150 years
- PC 4 - 120 years
- PC 5 & 6 - 120 years

Local Road Construction & Reconstruction (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent.

The following practices have no specific Standards or Guidelines:

Timber Resource Planning & Inventory (xE01)

Compartment Prescriptions (xE03a)

Silvicultural Activity Review & Evaluation (xE03b)

Water Resource Improvement & Maintenance (xF05)

Soil Resource Improvement (xK05)

Trail Construction & Maintenance (xL21)

Treatment of Activity Fuels (xP11)



W-6

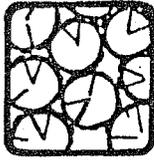
GOAL: Maintain existing deer and elk winter range to produce winter forage and cover; minimum intensity timber management; use *shelterwood* harvest type.

PRACTICES

DIRECTION

(Same as W-5)

(Same as W-5)



GOAL: Manage Pacific yew plant communities for moose winter range through appropriate silvicultural treatment.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Dispersed Recreation Management (xA14)

Guideline: Manage for semi-primitive motorized recreation during summer.

Moose Winter Range Survey (xC01f)

Standard: Develop timber/wildlife coordination plans every decade; inventory, analyze, and report on moose winter range.

Habitat Access Controlled by Closures (xC15)

Standard: Control all roads during winter to protect wildlife habitat.

Range Resource Management (xD02)

Standard: Administer allotments to protect Pacific yew resources.

Range Forage Improvement & Maintenance (xD03)

Guideline: Restrict range forage improvement to areas where conifer and Pacific yew regeneration has been established.

Range Structural Improvement & Maintenance (xD05)

Guideline: Improve structures for protection of conifer and Pacific yew regeneration and to facilitate livestock distribution.

Reforestation Other Than Backlog (xE04a)

Guideline: Reforest to desired stocking levels either through planting or through natural regeneration over 20 years for conifers and 20-30 years for Pacific yew.

Stand Improvement (Pacific Yew) (xE05)

Standard: Treatment activity should retain at least 50 percent of live Pacific yew component scattered throughout the unit.

Guideline: Stocking control should achieve the following canopy coverage objectives:

	% Canopy Cover	
	Overstory	Pacific yew
Taxus brevifolia/	42%	60%
Asarum caudatum h.t.	(Std.dev.21%)	(Std.dev.18%)
Taxus brevifolia/	34%	53%
Clintonia uniflora h.t.	(Std.dev.16%)	(Std.dev.20%)

PRACTICES (Continued)

DIRECTION

Timber Sale Preparation &
Administration (xE06a)

Standard: Harvest will occur on a maximum of 5 percent of Pacific yew stands per decade on a 200-year rotation.

Guideline: Preferred harvest type is patch clearcuts no greater than 20 acres (10 acres preferred). Alternate harvest types may include selection cuts or shelterwood.

Local Road Construction &
Reconst. (xL10)

Guideline: Mitigation measures should be taken to reduce sediment from road construction by 60 percent.

Treatment of Activity Fuels
(xP11)

Guideline: Machine pile, yard out tops for hazard reduction; remove large cull pieces where necessary to prevent physical barriers to animal movement. Generally, burning will not be prescribed.

The following practices have no specific Standards or Guidelines:

Trail Construction & Maintenance (xL21)



GOAL: Maintain existing bighorn sheep range to produce permanent browse.

PRACTICES

DIRECTION

General Forest-wide direction applies.

Dispersed Recreation
Management (xA14)

Guideline: Manage for semi-primitive non-motorized recreation.

Bighorn Sheep Habitat
Manipulation (xC01g)

Standard: Develop plans and implement projects to meet Forest-wide forage production targets for bighorn sheep habitat.

Habitat Access Controlled
by Closures (xC15)

Standard: Close all roads to protect wildlife habitat.

The following practices have no specific Standards or Guidelines:

Trail Construction and Maintenance (xL21)

c. General Management Direction

In addition to the site-specific management prescriptions listed in the foregoing pages, there is general management direction applicable throughout the MRDP area. This is intended to supplement appropriate laws, regulations, and national and regional direction. (Standards are defined as principles requiring a specific level of attainment. Guidelines indicate desirable actions or conditions to be achieved.)

General Forest-wide Management Direction

Visual Resources

Standards:

1. Revise visual quality inventory as use patterns change and validate every 10 years.
2. Monitor significant landscape-modifying activities yearly.
3. Land-disturbing activities will meet the inventoried visual quality objectives as guided by USDA Handbook No. 462, National Forest Landscape Management, Vol. 2, Chapter 1.

Recreation

Standards:

1. Update recreation use statistics yearly.
2. Evaluate each recreation special use permit every 5 years.
3. Maintain all fee campgrounds at a full-service level.

Guidelines:

1. Create vegetation management plans for developed campgrounds where needed.
2. Make recreation area facilities accessible to handicapped individuals.
3. Update inventory of recreation opportunities and evaluate every 5 years. Develop management plans for potential recreation areas.
4. Where land-disturbing activities coincide with trail locations, keep trails open and free of debris, reroute, or abandon them. Use appropriate signing as necessary.
5. Create dispersed campsites where a demonstrated need exists.

6. Create additional opportunities for winter recreation where user needs indicate. Sign snowmobile trails, construct and maintain cross-country ski trails, and construct support facilities designed for winter use.
7. Reroute trails for an improved recreation experience.
8. Sign interpretive sites of national historic interest or unique land management practices.
9. Create camping and picnic areas for large groups close to population centers as plans and public need develop.

Wildlife and Fish

Standards:

1. Conduct surveys annually to identify potential and existing habitat and to monitor presence and trends of bald eagles and peregrine falcons. Prepare management guidelines and revise as needed in response to survey findings.
2. In cooperation with the Wolf Recovery Team of the U.S. Fish & Wildlife Service, conduct surveys to delineate and determine the quality of habitat for the gray wolf. Prepare a gray wolf management plan within 3 years and revise every 5 years.
3. In response to sightings, conduct surveys to identify and evaluate other threatened and endangered species, such as grizzly bear and plants, and their habitat.
4. As required by the Endangered Species Act of 1973, prevent destruction and adverse modification of the habitat of threatened and endangered species. Assess the potential impacts of programs and activities and prepare an evaluation.

Pursuant to Section 7 of the Endangered Species Act, consult with the U.S. Fish & Wildlife Service when management activities may affect, either positively or negatively, the habitat of threatened and endangered species.
5. Fish habitat will be surveyed every decade. Critical anadromous spawning habitat will be monitored yearly.

Guidelines:

1. Coordinate planning of transportation system when key wildlife habitat areas are involved. Develop a road management plan and revise annually.
2. Involve fishery and wildlife biologists, soil scientists, and geological engineers in the location and design phases of road construction.
3. Develop plans and implement projects to meet Forestwide forage production targets for elk, deer, bighorn sheep and moose winter range.
4. Restore anadromous fish habitat to the natural carrying capacity where opportunity and need exist.
5. Increase the carrying capacity of anadromous fish habitat where opportunity and need exist.
6. In elk winter range areas, stimulate browse production after timber harvest. In moose winter range areas on tractor ground, manage timber harvest to perpetuate yew stands.
7. Use the "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to assess the quality of elk habitat in project EA's.
8. Use recommendations from "Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho" to minimize impacts on elk habitat and to achieve established objectives.
9. Minimize road construction in or adjacent to designated old-growth management stands.
10. Maintain at least 10 percent of the forested acres on the Forest in old-growth.
11. The quality of old-growth management and replacement stands that fall within the boundaries of project EA's should be verified as part of the EA evaluation.

Range

Standard:

Maintain or improve vegetative trend.

Guidelines:

1. Complete planning and analysis every decade on all allotments.
2. Manage livestock in balance with other Forest resources.

Cultural Resources

Standards:

1. All areas of land disturbance will be surveyed; however, the intensity of the survey will depend upon variables such as environmental factors and judgment.
2. The quality of mitigative activities will be high enough to receive the approval of the State Historic Preservation Officer, Advisory Council, and Forest Supervisor.

Guidelines:

1. The Forest should assess cultural resources on a site-by-site basis to determine whether they should be mitigated, stabilized, preserved, or restored for scientific purposes or public interpretation.

Timber

Standards:

1. All management prescriptions that involve vegetative manipulation will be implemented within the framework of silvicultural prescriptions prepared for individual stands. Snag management will be included in all silvicultural prescriptions.
2. Management prescription guidelines will serve as starting points for developing silvicultural prescriptions for Environmental Assessments. Site-specific data gathered by stand exams will be used for detailed stand prognoses and economic analyses of stand alternatives and project- design alternatives.

Guideline:

1. The Forest Silviculturist should annually review 1 percent of all silvicultural prescriptions.

Soils

Standards:

1. The potential for soil displacement, compaction, puddling, mass wasting, and surface soil erosion will be specifically addressed in each Environmental Assessment.

Guidelines:

1. Annual management reviews by an interdisciplinary team should be performed and documented to determine whether the soils standards and guidelines listed here are appropriate.

2. Soil Displacement/Compaction/Puddling

- (a) A minimum of 80 percent of an activity area should remain noncompacted, nondisplaced, and nonpuddled upon completion of current activities. This direction does not apply to permanent recreation facilities or other permanent facilities such as system roads that operate on a seasonal or year-round basis.

An activity area is the total area for which a ground-impacting activity is planned; for example, a unit of a timber sale, a slash disposal project, or a grazing allotment. The area would also include transportation systems within and directly adjacent to the project.

- (b) Sites on which the direction for displacement, compaction, and puddling is not met should require rehabilitation. Disking, ripping, and fertilizing may be needed to meet the direction.

- (c) Uses of mechanized equipment off roads and established trails should be regulated to protect the soil resource. Existing trails and roads should be used whenever possible.

3. Erosion

- (a) Maintain sufficient ground cover to prevent rill erosion and sluffing on roads and sheet erosion on other activity areas.

Effective ground cover is the basal area of perennial vegetation plus organic litter 1/2-inch or more thick and rock material from 3/4- to 12-inch in diameter (on longest axis). It would include the crowns of trees and shrubs that are in contact with the soil. The effective ground cover figures relate to acceptable levels of on-site erosion for landtypes and will be found in the Forest Land System Inventory Report.

- (b) Sites where this management direction won't be achieved through natural means within the specified period of time should require rehabilitation measures. Planting, slash spreading, and mulching are some rehabilitation measures that might be used.

4. Soil Mass Wasting

(a) Areas within projects with natural stability ratings of moderately stable, unstable, or very unstable should be identified and addressed in the Environmental Assessment. When mass wasting is anticipated to result in significant soil loss or sedimentation, hazards to lives or property, fish habitat damage, or damage to other resource values, alternative management prescriptions should be developed and evaluated.

Water

Guideline:

1. For all projects, effects on water yields will follow the guidelines contained in Forest Hydrology: Part II--Hydrologic Effects of Vegetation Manipulation, pp. 22-61.

Minerals

Standards:

1. Cultural resource surveys shall be conducted prior to approval of minerals-related activities.
2. All applicable Federal laws and regulations relevant to mining operations in locatable, leasable, and salable minerals on National Forest lands shall apply.

Guidelines:

1. Mining operations proposed to be conducted in the Selway-Bitterroot and River of No Return Wildernesses after 1/1/84 and the Gospel-Hump Wilderness after 1/1/88, will be examined for proof of discovery prior to approval of the Plan of Operations.
2. Timber necessary for mining operations should be selected according to sound Forest management principles. Timber salvage should occur where large-scale mining ventures require its removal, but not its use for mining purposes.
3. Access will be granted for mineral discoveries in roadless areas, but before access requiring new road construction is granted, claims will be examined for proof of discovery. Road construction should be commensurate with sound Forest management practices and the reasonable needs of access to the minerals-related activity. Major roads necessary for large-scale mining ventures should be constructed to Forest Service specifications, and, if possible, to the benefit of other resources.

4. Surface occupancy in permanent structures should be authorized only where reasonably incident to legitimate minerals-related activities.
5. Routine compliance inspections should be conducted to insure that minerals-related activities are conducted as agreed to. The number of compliance visits should depend upon the intensity of the proposed operation. Non-compliance should be immediately pursued as directed in FSM 2800.
6. The Forest will assist miners in developing operating plans that provide for environmental protection and ultimate rehabilitation while, at the same time, allowing for exploration, development, and production to proceed in a reasonable and timely manner according to accepted industry standards.
7. Common variety mineral materials sites necessary for Forest management uses should be evaluated for possible withdrawal.
8. Mining claimants will be notified of impending Forest Service actions that may affect their claims. Every effort should be made to protect recognizable claim corners and discoveries from disturbance as a result of Forest Service activities. Mining claims with recognized surface rights will not be entered for management purposes until permission of the claimant is obtained.
9. Hardrock minerals on acquired lands should be managed according to the mineral leasing laws.

Fire

Guidelines

1. Increase protection commensurate with firewood gathering, timber management, and recreational activities to control wildfires at 10 acres or less 90 percent of the time.
2. If hazard appraisal data predicts that activity-created fuel levels will exceed an intensity of 100 Btu/ft²/s within 3 years, hazard reduction treatment should be undertaken.

Riparian Areas

Standards:

1. No management practices will be allowed in riparian areas that will cause detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions and fish habitat.
2. Preferential consideration will be given to riparian area-dependent resources over other resources in cases of unresolvable conflict. (Resources such as fish, certain wildlife, vegetation, and water are totally dependent upon

riparian areas.)

Actions within or affecting riparian areas will include protection and, where applicable, improvement of riparian-dependent resources.

Guidelines:

1. Motorized recreation vehicles (other than on-snow types) should generally not be allowed off roads and trails in sensitive riparian areas.
2. Timber harvest landings should not be located in riparian areas.
3. Trees should not be felled into stream courses.
4. Trees contributing to streambank support should not be harvested within riparian areas.
5. Management activities should not be permitted to adversely change the composition and productivity of key riparian vegetation. Riparian areas now degraded by management should be rehabilitated before any further nondependent resource use of the immediate area should be permitted.
6. Management activities should not be permitted to change stream geomorphology by significantly altering streambanks, channel dimensions, or channel sediment.
7. Sufficient streamside vegetative canopy should be maintained to prevent unacceptable water temperatures and to provide fish cover.
8. Roads and trail crossings in riparian areas should be kept to a minimum. The construction of roads and trails parallel to streams (in riparian areas) should be avoided. Opportunities to remove existing roads and trails from riparian areas should be considered if they are producing significant impacts on riparian-dependent resources. Roads and trails should cross streams at as near a right angle as practical.
9. Use of harvesting equipment that will result in significant ground disturbance should not be allowed in riparian areas.
10. Logs should be totally suspended when possible while crossing riparian areas.

d. Management Areas

Management areas are combinations of capability areas, or in other words, fixed geographic locations of similar biologic and physical response to which unique combinations of management prescriptions or single management prescriptions are applied. Management areas are delineated on the MRDP maps.

e. MRDP Maps

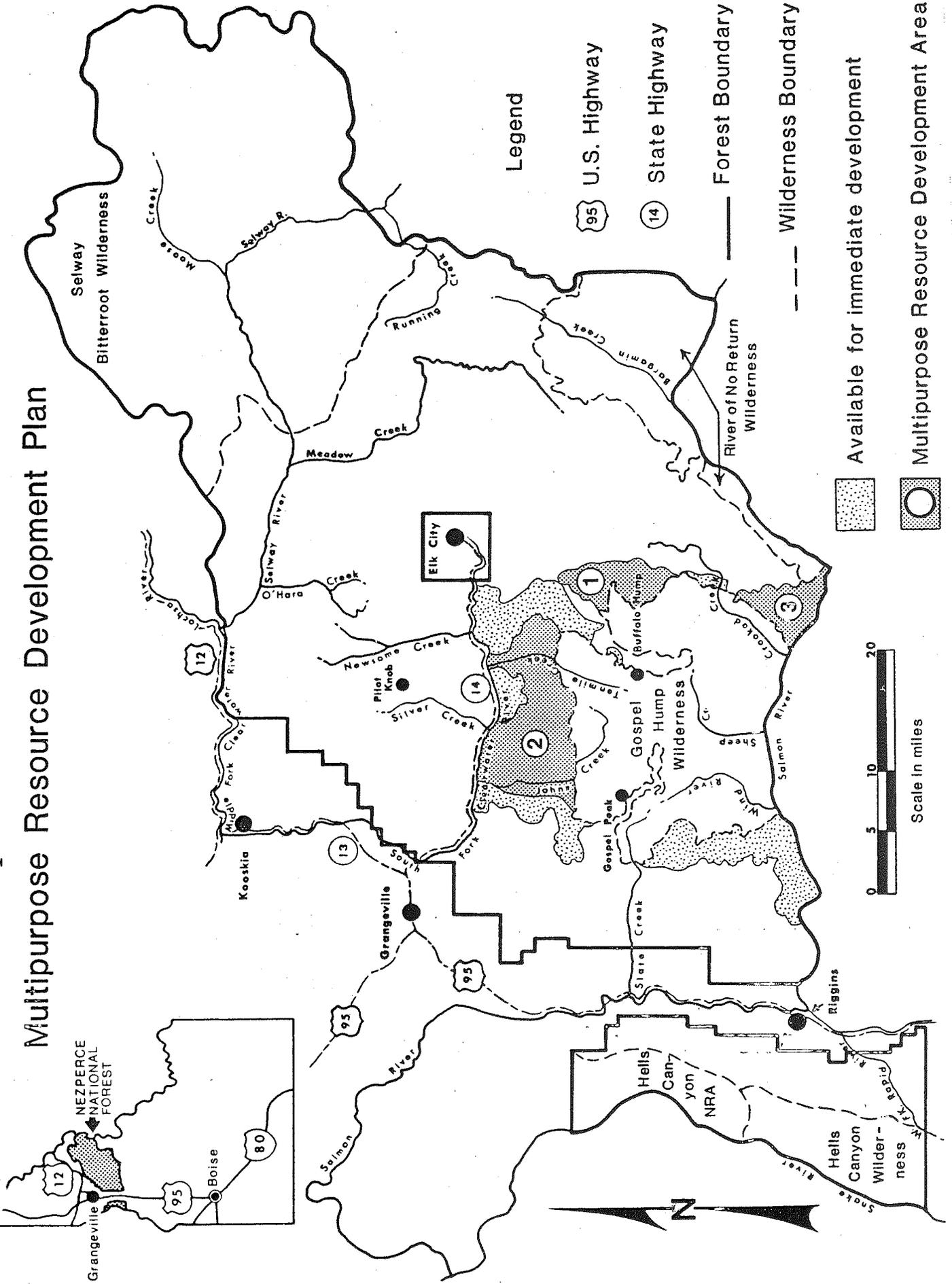
A series of maps follows. There is a vicinity map and a separate 1" = 1 mile scale map for each of the MRDP areas.

The separate maps show the topographic features, general timber sale locations for the first decade, and the basic arterial and collector road system.

For each separate map, an overlay is provided that delineates management areas and the fishery objective goals for each drainage.

Nezperce National Forest

Multipurpose Resource Development Plan



Map Legends for Management Areas and Fisheries Objectives

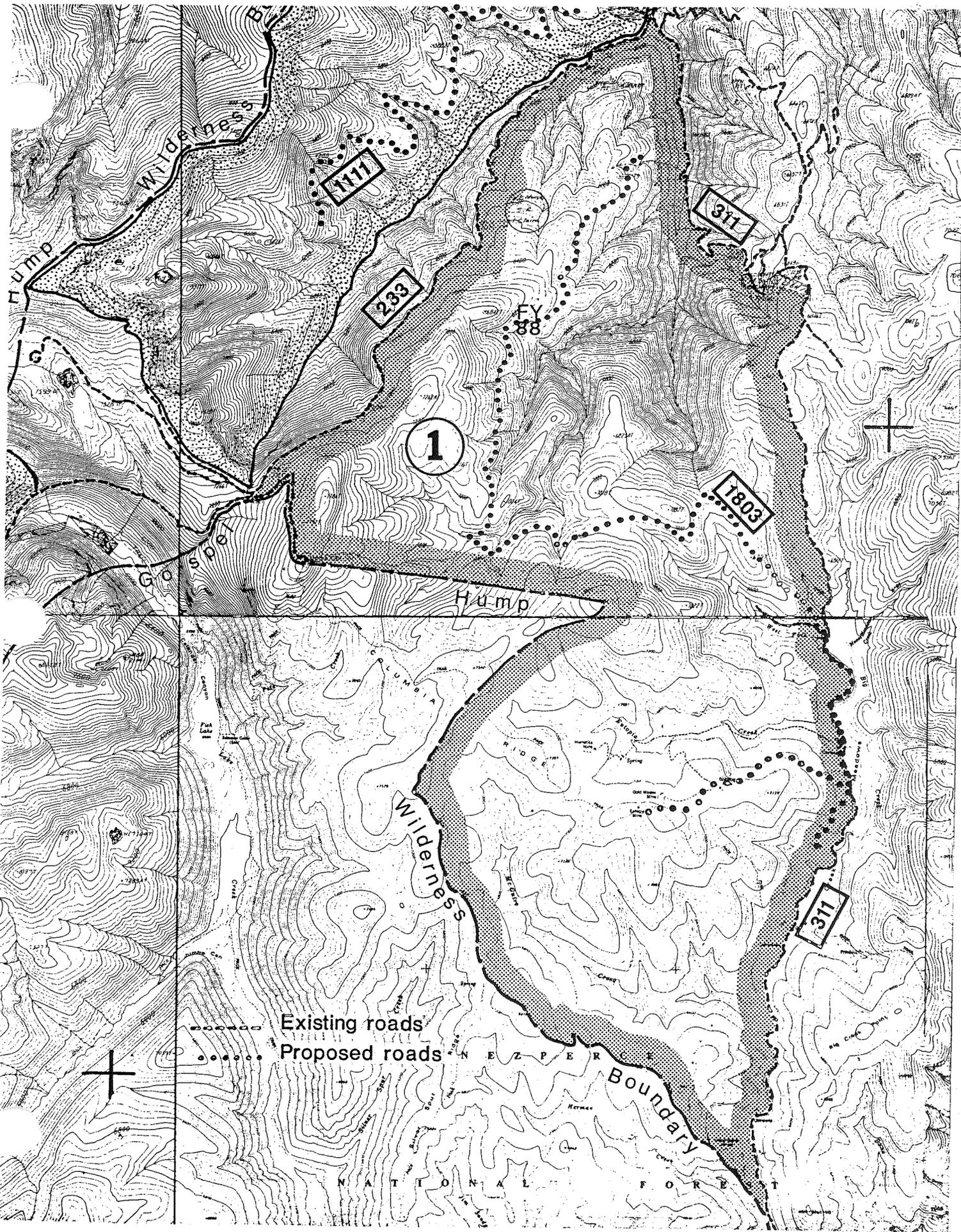
<u>Management Area</u>	<u>Management Emphasis</u>	<u>Prescriptions Used</u>
1	Minimum Level	M&M
10	Riparian	RIP-7
12	Timber Management	T-8, 9, 10; W-9
13	Timber Management w/ Visual Management for Retention and Partial Retention Visual Quality Objectives	T-8, 9, 10; V-1, V-9
14	Timber Management w/Deer/ Elk Winter Range Management and Visual Management	M&M, T-8, 9, 10; V-1, V-9; W-1, 5, 6
15	Timber Management w/Deer/ Elk Winter Range Management	M&M; T-8, 9, 10; W-1, 5, 6
16	Deer/Elk Winter Range Mgmt.	M&M; W-1, 5, 6, 15
17	Visual Management for Reten- tion and Partial Retention Visual Quality Objectives	V-1, V-9; W-9
18	Deer/Elk Winter Range Mgmt. w/Visual Management	M&M; V-1, V-9; W-1, 5, 6, 15
88	Old-Growth Mgmt.--Existing and Replacement	OG-1, OG-2

Management Areas 12-18 may contain some minor amounts of M&M, OG-1 & 2 prescriptions.

When the management area number is followed by the letters A, B, C, or D, it establishes the objective for fishery management in terms of the percent of full potential it should be managed for.

- A = 100
- B = 80 to 90
- C = 70
- D = Varies from 0 to 60

The notation of a fiscal year on the map denotes a timber sale to be prepared in that general area in that fiscal year. This appears as "FY 88", etc.



1

1711

233

311

1803

311

Existing roads

Proposed roads

Wilderness Boundary

NATIONAL FOREST

Hump

WILDERNESS

Hump

GOSPOD

FY 88

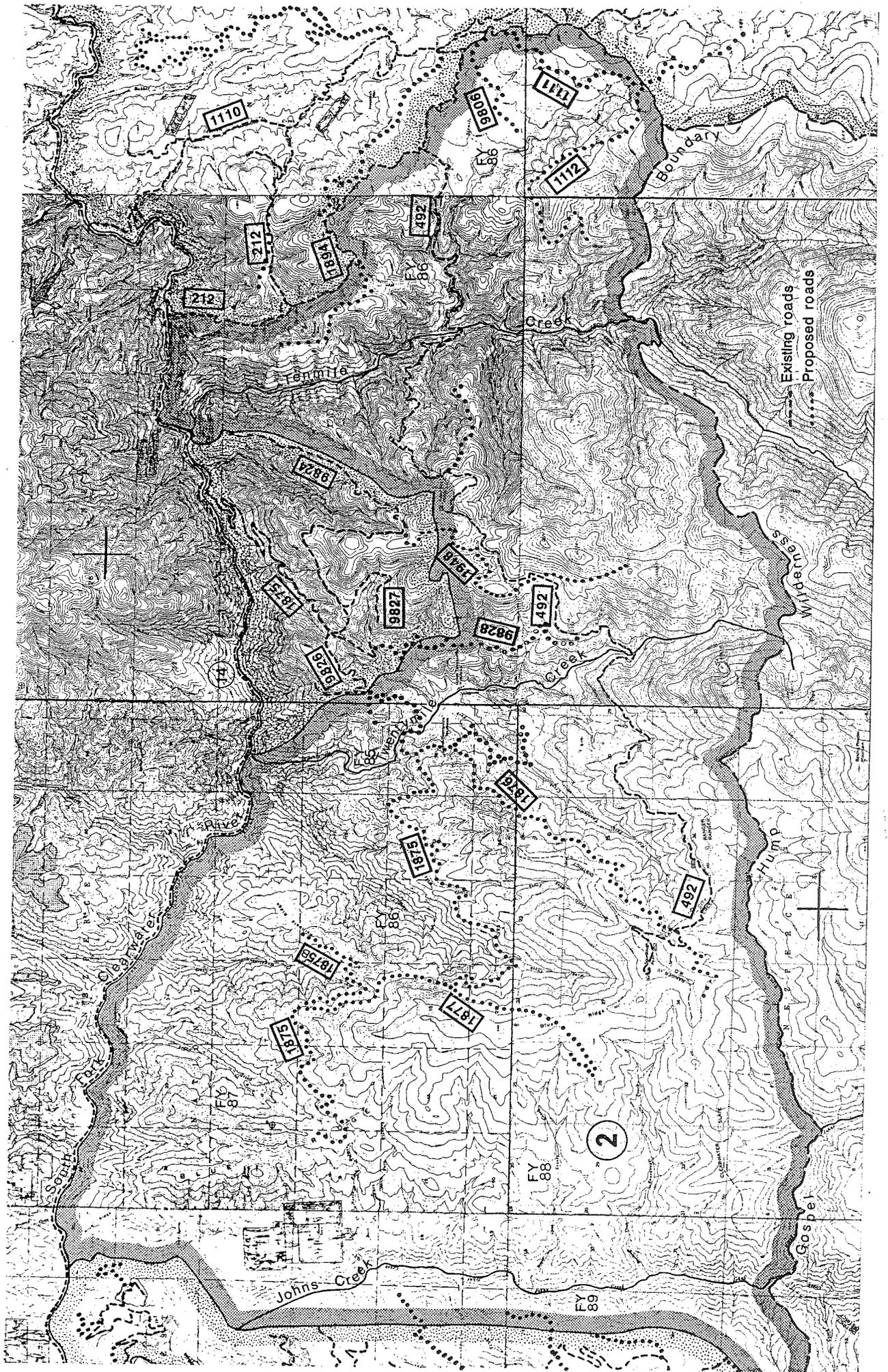
HIDGEL

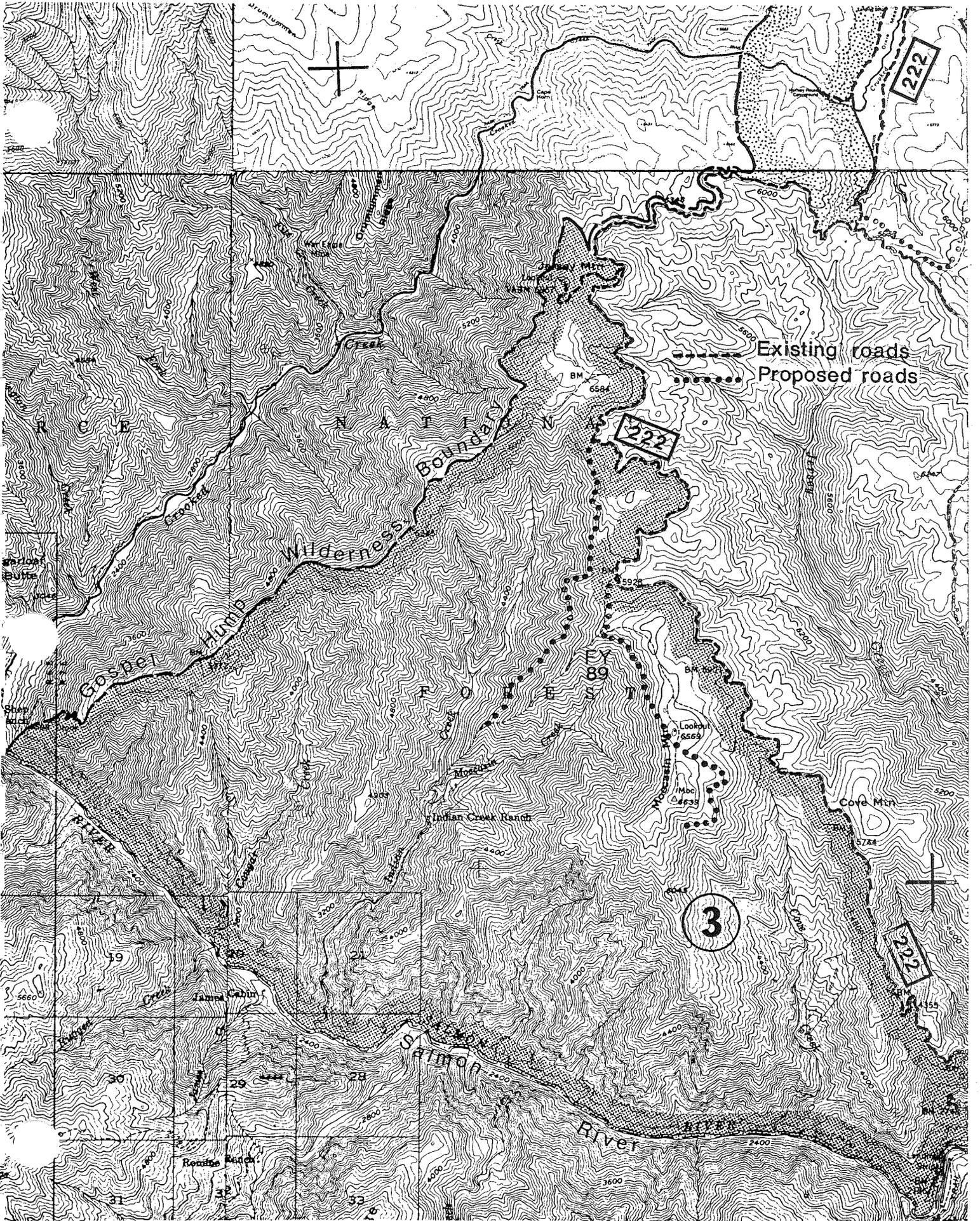
Sassaparilla

NEZPERE

Boundary







222

222

222

3

Existing roads
Proposed roads

WILDERNESS
BOUNDARY

Gaspereau
River

Indian Creek
Ranch

Lookout
6569

Mbc
4633

Cove Mt.
5724

Salmon
River

Jamae Cabin

Rouge Ranch

6442

3600

5200

4400

4800

5200

5600

6000

6400

6800

7200

7600

8000

6000

5600

5200

4800

4400

4000

3600

3200

2800

2400

2000

1600

Spring
Bulbs

Shady
Hill

Spring
Bulbs

Spring
Bulbs

Spring
Bulbs

Spring
Bulbs

Spring
Bulbs

Spring
Bulbs

f. Special Direction

(1) Transportation System

A gate will be installed for traffic control purposes (primarily to protect wildlife during calving or hunting seasons) at the Twentymile Creek-Rainy Day Creek saddle.

All construction of arterial or collector roads will adhere to a 1/4-mile-wide corridor as indicated by the road locations shown on the MRDP maps.

Roads accessing wilderness portals at Orogrande Summit, Sourdough, and Moore's Cabin will be kept open as weather permits. These roads, by name and number, are the Crooked River Road #233, Sourdough #492, and Gospel Road #444. Each will be bladed and drained at least once annually.

Once a connection is made by any one of the system roads between the Rainy Day bridge and the Sourdough wilderness portal, traffic could be routed over a much shorter distance. The decision to do this will not be made until the connection is complete, public involvement on the subject is held, and other trade-offs are considered.

All other roads will be maintained as conditions demand, and managed so as to maintain an open road density of 1 mile per square mile. The details of road closures will be reconsidered annually in the Travel Plan, but the objective will always be to have not more than 1 mile per square mile open (a severe impact to elk habitat appears with open road densities higher than this) when considered on a prescription watershed basis.

The Johns Creek trail will be maintained and kept open for early spring and summer recreation use.

(2) Recreation

A wilderness portal with parking, camping, and sanitary facilities will be developed at Tenmile Creek as soon as appropriations permit.

Another wilderness portal will be improved and maintained at Sourdough Saddle.

A wilderness portal with information, stock handling, and toilet facilities will be maintained at Orogrande Summit.

(3) Winter Game Range Rehabilitation

Approximately 4,000 acres of elk-deer winter range is losing its forage because of succession. Where economics permit, this range will be rehabilitated by timber harvest and burning. However, from 100 to 200 acres will be programmed annually during the first 2 decades and where timber harvest is not feasible, prescribed fire will be used.

On a willing-seller basis, and as appropriations will allow, the homesteads at Gilmore Ranch on Johns Creek in Sections 6 and 7 of T28N, R5E, the Indian Creek property in Section 15, T24N,

R7E, and on Cove Creek in Sections 19 and 30, T24N, R8E will be purchased. These homesteads are in the center of important key winter range for elk and deer, and for bighorn sheep on the Indian Creek property. Should subdivision ever occur on these properties, the effect on wildlife would be beyond proportion to the acres involved. Scenic easements or land exchanges are suitable substitutes for full purchase.

g. Monitoring and Evaluation

The purpose of monitoring and evaluating this plan is to provide the decisionmaker and the public information on the progress and results of implementing this plan. This will be the management control system. The monitoring will be on a total Forest basis and not limited just to the Gospel-Hump MRDP area.

Monitoring and evaluation entails comparing the end results being achieved to those projected in the plan. Costs, outputs, and environmental effects both experienced and projected will be considered.

To do this, a comparison will be made of overall progress in implementing the plan as well as whether the overall relationships on which the plan is based have changed over time. When changes occur, they will be evaluated as to their significance, and appropriate amendments or revision made.

The goals of monitoring are to determine:

- if planned goals and objectives are being met.
- if planned programs and activities are resolving public issues and management concerns;
- if the effects of implementing the plan are occurring as predicted;
- if the dollar and manpower costs of implementing the plan are as predicted; and
- if policies, standards, and guidelines are being followed.

When monitoring results are reported, their significance will be evaluated through the following Decision Flow Diagram. As indicated in the diagram, the results of this evaluation lead to decisions on further action of the following types:

- referring problem to the appropriate line officer for improvement of management practice application;
- modifying the management practice as a plan amendment;
- revising the schedule of outputs;
- revising the cost/unit output; or
- initiating revision of the plan.

The document resulting from the use of the Decision Flow Diagram constitutes the evaluation report. As applicable, the following will be included in each evaluation report:

- a quantitative estimate of performance comparing outputs and services with those projected by the plan;
- documentation of measured effects, including any change in productivity of the land;

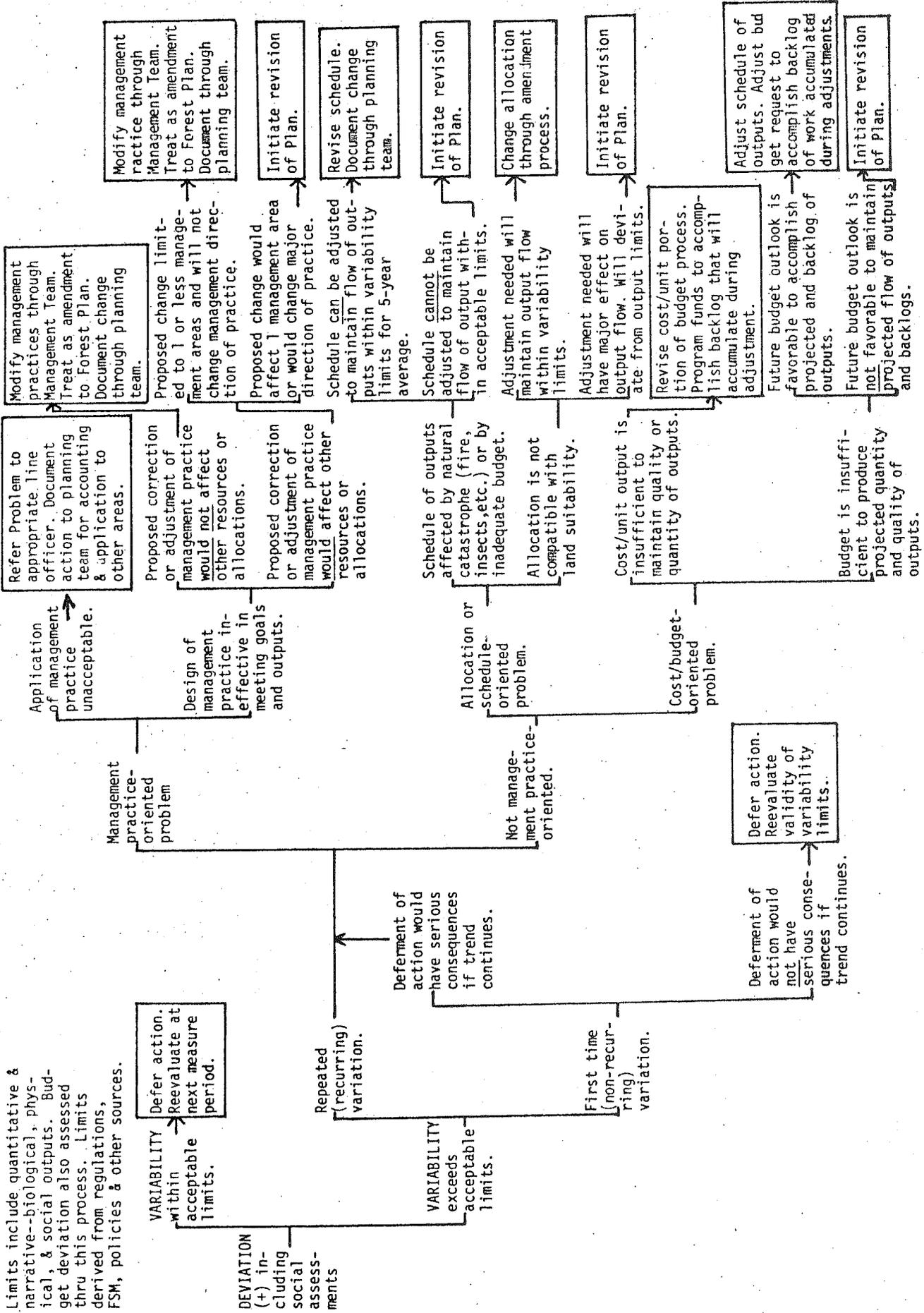
--recommendations for changes;

--a list of needs for continuing evaluation of management systems and for alternative methods of management; and

--unit costs associated with carrying out the planned activities as compared with unit costs estimated in the plan.

Results of the monitoring in this plan may heighten awareness of land management or resource interactions which would initiate additional monitoring needs.

DECISION FLOW DIAGRAM FOR EVALUATING VARIABILITY OF MONITORED ACTIVITIES



MONITORING PLAN

Resource Element	Standards, Guidelines, Practices, Outputs, or Effects to be Monitored	Data Source	Location	Frequency	Precision	Responsibility	Reliability	Increased Cost (5-Year Period)	Acceptable Deviation Limits
Soils	Compliance with standards and guidelines	Field evaluation of effects of management practices	Forest-wide; 7 activity areas	Annually	M	Planning Staff	M	\$ 16,100	-20%
Water	Sediment mitigation measures and BMP's for effectiveness and compliance	Adm. Reviews by ID Team	Forest-wide	Annually; 3 projects per year	M	"	H	No increase	Acceptable results of ID Team review
Water	Compliance w/existing State & Federal Water Quality Standards	Flow measurements and water quality characteristic sampling of selected, representative streams.	"	Annually; 14-25 per year (depending on purpose)	M	"	M-H	\$41,000	State & Federal Water Quality Standards not exceeded
Water	Management activities in riparian areas for compliance w/standards, guidelines, and prescriptions.	Adm. Reviews by ID Team	"	Annually; 3 projects per year	M	"	H	No increase	Acceptable results of ID Team review
Water	Programmed soil and water resource improvement acres	Management Attainment Report	"	Annually	H	"	H	"	+/- 10% of programmed outputs
Water	Management effects on stream sedimentation and fisheries habitat	Flow measurements, sediment sampling, and stream cross-sections of selected, representative streams	"	Annually; 22 stations per year; 4 stations per District; 8-10 cross-sections/year	M	"	M	\$82,000	Can vary from +/-5% to +/- 40% depending on drainage
Water	Fishery and water quality drainage objectives	Environmental Assessments (EA's) and Sediment Prediction Model outputs	Key fish drainages	Annually	H	"	H	No increase	Meets or exceeds objectives by drainage
Fisheries	Fish/watershed objectives by drainage. Measure fish habitat quality & quantity, population trends of indicator species.	Fish habitat surveys; fish density transects, inter-gravel environment and stream channel stability	22 stations; key fish drainages	Annually where disturbance has occurred	M	Wildlife & Fishery Staff	M	\$175,000	Decline in habitat quality of no more than 5% of stated objective
Fisheries	Monitor projected habitat improvement and maintenance outputs	Management Attainment Reports; Annual Wildlife Reports	Forest-wide	Annually	H	"	H	No increase	+/- 10% of programmed outputs
Fisheries	Effects of specific management practices on aquatic environment	EA's; field reviews & habitat surveys	"	Annually; 10% sample	M	"	M	\$47,500	Decline in projected habitat quality for more than 1 year

MONITORING PLAN

Resource Element	Standards, Guidelines, Practices, Outputs, or Effects to be Monitored	Data Source	Location	Frequency	Precision	Responsibility	Reliability	Increased Cost (5-Year Period)	Acceptable Deviation Limits
Wildlife	Big game population estimates	Idaho Dept. Fish & Game	Forest winter ranges	Annually	M	Wildlife & Fishery Staff	M	No increase	+/- 15% change in estimate over 2-year period
Wildlife	Big game carrying capacity:								
	a. Wilderness winter range	Field surveys; fire records	Wildernesses	"	M	Distr. Rgrs; Wildlife & Fishery Staff	H	\$2200	+/- 20% predicted acres of winter range burned by wildfire
	b. Habitat improvement	Quarterly management attainment reports; annual wildlife report	Forest-wide	"	H	"	H	\$2200	Not less than 10% programed activities
	c. Winter range analysis	Field surveys; AMP's; timber stand data base	"	"	H	"	H	\$32,600	Greater than 25% error in production estimates
	d. Available forage for big game on winter ranges	AMP's; EA's; field surveys	"	"	H	"	H	No increase	More than 10% of winter ranges grazed by live-stock exceed utilization standards
	e. North Idaho Elk Habitat Coordinating Guidelines	EA's; timber sale project plans	"	"	M	"	H	No increase	More than 10% of EA's w/more than 10% decline from potential elk use
	f. Open road density	EA's; Forest Travel Plan; sample surveys	Roaded areas	"	M	Same as above w/Forest Engr.	M	No increase	Greater than 10% from planned objectives within prescription watersheds
Wildlife	Timber harvest on moose winter ranges	EA's; timber sale project plans	Forest-wide	"	H	Distr. Rgrs; Wildlife & Fishery Staff	H	No increase	More than 5% per project of inventoried winter range (Pacific yew stands) treated w/silvicultural prescriptions other than those developed for yew
Wildlife	Habitat for old-growth dependent species	EA's; research; field surveys; timber stand data base; System 2000 data	"	"	M	"	H	\$8500	No deviation from established guidelines for old-growth dependent species
Wildlife	Threatened and endangered species	EA's; field surveys; elk coordinating guidelines	"	"	M	"	H	\$2600	No decline in T&E habitat capability

MONITORING PLAN

Resource Element	Standards, Guidelines, Practices, Outputs, or Effects to be Monitored	Data Source	Location	Frequency	Precision	Responsibility	Reliability	Increased Cost (5-Year Period)	Acceptable Deviation Limits
Recreation	Comparison of actual use with Forest Plan projections	RIM reports; Forest Plan	Forest-wide	Annually	L	Rec. Staff	L	No increase	+/- 20% change for 5-year projections
Visual	VQO standards and guidelines in visual prescription	EA's; VQO maps; field surveys	Land-disturbing projects	"	M	"	M	No increase	Non-compliance with standards and guidelines on no more than one project per district per year
Range	Outputs from grazing allotments	AMP's and grazing permits	Forest-wide	"	H	Range Staff	H	No increase	Within +/-10% of target AUM's
Air	Air Quality Standards	None	Moose Creek RD	"	M	Dist. Ranger	M	\$500	Change does not exceed standards
Economics	Appropriated budget, by resource program element, as related to Forest objectives (outputs)	RO budget advice statement; PAMARS accomplishment review; 5-year outlook for funding	Forest-wide	"	H	Adm. Ofcr. & Planning Staff	H	No increase	Appropriated budget is commensurate with targets assigned
Economics	Economic assumptions on unit costs and revenues, supply and demand functions, economic resource benefits	Timber appraisals; contracts; AMP's; RIM; PARD; PAMARS; capital investment requests; GA costs; independent research	"	"	M	Planning Staff	M	No increase	Data is suitable for application to project-level activities
Socio-Economics	Social indices defined in Forest Plan	Interviews; news clippings, correspondence	Local influence zone	Every 5 years	M	"	M	\$1,000	No decline from current social indices ratings
Timber	Regulated volume offered for sale	5- & 10-year sale program; Quarterly Cut & Sell Report; Accomplishment Reports; Timber Inventory Adjustment Reports; TM Information System	Forest-wide	Annually	H	Timber Staff & Adm. Ofcr.	H	No increase	+/-10% from 5-year sale schedule
Timber	Acres of regulated harvest by harvest method, productivity class, condition class	Timber stand data base, timber inventory adjustment report, TM information system	"	"	H	Planning Staff	H	No increase	+/-10% of sale schedule

MONITORING PLAN

Resource Element	Standards, Guidelines, Practices, Outputs, or Effects to be Monitored	Data Source	Location	Frequency	Precision	Responsibility	Reliability	Increased Cost (5-Year Period)	Acceptable Deviation Limits
Timber	Silvicultural Practices; Examination & Prescription								
	a. Size of opening	Timber Stand Data Base (T.S.D.B.); EA's	Forest-wide	Annually	H	Timber Staff	H	No increase	No deviation from regional guidelines w/o required approval Professional judgment
	b. Prescription implementation	T.S.D.B. & sale reviews	"	"	H	"	H	No increase	
	c. Regeneration period	T.S.D.B.	"	"	H	"	H	No increase	Not to exceed 5 years or as in prescription
	d. Reforestation & timber stand improvement	T.S.D.B.	"	"	H	"	H	No increase	+/-10% of planned levels
Timber	Unsuitable lands - check to T.M. information assure prohibited activities system; timber are not practiced	inventory adjustment	"	"	H	Planning Staff	H	No increase	No prohibited activities on unsuitable lands
Timber	Regulated timber base-- suitable lands	Timber mgmt. information system	"	Every 5 years	H	"	H	No increase	+/-5% change in suitable acres in 5-year period
Timber	Insect & disease activity	Forest insect & disease mgmt. annual report	"	Annually	H	Timber Staff	H	No increase	No significant increase in insect & disease activity
Wilderness	Manage wilderness according to prescribed levels of management	Project Work Plans	Forest-wide	Annually	M	District Rgr.	M	No increase	No deviation from prescribed levels
Wild & Scenic Rivers	Development of River Management Plans and compliance with direction in them	EA's; field review	Forest-wide	Annually	H	Rec. Staff	H	No increase	Plans developed as scheduled; all activities meet direction.
W&SR	Meet VOO assignments with all project activities	Landscape Mgmt. Plan; field review	"	"	M	"	M	No increase	Meets or exceeds objective
W&SR	Scenic Easement compliance	Administrative Plans; field review	"	"	H	Lands Staff	H	No increase	Meets or exceeds direction in Scenic Easement
W&SR	Number of outfitter permits	Proposed Wild River Management Plan	Salmon River	"	H	Rec Staff	H	No increase	Not to exceed direction in River Mgmt. Plan.

3. Outputs and Effects

Table 1 illustrates the range, timber, elk, and recreation outputs by the preferred alternative through the first 5 decades.

Table 2 illustrates the stream habitat condition to be maintained and the type of fish use for all prescription watersheds that drain the MRDP area.

Table 1.--Annual Outputs

Decade	Range (AUM)	Timber (MMBF)	Elk (Animals)	Dispersed Recreation (MRVD)
1	215	6.3	2,508	1,163
2	222	8.0	2,543	1,279
3	222	12.3	2,562	1,331
4	222	10.3	2,535	1,377
5	222	6.8	2,544	1,462

Table 2.--Fishery Objectives in Terms of Percent of Total Potential for MRDP Area Streams

Watershed No.	Watershed Name	Habitat Potential Objective (Percent)	Fishery Type	
			Anadromous	Native
305-01-01	Lower Johns Creek	90	X	X
02	Middle Johns Creek	90	X	X
03	Frank Brown Creek	90	X	X
13	Trout Creek	70		X
15	American Creek	70		X
17	Deer Creek	60		X
305-02-13	Wing Creek	70		X
14	Huddleston Creek	60		X
15	Otter Creek	60		X
16	Unnammed	0		None
207-02-01	Vetter Creek	70		X
03	Big Creek	70		X
08	Upper Indian Creek	70		X
09	Moccasin Creek	70		X
10	Unnamed	40		X
11	Unnamed	40		X
12	Lower Indian	70		X
13	Cougar Creek	40		X
14	Rattlesnake Creek	0		None
32	McGuire Creek	70		X
207-03-22	Jersey Creek	90	X	X
23	Cove Creek	60		X
305-02-03	Lower Tenmile Creek	80	X	X
04	Buckhorn Creek	50		X
06	Sixmile Creek	70	X	X
09	Upper Twentymile	80		X
10	Morgan Creek	90	X	X
11	Lower Twentymile	80		X
12	West Fork Twentymile	80		X
305-03-05	Upper Crooked River	70	X	X
06	West Fork Crooked River	70	X	X

4. Significant Activities in the First Decade

a. Timber Sales

The tables that follow illustrate the harvestable acres in the first decade by productivity class (PC), by District, and by management area. The second depicts the same acreage by year, by sale name, and by expected volume. Road construction to be amortized by and constructed for a given timber sale is also shown. Control will be by acreage assignments and volume figures can be expected to fluctuate.

Table 3.--Acres of Final Harvest - First Decade

GHMRDA	Management Area						Total
	12	13	15	16	17	18	
<u>D-4</u>							
PC-3	268	16		27	13		
PC-4	1035	50			34		
Total	1303	66		27	47		
<u>D-5</u>							
PC 5/6	82		150				219
Total	82		150				219
<u>D-8</u>							
PC-3	36				165		15
PC-4	377				112		
Total	413				277		15
<u>Grand Total</u>							
PC-3	304	16		27	178	15	540
PC-4	1412	50			146		1608
PC-5/6	82		150			219	451
Total	1798	66	150	27	324	234	2599

Table 4.--Acres of Final Harvest by Timber Sale & Expected Volume

<u>Year</u>	<u>Sale Name</u>	<u>Total Volume</u>	<u>Acres</u>	<u>Miles of Local Road</u>
1985	Twentymile (D-8)	3.4 MMBF	120	0.0
1986	Four/Sixmile (D-8)	10.0 MMBF	417	6.0
1986	Wing Creek (D-4)	20.0 MMBF	900	6.0
1987	Blue Otter (D-4)	8.0 MMBF	243	6.0
1988	Snoose Basin (D-4)	8.0 MMBF	300	3.0
1988	Crooked River-Divide (D-8)	5.0 MMBF	168	5.0
1989	Cove Mountain (D-5)	4.8 MMBF	451	3.0
	Totals	59.2 MMBF	2,599	29.0

b. Road Construction by Contract

Table 5.--Contract Road Construction

<u>Fiscal Year</u>	<u>Road Name</u>	<u>Sales Accessed</u>	<u>Miles</u>	<u>Cost</u>
1984	Blue Ridge Extension	Twentymile, Wing Creek, Blue Otter	13.0	\$910,000
1985	Sixmile	Four/Sixmile	3.0	\$140,000
1987	Blue Ridge Ext. #2	Snoose Basin	6.0	\$420,000
			<u>22.0</u>	

c. Total Miles of Access Road Construction

Table 6.--Total Road Construction

<u>Fiscal Year</u>	<u>Road Miles</u>
1984	13.0
1985	3.0
1986	12.0
1987	12.0
1988	8.0
1989	3.0
Total	<u>51.0</u>

d. Winter Game Range Rehabilitation

(1) An average of 100 acres will be burned annually on the elk winter range in the Tenmile-Buckhorn Creek area for the first decade.

(2) An average of 260 acres will be burned annually on the elk-bighorn winter range on the Salmon River face below Moccasin Mountain for the first decade.

III. RESEARCH

A. OBJECTIVES

Objectives of the research program were as follow:

1. To determine the status of the fisheries resource in the Gospel-Hump area (including water quality relationships).

a. Determine the location and standing crop of resident fisheries.

b. Determine the location and standing crop of anadromous fisheries.

2. To determine the status, distribution, movement, and management of game populations in the Gospel-Hump area.

a. Instrument and monitor elk and moose.

b. Conduct aerial surveys of elk and moose.

c. Provide information from available data relative to habitat requirements of Rocky Mountain elk.

3. To provide findings and recommendations concerning integration of land management with protection and enhancement of the fish resource.

a. Measure the natural bedload sediment production and delivery efficiency of streams in the Gospel-Hump area.

b. Measure relative increases in erosion following disturbance on representative sites.

c. Evaluate the effects of land management on stream sedimentation.

d. Determine the effects of sediment scouring or deposition in streams on survival from fish egg to emergent alevin, and on juvenile and adult fish numbers.

4. To provide findings and recommendations concerning integration of land management with protection of the game resources.

a. Determine the relationships between elk or moose home range size and habitat requirements.

b. Determine relationships between moose and pacific yew.

c. Determine effects of land management on the ecology of pacific yew.

d. Evaluate the effects of land management on the status of elk and moose.

B. DESCRIPTION OF RESEARCH STUDIES

Five separate but integral projects were conducted between February 1978 and April 1982 to study the interactions between fish and game resources and proposed Nezperce Forest land management activities. (Each of the studies listed below is being published separately by the Intermountain Forest and Range Experiment Station.)

1. A fishery study was conducted by University of Idaho researchers to evaluate potential production of fish in Gospel-Hump streams, and how fish habitat and productivity would be affected by changes in stream sedimentation.

2. A watershed-hydrologic model was developed by researchers at Colorado State University to be used to simulate streamflow and sediment production in Gospel-Hump management area streams.

3. A watershed-soils study was conducted jointly by researchers at the University of Idaho and the Intermountain Station, Moscow, to determine on-site erosion and rates of sediment production on natural sites, and following timber harvest activities.

4. A wildlife study at the University of Idaho evaluated the status of elk and moose in the Gospel-Hump, and how management activities would affect elk or moose habitat relationships and numbers.

5. A study was conducted at the Intermountain Station, Moscow, to enable proposed timber management activities to be translated into changes in vegetation cover for input to the watershed and game response models.

C. RESEARCH APPROACH

The research program was designed to meet the defined objectives by following three main approaches: develop estimation procedures, inventory the resources, and integrate the results.

Procedures for estimating the responses of timber, water, fisheries, and game resources to management were developed in the form of five separate resource response models. The models were used to evaluate the interactions between forest resources and timber management activities in the MRDA. The first is a vegetation model which can predict volumes and productivity of timber through time, given different management situations. It provides the major link between proposed management activities and the watershed and wildlife models by estimating changes in forest cover. The second is a stream-hydrologic model which simulates streamflow and sediment transport in Gospel-Hump streams. The third, a watershed-soils model, predicts the important natural and post-harvest land and streambed sediment properties needed to drive the hydrologic model. The fourth, a fisheries model, uses the sediment output produced by the hydrologic model to simulate effects on fish productivity. Finally, the wildlife model uses the changes produced by proposed management activities, such as miles of roads and area harvested, and the changes in cover displayed by the vegetation model to predict long-term changes in elk and moose numbers, translated from changes in habitat quality.

Next was to ensure that adequate inventory data were available to apply these procedures in the development of the Multipurpose Resource Development Plan. The information collected about the various Gospel-Hump resources was used in several ways throughout the research program. First, in developing the response models, data was collected to establish the relationships between the resource of interest, its physical and biological environment, and its changes in response to a changing environment. An example would be to define the relationship between elk habitat characteristics and elk numbers. Second, inventory data was needed to establish starting values for projections made by the response models. Third, data collected on the Gospel-Hump fisheries and game resources was incorporated into yield estimates used in the overall forest planning model (FORPLAN). Finally, inventory data were used in the calibration and validation of the prediction models. In all the separate studies, the inventory tied in with the existing Nezperce Forest data base through a computer mapping system used to spatially represent landform and vegetation type characteristics.

The third step was to integrate the predictive procedures for each of the resources so that tradeoffs between conflicting uses can be displayed. There were several requirements for accomplishing this integration. First, the outputs for which predictions are needed must be specified in terms of their units, time span, and resolution. In this case, the outputs are those which will be affected by the FORPLAN alternative activities scheduling model (sediment yield in tons per acre per year, for example). Second, the separate models must be linked compatibly, by making sure that the inputs needed by one model are supplied by the outputs of a previous model in the same units and resolution in time and space. Finally, inputs not satisfied by outputs from a previous model must be obtained from inventory procedures or from outside research.

Model and Inventory Integration is shown in Figure 1. The separate models are listed down one side and also across the top. Individual cells represent passage of information from a model along the left-hand side to each model across the top. Cells along the diagonal represent the inputs to each model supplied by data collection, or in other words the starting values used in the predictions. Finally, outputs resulting from interactions of the separate resources as predicted by the system of models, and representing information consistent with the FORPLAN activity scheduler, are displayed in the far right-hand column.

GOSPEL-HUMP ECOSYSTEM COMPONENTS (INTERACTIONS IN TIME AND SPACE)

From	VEGETATION	WATERSHED	SOILS	FISHERIES	WILDLIFE	INDICATOR VARIABLES
VEGETATION	<p>PROGNOSIS MODEL (INT)</p> <ul style="list-style-type: none"> Crown Models Shrub Production Models Inventory Management Prescriptions 	<ul style="list-style-type: none"> Canopy Cover Potential Canopy Storage Ground Cover Evapotranspiration 	<ul style="list-style-type: none"> Canopy Cover Ground Cover Location & Miles of Road Constructed 		<ul style="list-style-type: none"> Canopy Cover Ground Cover Forage Production Stand Foliage Profile Location & Miles of Road Constructed, Area Clearcut 	Timber Yield
WATERSHED		<p>SMOUSED MODEL</p> <ul style="list-style-type: none"> Simons, Li, Ward, Combs (CSU) Inventory Weather Data Watershed Geometry (WRIS) Sediment Production, Transport, Deposition 		<p>Sediment Yield by Size Fractions</p> <p>Changes in Stream Bed Elevation</p> <p>Cobble Embeddedness</p>		Tons of Sediment Stream Discharge
SOILS		<p>Sediment Particle Size Distribution</p>	<p>EROSION MODEL</p> <ul style="list-style-type: none"> McMurtry (UI) Inventory Weather Data Landform Mapping (WRIS) Volumes of On-Site Erosion, Bedload Sediment 			
FISHERIES				<p>FISHERIES MODEL</p> <ul style="list-style-type: none"> Shepard, Bjornn (UI) Inventory Changes in Habitat and Anadromous & Resident Fish Numbers 		<p>Change in Anadromous Fish Productivity in 5th Order Streams</p> <p>Change in Standing Crop of Resident Fish</p>
WILDLIFE					<p>WILDLIFE MODEL</p> <ul style="list-style-type: none"> Nelson, Peek (UI) Inventory Map Data (WRIS) Home Range Size Migration Patterns 	<p>Changes in Big Game Habitat, Numbers, & Migration Patterns</p>

Figure 1. Gospel-Hump interaction matrix, showing the integration of inventory, models and resources.

D. RESULTS

Results from the research model runs follow, and are broken down by wildlife, watershed, and fish.

All alternatives were not modeled. In the wildlife model, alternative H and its departures were not run, as they did not exist at that stage. Alternative H was developed from alternative E, and the wildlife treatment was so similar that another run was not justified although full comparisons were made of all alternatives in the FORPLAN model and can be seen in appendix C. Watershed and fish models took only the worst case alternatives and compared them to the no-action alternative. Because the SNOWSED model proved to be undependable, however, decisions based on watershed and fish outputs were made with the Nezperce NF model (see appendix C). The watershed and fish predictions which follow are merely part of the record, and were not used in the decisionmaking process.

1. Wildlife (2)

The processing of each management emphasis alternative for the first decade involved four steps: (1) the acres of each stand cut within each use area were determined; (2) the miles of new collector and local roads planned for each use area were determined; (3) data from items 1 and 2 were used as input for the habitat quality model; and (4) the results of the habitat quality model were interpreted and recommendations for the preferred alternative formulated.

The first decade impacts of each of the management emphasis alternatives on the quality of elk and moose habitat on the management area along the South Fork of the Clearwater River are listed in tables 7 and 8. In these single decade runs, all roads which are currently in place in the management area were assumed to be open. The detrimental impact of open roads on elk habitat quality is apparent. There is no improvement in elk habitat quality if roads are left open. However, if roads are closed, the habitat quality is related to the amount of foraging areas provided by timber cutting. Moose summer range is enhanced by the additional foraging areas provided by timber activities. Moose winter range is adversely affected by timber cutting in old-growth stands. The cumulative effects of several decades of cutting on moose winter range depends on the specific silvicultural practices employed. If Pacific yew can be retained in the stand, this decline will be reversed in 80 to 100 years. If Pacific yew is not retained, the decline in quality of moose winter range will continue.

The impacts of 5 decades of each management alternative are illustrated in figures 2 to 4 for elk winter range and figures 5 to 7 for elk summer range habitat quality. In the 5 decade runs, all roads (both existing and planned) are evaluated under the three road conditions (open, local roads closed, all roads closed). The over-riding influences of open roads on elk habitat quality are readily apparent. All alternatives show declining habitat quality if roads are open and an improvement in habitat quality if roads are closed.

The road management policy has the greatest impact on elk habitat quality. If all roads are open, no action is best.

Moose summer habitat quality is improved by providing more foraging areas through timber harvest. The effect of timber harvest on moose winter range depends on the silvicultural practice selected and the type of stand cut.

With all roads closed, alternative G is best in summer and alternative E is best in winter. With only collector roads open, alternative E is best in winter, and alternative B is best in summer. The major effect is the road management policy, not the timber harvest intensity. Harvest with road closures will improve winter range and reduce negative impacts on summer range.

Table 7.-- Habitat Use Indices by Alternative for Elk and Moose in the MRDP Area along the South Fork Clearwater River at the End of the First Decade.*(Habitat Use Index is the predicted quality of habitat expressed as a percentage of current habitat quality.)

Management Alternative	Elk		Moose	
	Winter	Summer	Winter	Summer
Current Conditions	100	100	100	100
Base Run (Alternative B)	95	99	99	103
Alternative A				
- All Roads Open	81	85	95	100
- New Collectors Open	89	90	95	100
- All New Roads Closed	100	94	95	100
Alternative G				
- All Roads Open	92	90	93	100
- New Collectors Open	92	97	93	100
- All New Roads Closed	102	100	93	100
Alternative D				
- All Roads Open	91	92	95	103
- New Collectors Open	91	96	95	103
- All New Roads Closed	100	98	95	103
Alternative C				
- All Roads Open	91	89	98	103
- New Collectors Open	95	94	98	103
- All New Roads Closed	100	97	98	103
Alternative E				
- All Roads Open	87	85	94	103
- New Collectors Open	101	91	94	103
- All New Roads Closed	107	97	94	103

*This calculation assumed that existing roads would always be open. This agrees with the figures only for the "Roads Open" category.

Annual

Table Theoretical/Carrying Capacities for Elk and Moose in the
MRDP Area along the South Fork of the Clearwater River
at the End of the First Decade (assuming that all existing
roads will stay open)

Management Alternative	Elk		Moose	
	Winter	Summer	Winter	Summer
Current Conditions	143.00	1000.00	85.00	85.00
Base Run (Alternative B)	134.06	979.07	70.06	77.55
Alternative A				
- All Roads Open	109.02	686.04	49.35	63.78
- New Collectors Open	123.33	790.69	57.00	71.42
- All New Roads Closed	143.00	874.42	61.37	75.79
Alternative G				
- All Roads Open	128.69	760.69	43.30	63.49
- New Collectors Open	128.69	937.21	51.40	71.59
- All New Roads Closed	159.64	1000.00	55.60	75.79
Alternative D				
- All Roads Open	126.90	832.55	52.02	71.05
- New Collectors Open	126.90	916.28	56.19	75.23
- All New Roads Closed	143.00	958.14	61.37	80.40
Alternative C				
- All Roads Open	126.90	769.76	63.70	74.08
- New Collectors Open	135.06	874.42	66.70	77.07
- All New Roads Closed	143.00	937.21	70.02	80.40
Alternative E				
- All Roads Open	119.75	686.04	43.23	65.15
- New Collectors Open	151.32	811.62	53.43	75.35
- All New Roads Closed	201.22	937.21	58.48	80.40

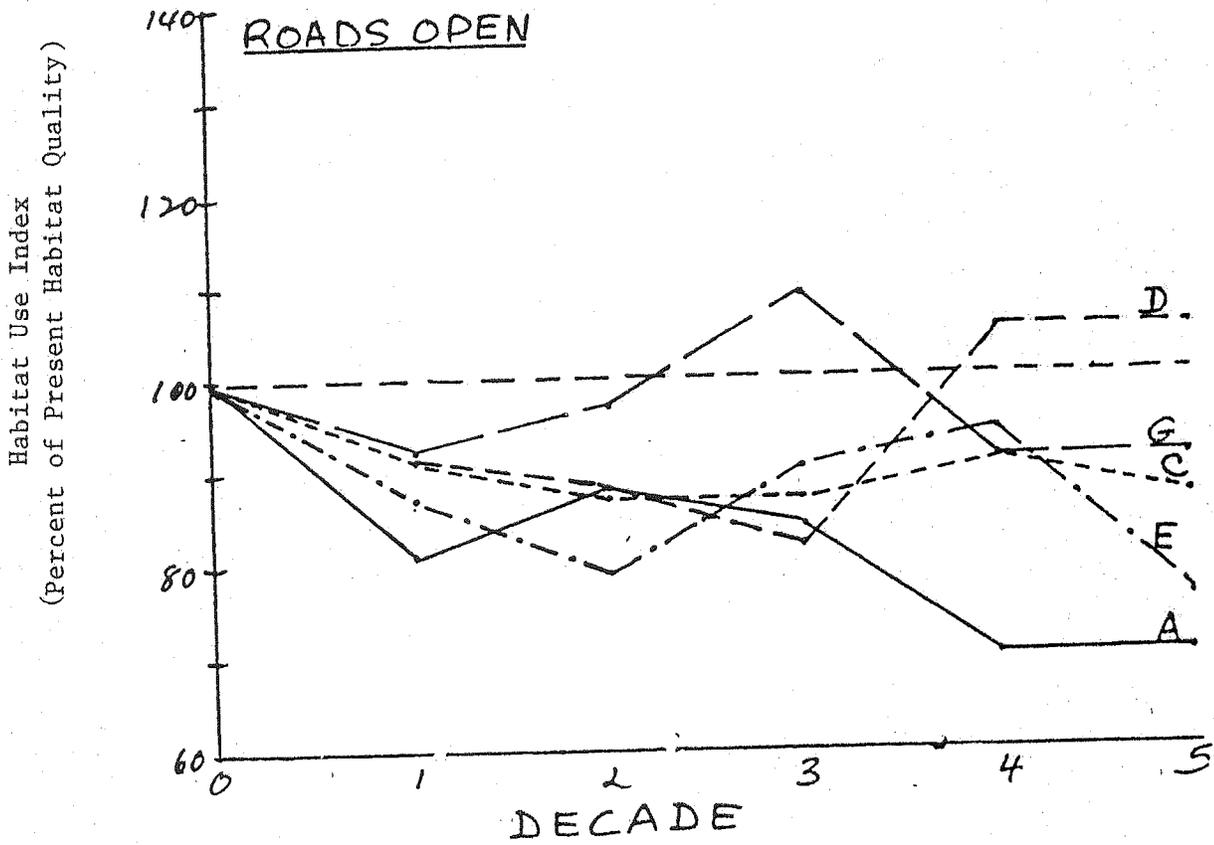


Figure 2 . Elk winter range habitat quality in the management area along the South Fork of the Clearwater River. All roads are assumed to be open. (including existing roads).

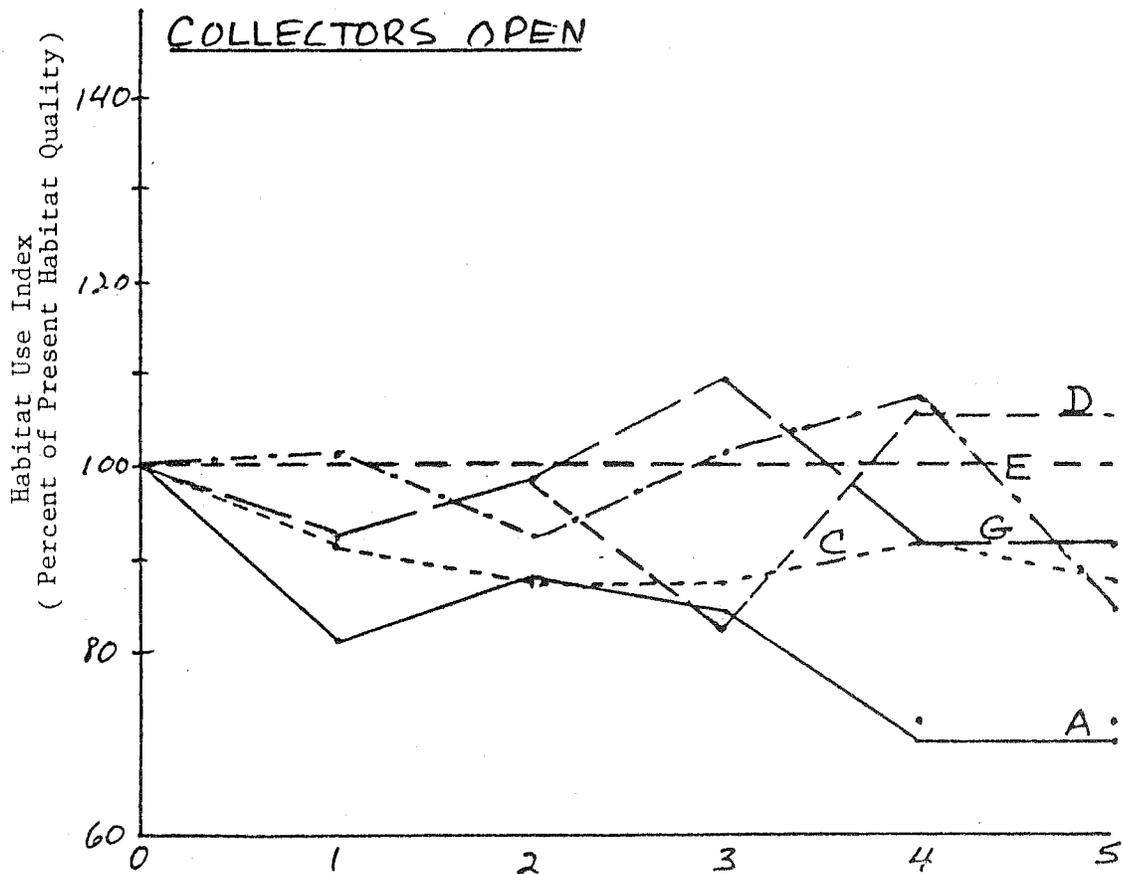


Figure 3 . Elk winter range habitat quality in the management area along the South Fork of the Clearwater River. Only collector roads are assumed to be open.

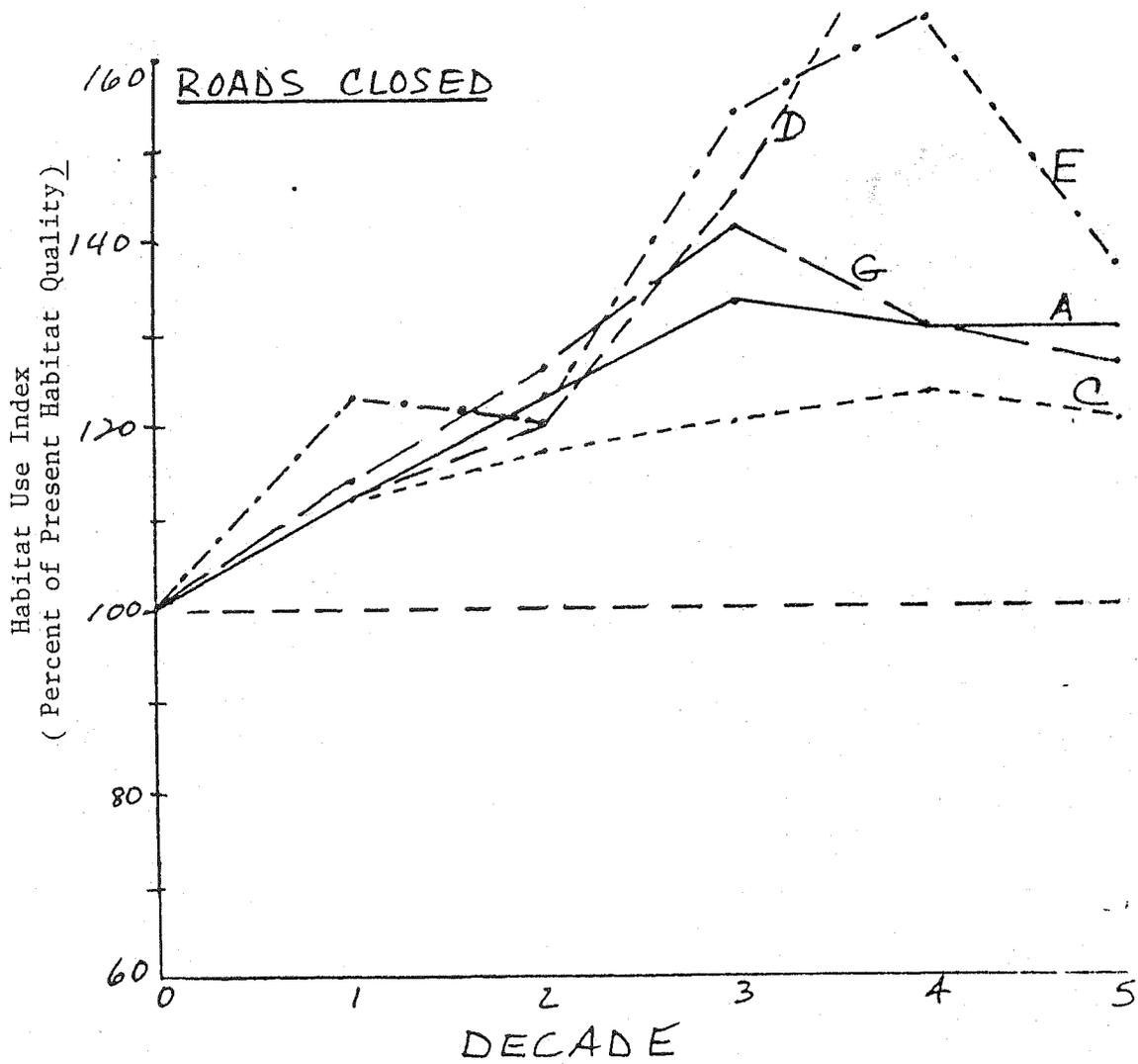


Figure 4. Elk winter range habitat quality in the management area along the South Fork of the Clearwater River. All roads are assumed to be closed (including existing roads).

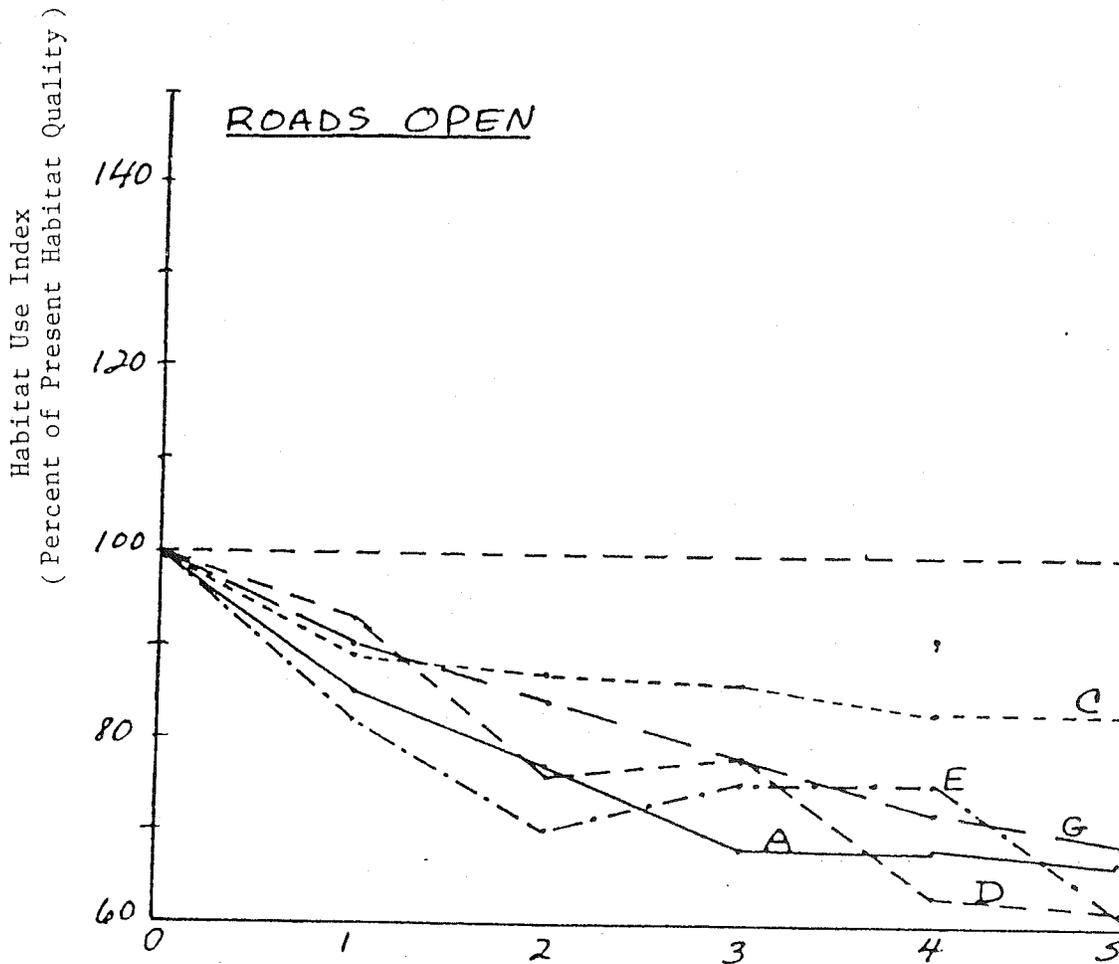


Figure 5. Elk summer range habitat quality in the management area along the South Fork of the Clearwater River. All roads are assumed to be open, including the existing.

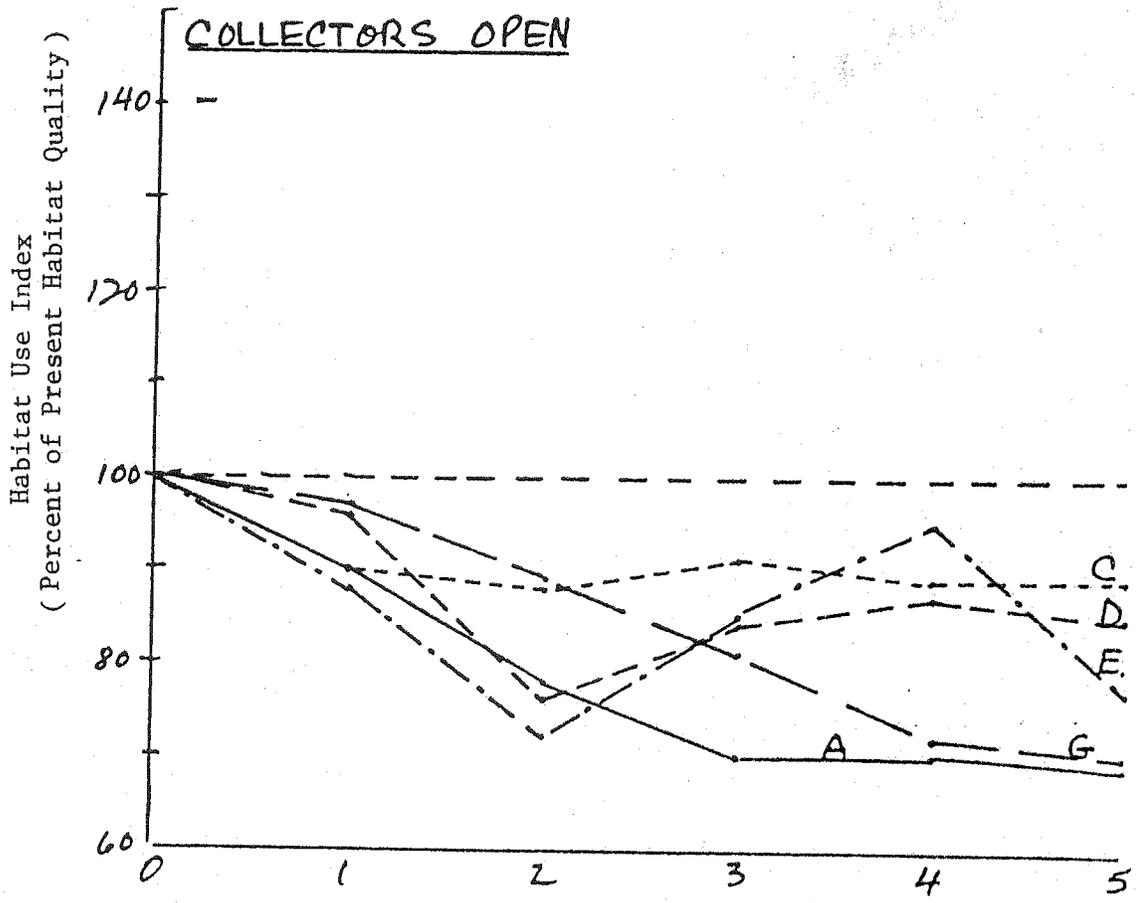


Figure 6. Elk summer range habitat quality in the management area along the South Fork of the Clearwater River. Only collector roads are assumed to be open.

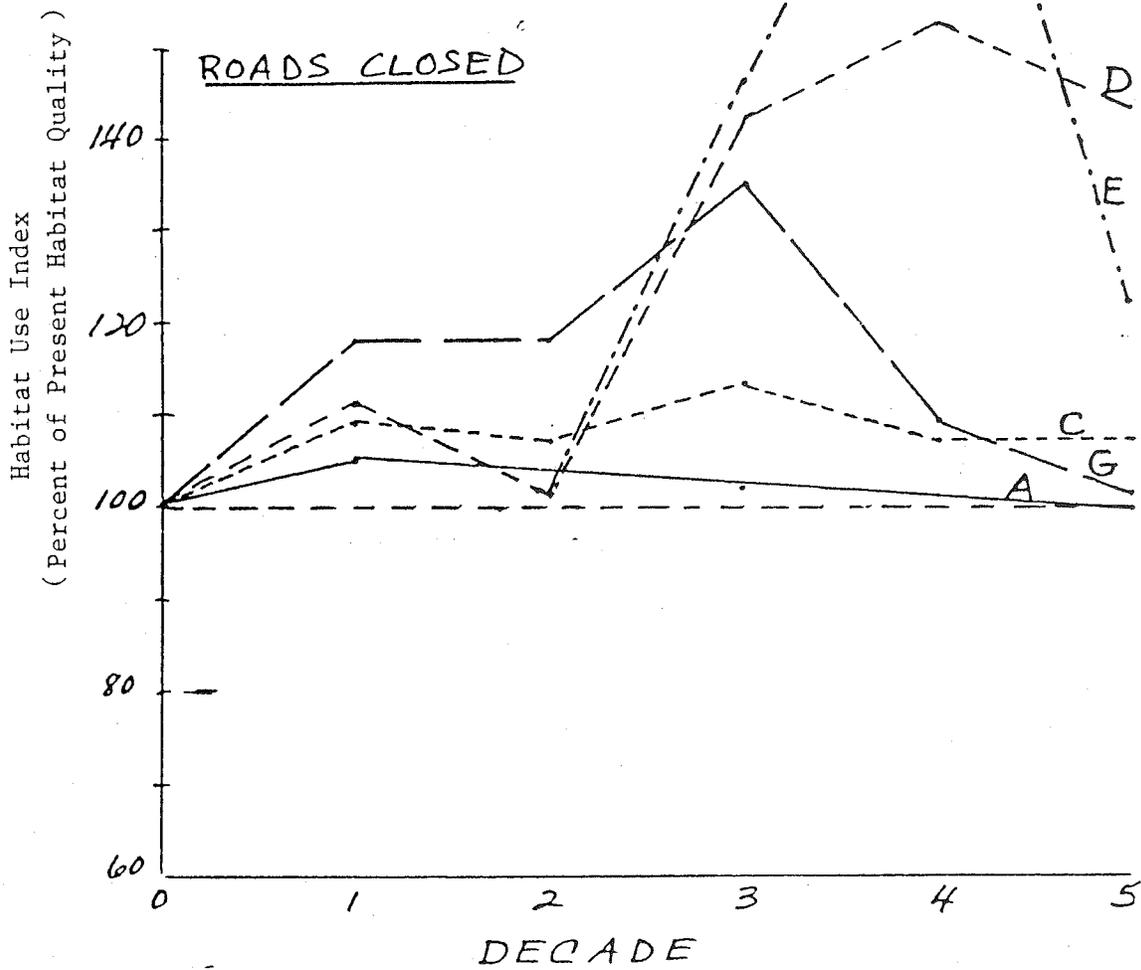


Figure 7. Elk summer range habitat quality in the management area along the South Fork of the Clearwater River. All roads are assumed to be closed, including existing ones.

2. Watershed

The simulation of the Gospel-Hump activities was the first time the SNOWSED watershed model had been used, and this application took place without prior extensive testing. Due to time limitations, the majority of the effort was in model development rather than application. Inevitably, certain deficiencies exist in the SNOWSED model, both in the model formulation and its application, which make the reliability of its results questionable at best. It is necessary to outline several major problems so that they may be kept in mind when reviewing the predictions of sediment and fish production for the Gospel-Hump alternatives.

First, the model does not allow for prediction of landslides and other mass-wasting events under natural or managed situations. The surface routing procedure does not allow for the concentration of surface runoff in draws, ephemeral streams, etc. Surface runoff and the erosion it generates are carried uniformly over the entire plane. This greatly affects the amount and sizes of particles carried to the stream. In particular, the model has a tendency to transport small particle sizes off the planes, which are easily transported through the channel system.

Since most first and second order streams are not modeled as channels, it was necessary to "force" surface runoff to occur on the planes to carry sediment to the main stream channels. Sediment field data from Horse Creek was used to aid in this application for an average water year. Extensive calibration with these data was not done prior to extrapolation to the Gospel-Hump area. Additionally, forcing the model to generate surface runoff on the planes created abnormal streamflow responses. We suspect the resulting flashiness, in which sediment input from surface planes is coupled with a large runoff spike, causes the channel to clean itself. In other words, fine sediment is being flushed out of the main channel during the same periods that surface erosion of particles into the channel is occurring. This is a most critical deficiency in the linkage of the watershed model to the fish model, which relies on accurate predictions of particle size distribution in the channel.

The area of disturbance of roads used in the model was slightly less than actual, and the mitigation measures applied to the roads were assumed to occur at time 0 in the simulation. Thus, there was no estimate of sediment produced during construction and before the mitigation treatments take effect, causing sediment production to be lower than that which could be expected.

The channel bottom particle size distribution is assumed to be uniform throughout the channel. Likewise, any deposition or scour of material affects only the average particle size distribution. Local alterations of bottom materials, which may be very important in governing fisheries habitats, are not modeled.

This program cannot currently model a pool environment. Since the fisheries biologists identify the overwinter pool environment as a factor limiting fish populations, this model deficiency is critical.

A channel segment can be described by only one cross section. This results in loss of resolution and creates a problem in selecting "representative" cross-sections for critical fishery reaches.

The subprogram to distribute aggradation and degradation across a channel never ran correctly and was abandoned. Without it, critical fishery reach cross-sections could not be updated from one year to the next within the simulation. If a channel was significantly aggraded or scoured during a run, the sediment transport properties could no longer be considered realistic.

The above tends to focus on the deficiencies in the SNOWSED model or in application of the model. The intent, however, is not to minimize the value of this model or large simulation models in general. Given the specificity of data required on channel conditions (both by habitat type and season) to make appropriate links to fisheries models, physical process modeling has a great deal of promise. However, no model, including SNOWSED, should be used for planning purposes without considerable testing and calibration. Given the present state of the watershed model and the detailed data required for linkage to the fisheries model, additional effort is needed in model refinement and application before reliable alternative comparisons can be made. This includes calibration of the model components with existing data from monitored watersheds; the collection of additional data, especially channel data, for calibration purposes; and an extensive testing phase on a variety of situations.

For the reasons cited, the Nezperce National Forest has not relied upon the SNOWSED data. It is presented here only to show the current extent of the research.

The Forest did use all the field data collected by this watershed and fish research in separate models. The watershed research was used to validate the R1/R4 sediment predictions (6). The fishery research was used in the R1/R4 fishery model (7). (Refer to appendix C to see a comparison of fish and watershed outputs by alternative by drainage, using the R1/R4 guidelines.)

Results of the SNOWSED watershed model runs are summarized in table 9 and figures 8-9. All comparisons of predicted water and sediment values for alternatives are with alternative B, the minimum management alternative. (Please note the SNOWSED model is not considered to be reliable at this time. This is included only to show the research prediction originally made and presented before full knowledge of SNOWSED's reliability was gained.)

a. Tenmile Creek (3, 4)

The first three projected years for Tenmile Creek showed no significant changes in either sediment production or streamflow for alternatives A, D, or E, when compared with the minimum management alternative (table 9 and figures 8a-8d). Modeled road impacts ranged from 3.11 miles for alternative D to 12.00 miles for alternative E, and harvest impacts from 270 acres cut (0.8 percent of total drainage area) for alternative A to 350 acres (1.0 percent of total) for alternative E (table 10 and figure 10).

Alternative E was projected for a total of 7 years to pick up any differences that might occur with further development. As noted, sediment production increased 26.7 percent over alternative B in year 5 of the projection, with 27 miles of modeled roads in place. In year 6, another 1,195 acres of modeled cuts were entered (3.5 percent of total area), resulting in a 23.1 percent increase in sediment over alternative B, then dropping off in year 7 to 8.1 percent. Total streamflow changed by less than 2 percent in year 6 for alternative E; in other years, the change was insignificant.

b. Twentymile Creek (3, 4)

In the Twentymile Creek drainage, alternative G, maximum timber emphasis, was compared to the minimum management alternative over a simulated period of 6 years. In year 1 of the projection, 11.5 miles of roads were modeled in the drainage, followed by a 680-acre cut (4.7 percent of the total drainage area) in model year 2 (table 10 and figure 11). Alternative G showed a 50 percent increase in total sediment production the first projected year over alternative B, dropping off to a 7.4 percent increase in year 2 (table 9 and figures 9a-9b). In the third and fourth years of the projection, no further road or harvest impacts were modeled, and increased sediment production dropped off further to 5.5 percent and then to about 3 percent. In years 5 and 6, sediment remained around 3 percent higher for alternative G than for B, even though 13.3 more miles of roads and 1,060 cut acres (7.4 percent of total area) were modeled. In none of the projected years did streamflow change appreciably between alternatives G and B (table 9 and figures 9c-9d).

The watershed model predicts significant sediment increases immediately following certain modeled impacts in both the Tenmile and Twentymile Creek drainages. These increases lessen over time, and road activities appear to have a greater effect on sediment production than do harvest activities. No significant changes in runoff were shown for either watershed for the duration of the projections. It should be noted that impacts were modeled only for the period 1984 to 1991, and that these first decade activities represent a small portion of the total impacts occurring over the full 5-decade planning horizon for the MRDA (figure 12). It seems likely that much greater increases in sediment yield could be realized in subsequent decades, especially for the alternatives in which road and harvest development is stressed.

Table 9. Total sediment production and total streamflow projected by the watershed model for 50-year jump management Emphasis alternatives. Values in parenthesis are percent change from the minimum management case, Alternative B.

Alternative A = Current management
 Alternative B = Minimum management
 Alternative C = Wildlife and fisheries emphasis
 Alternative D = Mountain pine beetle departure
 Alternative E = Noncommodity emphasis
 Alternative G = Maximum timber emphasis

TENMILE CREEK DRAINAGE

model year	date	Alternative B		Alternative A		Alternative D		Alternative E		Alternative G	
		sediment (tons/sq.mi)	flow (cfs/sq.mi)								
1	1985	100.1	260	100.1	260	100.1	260	100.1	260	100.1	260
				(0.0)	(-0.0)	(0.0)	(-0.0)	(0.0)	(-0.0)	(0.0)	(-0.0)
2	1986	82.0	298	82.0	298	82.0	298	82.0	298	82.0	298
				(0.0)	(-0.0)	(-0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
3	1987	107.2	309	107.2	309	107.2	309	107.2	309	107.2	309
				(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
4	1988	116.5	322					116.5	322		
								(0.0)	(0.0)		
5	1989	63.2	164					80.1	164		
								(26.7)	(0.1)		
6	1990	133.1	319					163.8	324		
								(23.1)	(1.6)		
7	1991	173.7	349					189.1	350		
								(8.1)	(0.1)		

TWENTYMILE CREEK DRAINAGE

model year	date	Alternative B		Alternative A		Alternative D		Alternative E		Alternative G	
		sediment (tons/sq.mi)	flow (cfs/sq.mi)								
1	1984	124.9	321							187.41	321
										(50.1)	(0.0)
2	1985	91.1	387					97.81	387		
								(7.4)	(-0.1)		
3	1986	131.4	381					138.51	381		
								(5.5)	(-0.1)		
4	1987	135.1	398					139.51	398		
								(3.3)	(-0.0)		
5	1988	58.7	207					60.3	207		
								(2.7)	(0.1)		
6	1989	159.1	393					164.11	392		
								(3.1)	(-0.1)		

Table 10. Summary of proposed road and harvest development by watershed by alternative. Miles of road constructed (local and collector), total acres harvested, and percent of total drainage harvested by year.

Alternative A = Current management
 Alternative B = Minimum management
 Alternative C = Wildlife and fisheries emphasis
 Alternative D = Mountain pine beetle departure
 Alternative E = Noncommodity emphasis
 Alternative G = Maximum timber emphasis

Year	Alternative A		Alternative C		Alternative D		Alternative E		Alternative G	
	miles roads	acres cut								
1985	4.70	0	(1)	(1)	3.11	0	5.45	0	(2)	(2)
1986	0	270			0	280	0	350		
1987	0	0			0	0	6.55	0		
1988	0	0			0	0	0	515		
1989	0	0			2.55	0	15.29	0		
1990	0	0			0	410	0	1195		
Total	4.70	270			5.66	690	27.29	2060		

TWENTYMILE CREEK

Year	Alternative A		Alternative C		Alternative D		Alternative E		Alternative G	
	miles roads	acres cut								
1984	8.58	0	(3)	(3)	7.20	0	6.01	0	11.50	0
1985	0	470			0	685	0	350	0	680
1986	0	0			0	0	0	0	0	0
1987	0	0			0	0	0	0	0	0
1988	0	0			4.67	0	1.89	0	13.30	0
1989	0	0			0	630	0	350	0	1060
Total	8.58	470			11.87	1315	7.90	700	24.80	1740

(1) No first decade activities occurred for Alternative C in Tenmile Creek.
 (2) Alternative G was not set up for Tenmile Creek.
 (3) No first decade activities occurred for Alternative C in Twentymile Creek.

TENMILE CREEK

RESULTS OF WATERSHED MODEL PROJECTIONS
SEDIMENT PRODUCTION BY ALTERNATIVE

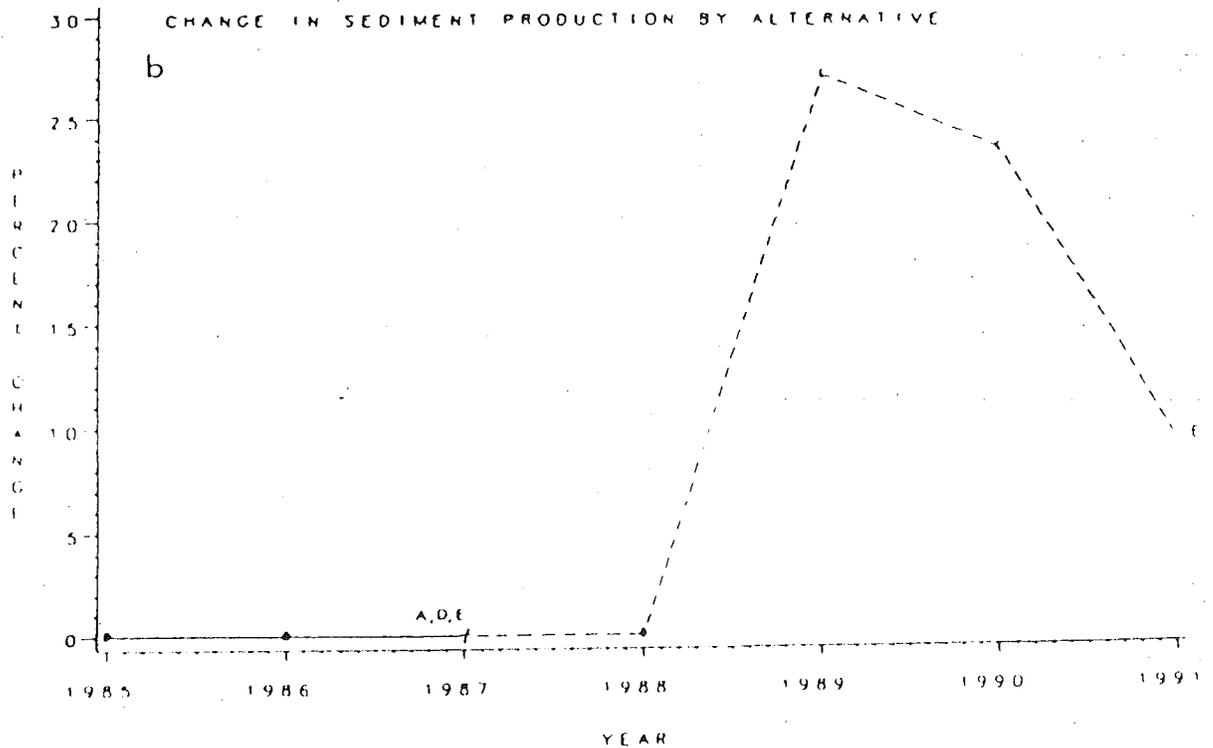
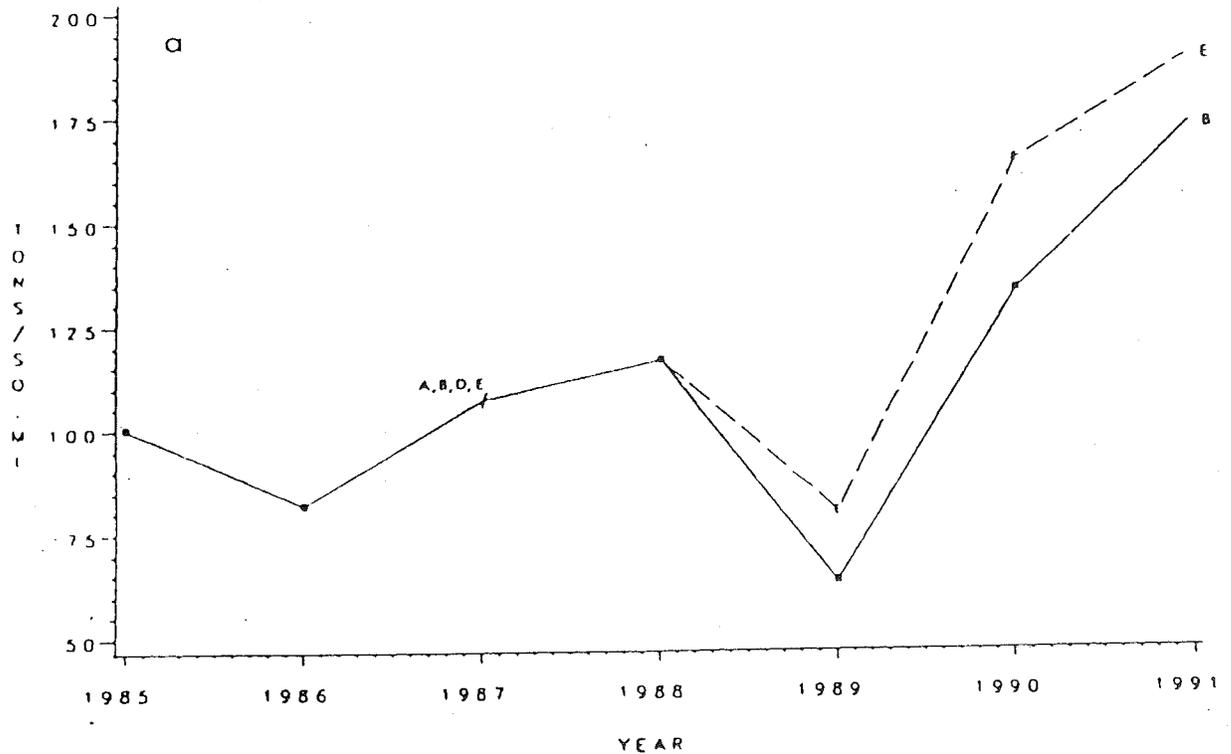


Figure 8. Results of watershed model projections for Tenmile Creek drainage. a) Total sediment production at mouth of drainage (tons/sq.mi.); b) Percent change in total sediment production compared to Alternative B, the minimum management case.

TENMILE CREEK

RESULTS OF WATERSHED MODEL PROJECTIONS
STREAMFLOW BY ALTERNATIVE

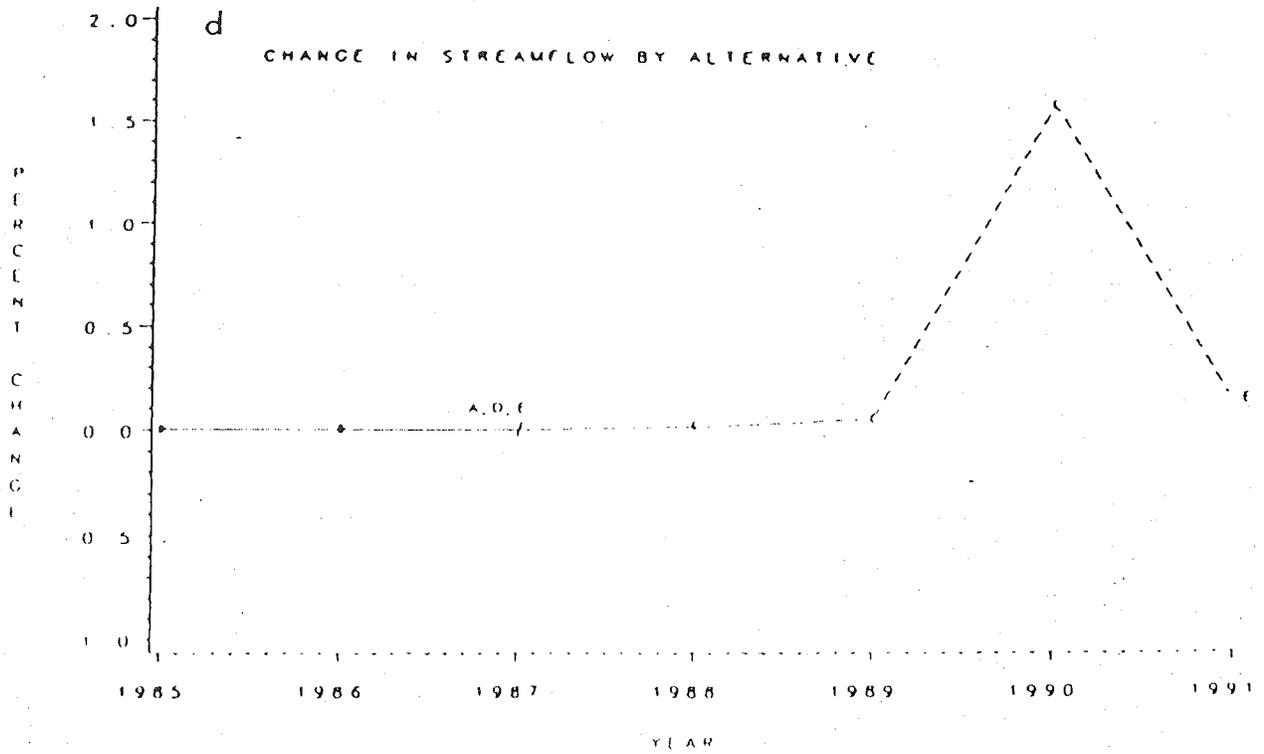
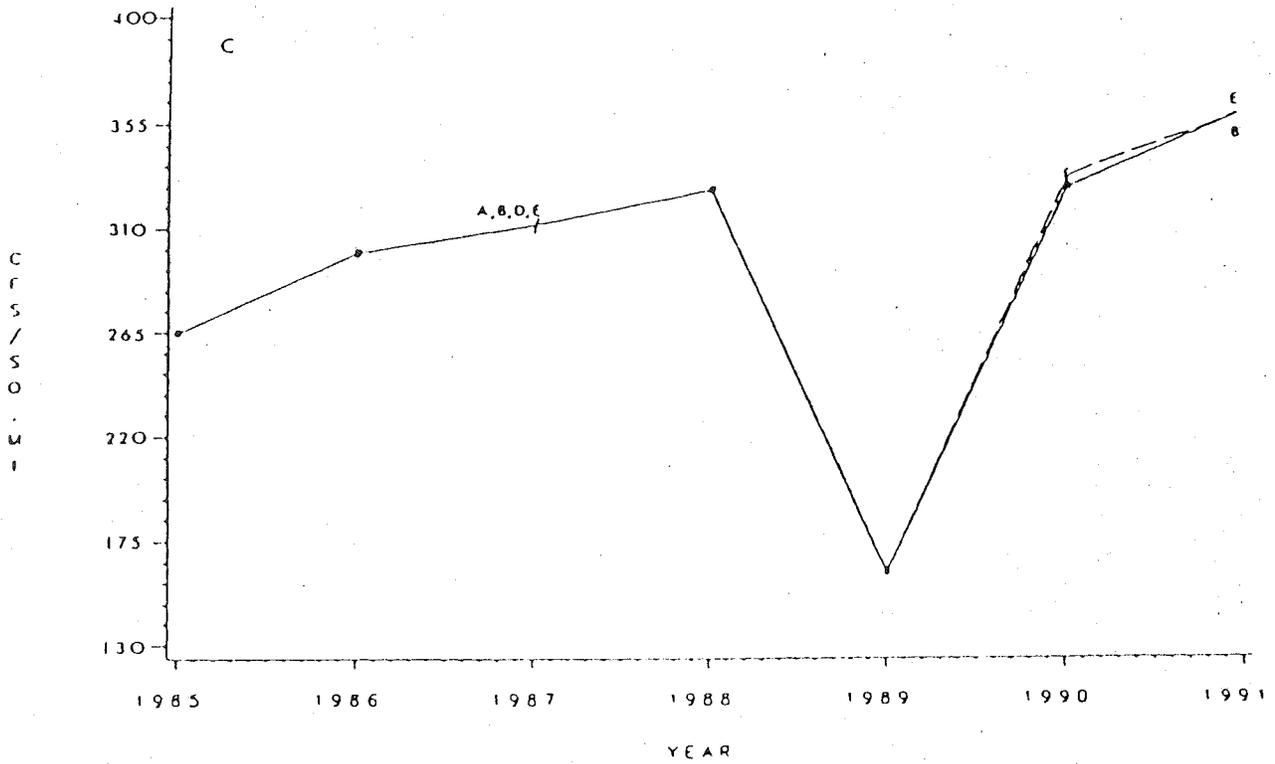


Figure 8 continued. c) Total streamflow at mouth of Tenmile Creek drainage (cfs/sq.mi.); d) Percent change in streamflow from Alternative B.

TWENTYMILE CREEK

RESULTS OF WATERSHED MODEL PROJECTIONS
SEDIMENT PRODUCTION BY ALTERNATIVE

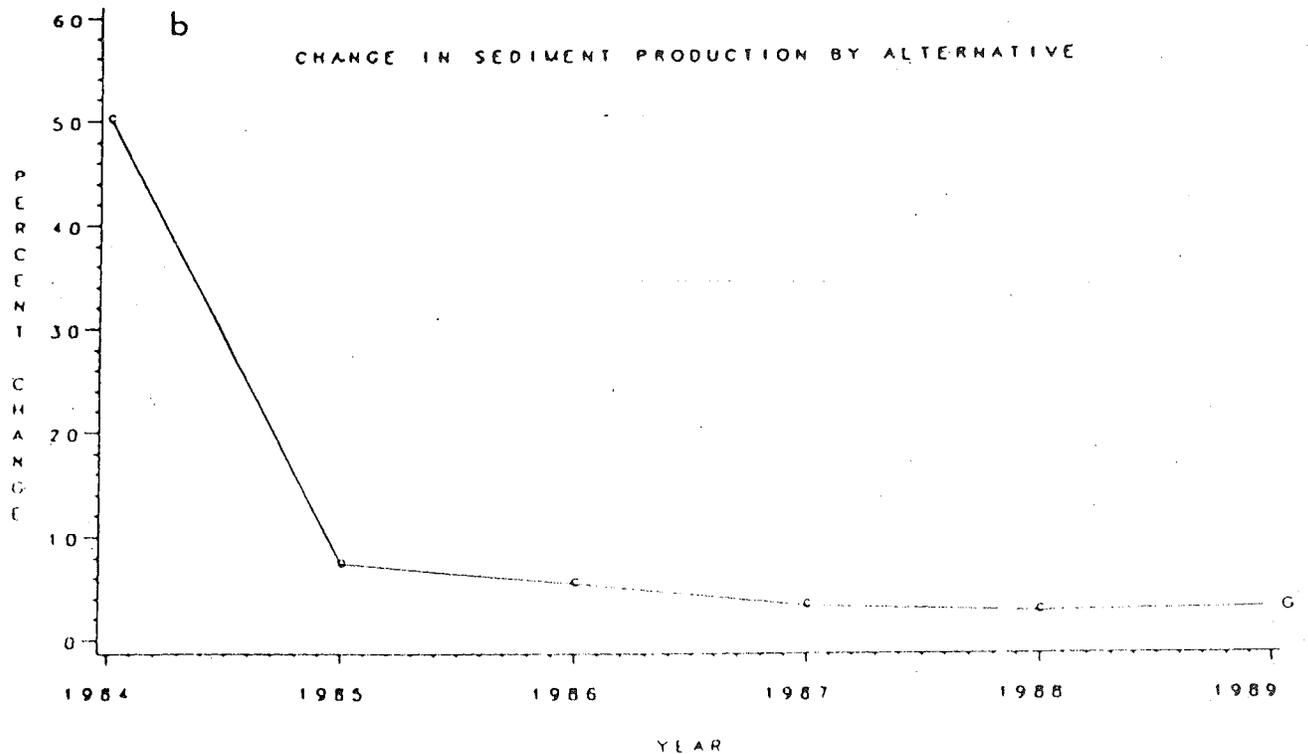
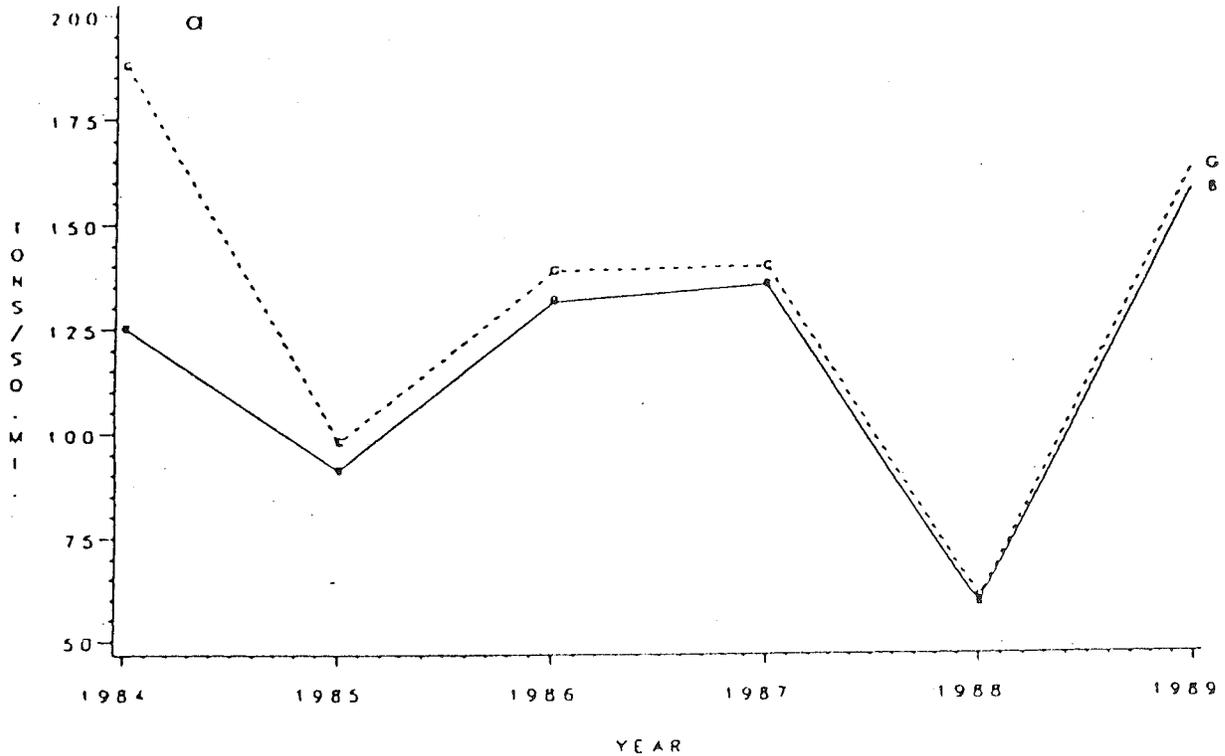


Figure 9. Results of watershed model projections for Twentymile Creek drainage. a) Total sediment production at mouth of drainage (tons/sq.mi.); b) Percent change in total sediment production compared to Alternative B, the minimum management case.

TWENTYMILE CREEK

RESULTS OF WATERSHED MODEL PROJECTIONS
STREAMFLOW BY ALTERNATIVE

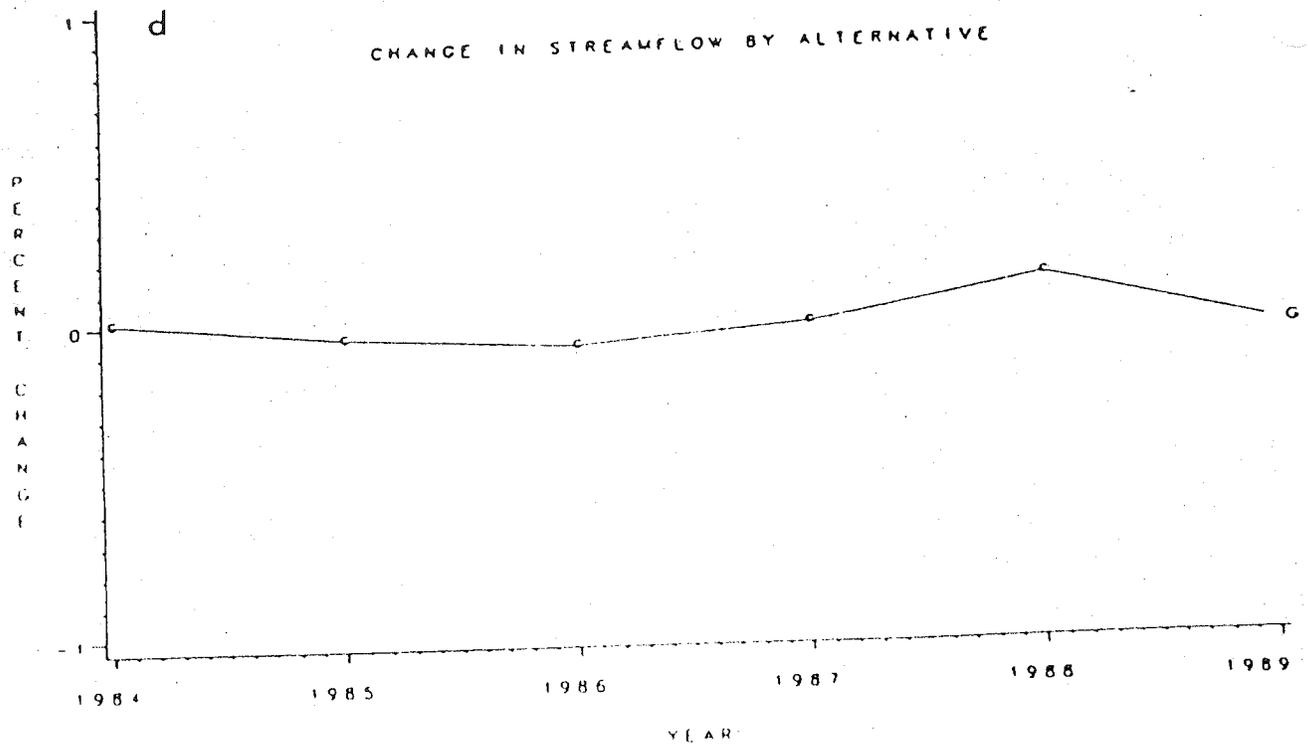
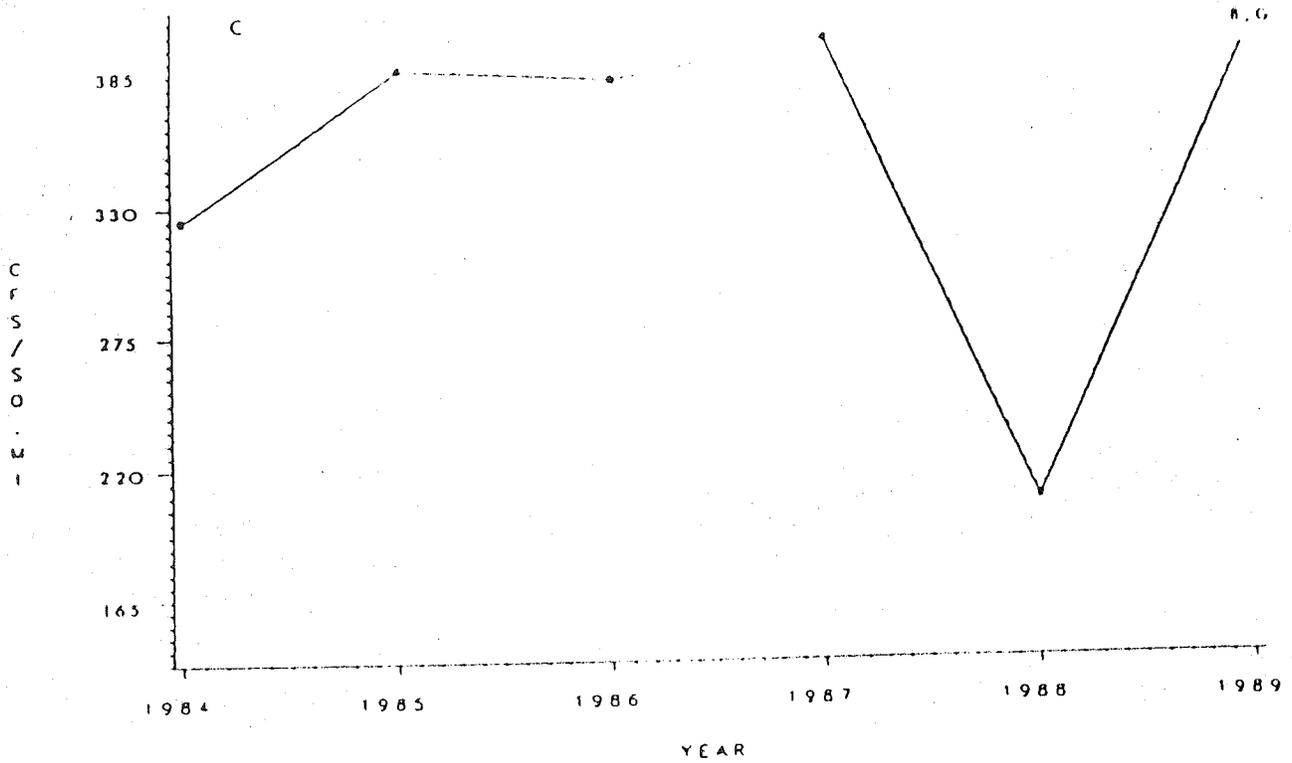
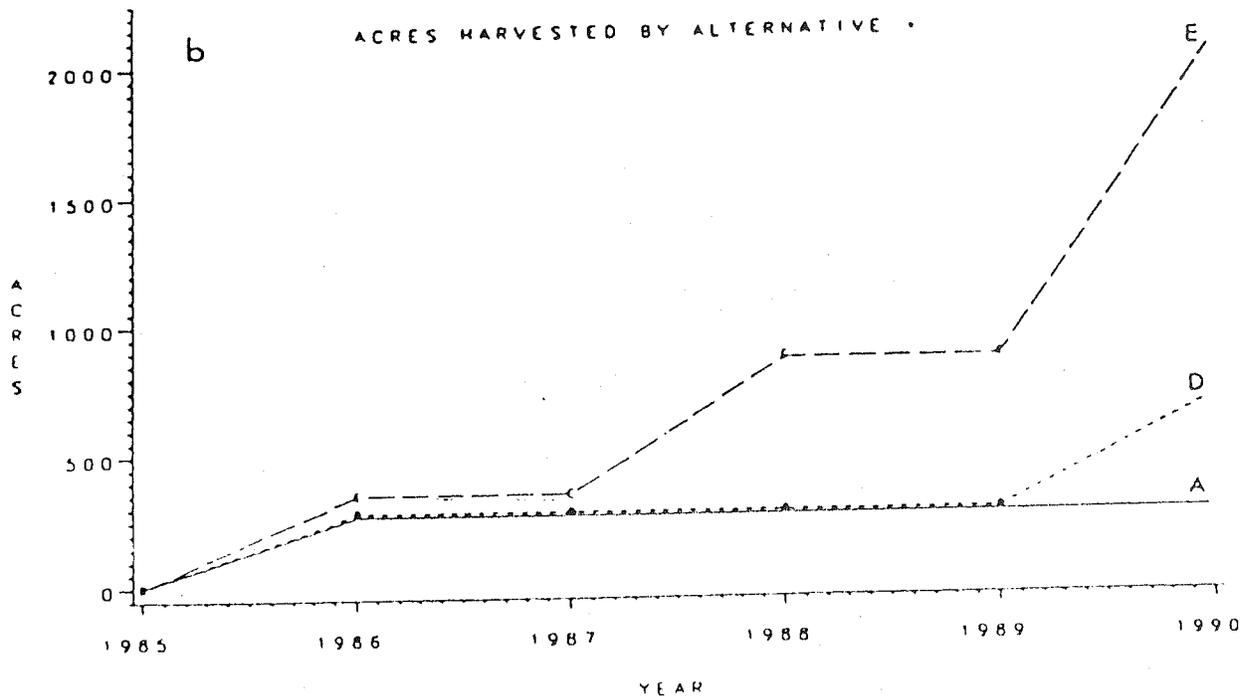
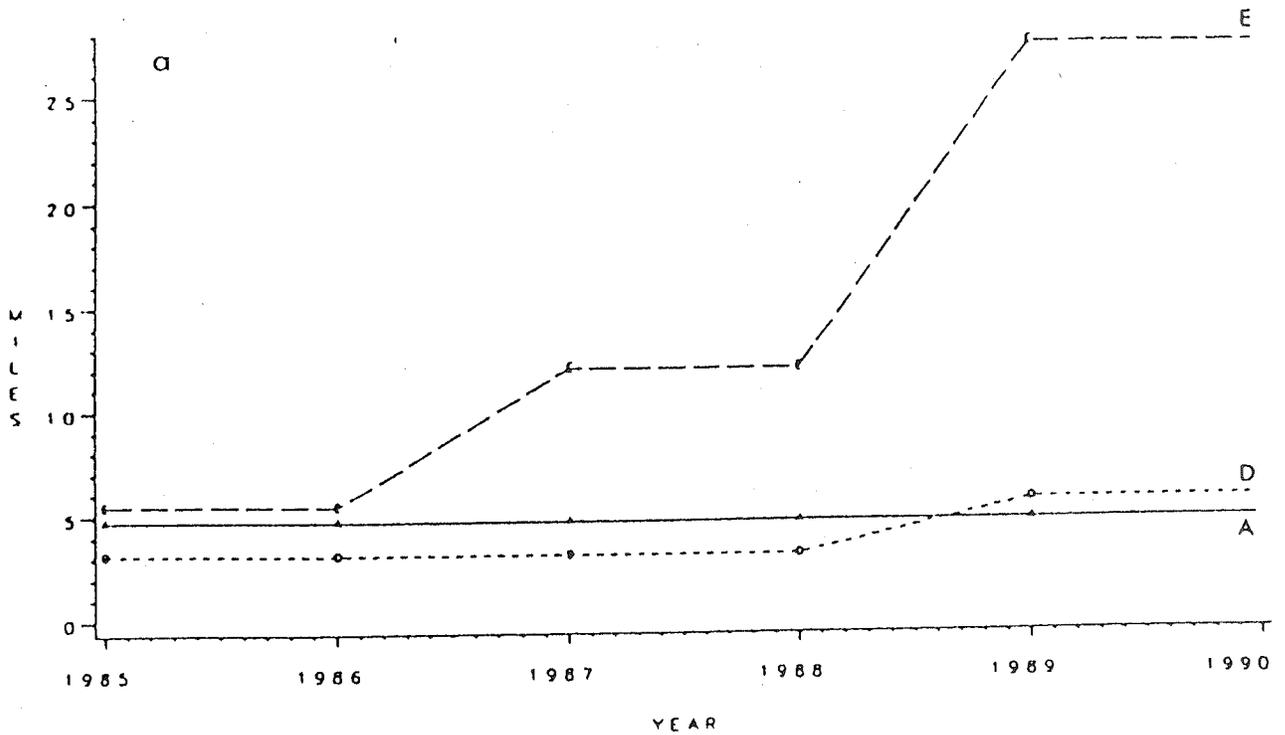


Figure 9 continued. c) Total streamflow at mouth of Twentymile Creek drain (cfs/sq.mi.); d) Percent change in streamflow from Alternative B.

TENMILE CREEK WATERSHED

MILES OF ROAD CONSTRUCTED BY ALTERNATIVE •

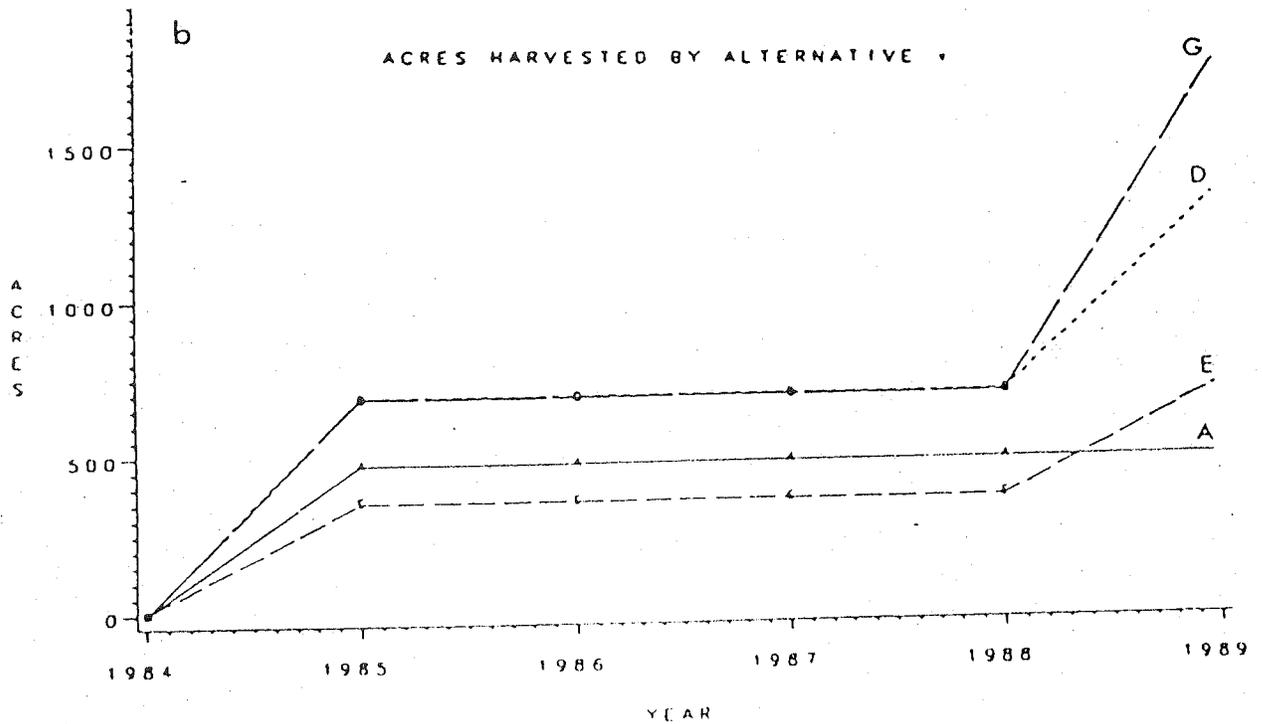
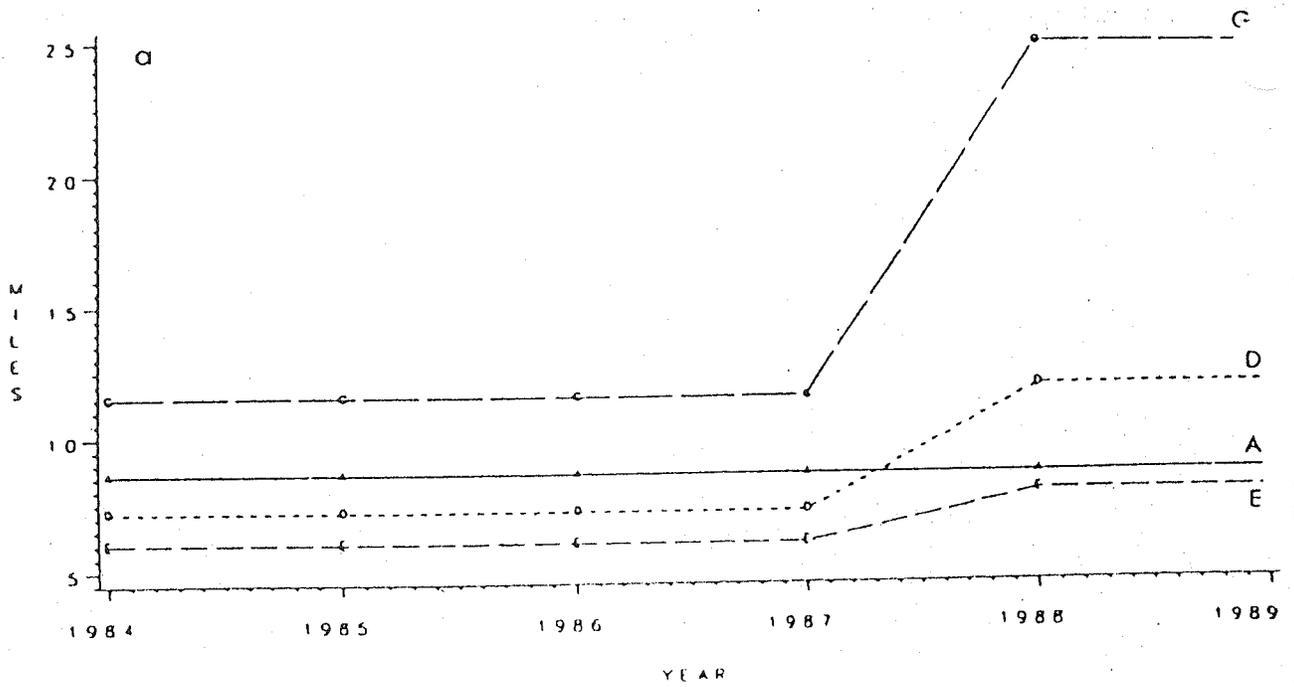


• NO FIRST DECADE ACTIVITIES FOR ALT C
 • ALT C NOT SET UP FOR TENMILE CREEK

Figure 10. First decade road and harvest impacts by management alternative in the Tenmile Creek drainage. a) Miles of road constructed (local and collector); b) Total acres harvested.

TWENTYMILE CREEK WATERSHED

MILES OF ROAD CONSTRUCTED BY ALTERNATIVE



• NO FIRST DECADE ACTIVITIES FOR ALT C

Figure 11. First decade road and harvest impacts by management alternative in the Twentymile Creek drainage. a) Miles of road constructed (local and collect b) Total acres harvested.

GOSPEL HUMP MRDA

CUMULATIVE ANNUAL FINAL HARVEST BY ALTERNATIVE

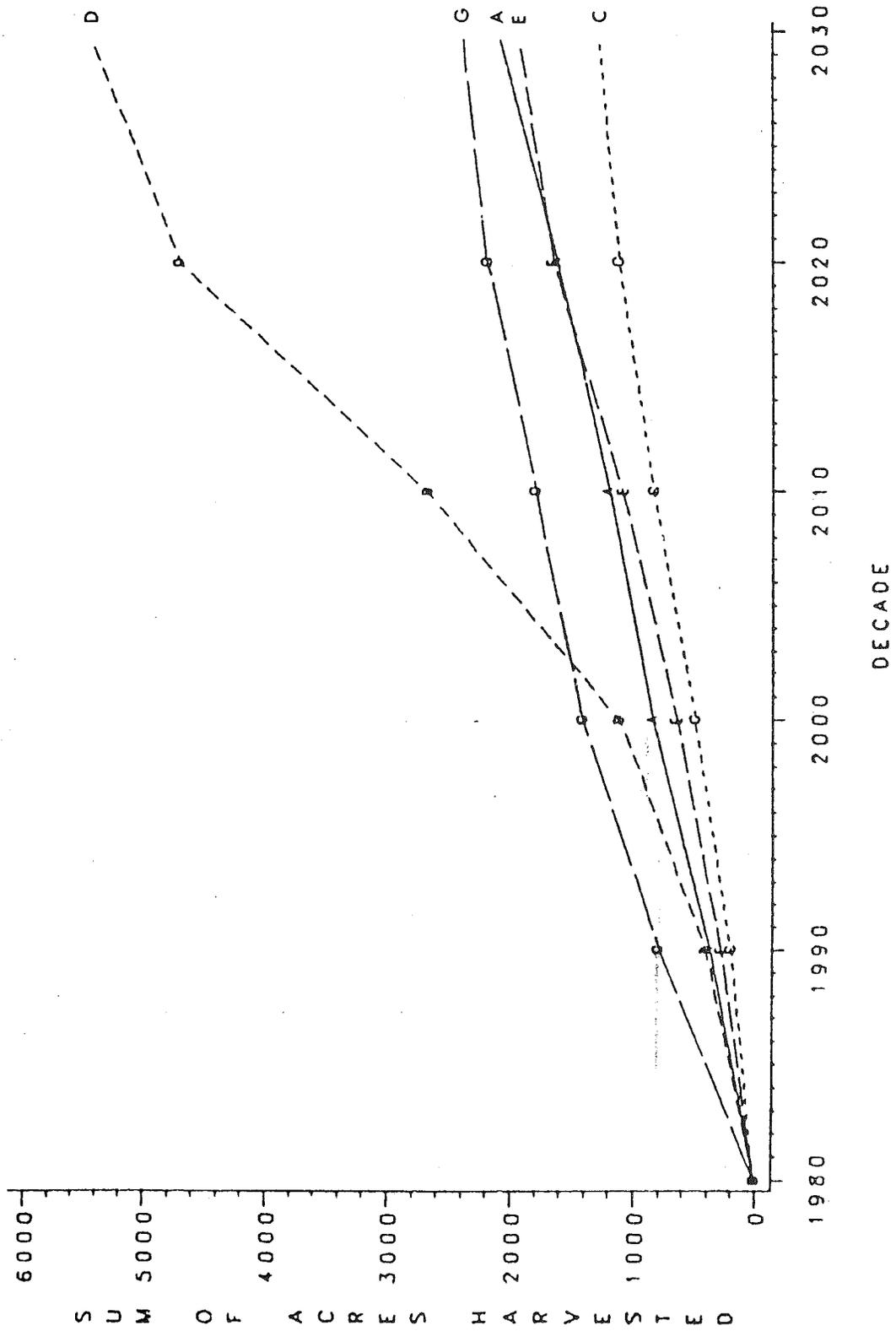


Figure 12. Total annual harvest by management alternative for the 50-year planning horizon. Watershed and fishery impacts were modeled for the first decade only.

3. Fisheries (5)

The fisheries model uses the changes in channel volume and sediment size composition predicted by the watershed model to estimate changes in fish productivity. Each period simulated for the watershed model was also examined for predicted impacts on fish habitat and production. (Please note the predictions reproduced here are not considered reliable since they are based upon the SNOWSED model. They are shown here because they are in the research report as presented to the Advisory Committee before full knowledge of the model's reliability was gained.)

For each alternative, the fisheries model predicts, with two exceptions, an increase in embryo survival, summer rearing capacity, and winter carrying capacity in Tenmile and Twentymile Creeks (tables 11 and 12). The model predicts a decrease in trout and steelhead embryo survival in Tenmile Creek.

This analysis assumes that outputs from the watershed model and the sediment-fish relationships are reasonably accurate. It is unreasonable to expect an increase in survival and holding capacity for all alternatives over a 6- to 7-year period. Therefore, the relative changes between alternatives were compared.

Alternatives were compared by calculating percentage change in embryo survival, summer rearing capacity, and winter carrying capacity between the first year modeled (present condition) and the last year modeled (predicted condition). Comparisons were made on October 1 of each year. In Tenmile Creek, years 1 and 3 (1985 and 1987) of alternatives A, B, D, and E, and years 1 and 7 (1985 and 1991) of alternatives B and E were compared. In Twentymile Creek, years 1 and 6 (1984 and 1989) of alternatives B and G were compared. The fisheries model output for Tenmile Creek is summarized in table 11.

a. Tenmile Creek

There was no difference between alternatives A, B, D, and E, when comparing years 1 and 3 in Tenmile Creek (table 13). The relative change in embryo survival, summer rearing capacity, and winter carrying capacity was the same for each alternative.

There was little difference between alternatives B and E when comparing years 1 and 7 (table 14). For embryo survival and summer rearing capacity, the difference was less than 1 percent. Differences in the relative change between alternatives B and E were 0.21 percent for trout and steelhead embryo survival. There was no difference in chinook salmon embryo survival between alternatives B and E. Differences in the relative change between alternatives B and E were 0.72 percent, 0.84 percent, and 0.65 percent, for trout, steelhead, and chinook salmon summer rearing capacity, respectively.

Differences between trout, steelhead, and chinook salmon winter carrying capacity for alternatives B and E were less than 10.0 percent. Differences in the relative change between alternatives B and E were 5.59 percent, 4.25 percent, and 8.27 percent for trout, steelhead, and chinook salmon winter carrying capacity, respectively.

b. Twentymile Creek

There was little difference between alternatives B and G when comparing years 1 and 6 in Twentymile Creek (table 15). The relative change in embryo survival and summer rearing capacity differed by less than 1 percent. Difference in the relative change between alternatives B and G was 0.10 percent for trout embryo survival. Difference in the relative change between alternatives B and G was 0.36 percent summer rearing capacity. The difference for trout winter carrying capacity for alternatives B and G was less than 10.0 percent. Difference in the relative change between alternatives B and G was 5.03 percent for trout winter carrying capacity.

If the watershed model and sediment-fish relationships reasonably predict sediment transport, deposition, size class distribution, and effects of sediment on fish accurately, it is concluded there are no significant differences between alternatives in either Tenmile or Twentymile Creeks. However, professional judgment and caution should be used when interpreting these results because of the way the watershed model calculates sediment transport off the planes and through habitat types (especially pools).

Table 11. Embryo survival, summer rearing capacity, and winter carrying capacity of trout, age 0 steelhead, and age 0 chinook salmon in Tenmile Creek on October 1 of each year modeled for alternatives A, B, D, and E.

Year	Embryo survival (%)		Summer rearing capacity (%)			Winter carrying capacity (%)		
	Age 0		Age 0	Age 0	Age 0	Age 0	Age 0	
	Trout	chinook salmon	Trout	steel-head	chinook salmon	Trout	steel-head chinook salmon	
Alternative A-Current Management								
1985	93.9	96.4	83.5	94.9	76.9	17.9	21.2	12.1
1986	93.2	100.0	91.0	97.8	82.5	28.4	32.2	21.3
1987	92.7	100.0	90.3	97.1	81.8	26.4	30.2	19.5
Alternative B-Minimum Management								
1985	93.9	96.4	83.5	94.9	76.9	17.9	21.2	12.1
1986	93.2	98.5	91.0	97.8	82.5	28.4	32.2	21.3
1987	92.7	100.0	90.3	97.1	81.8	26.4	30.2	19.5
1988	92.6	100.0	94.4	99.1	85.8	35.6	39.5	28.2
1989	92.1	100.0	95.4	99.5	87.0	36.0	39.9	28.6
1990	91.8	100.0	95.6	99.5	87.1	36.9	40.8	29.4
1991	91.9	100.0	95.7	99.1	87.5	42.5	46.3	35.0
Alternative D-Mountain Pine Beetle Departure								
1985	93.9	96.4	83.5	94.9	76.9	17.9	21.2	12.1
1986	93.2	100.0	91.0	97.8	82.5	28.4	32.2	21.3
1987	92.7	100.0	90.3	97.1	81.8	26.4	30.2	19.5
Alternative E-Noncommodity Emphasis								
1985	93.9	96.4	83.5	94.9	76.9	17.9	21.2	12.1
1986	93.2	98.5	91.0	97.8	82.5	28.4	32.2	21.3
1987	92.7	100.0	90.3	97.1	81.8	26.4	30.2	19.5
1988	92.6	100.0	94.4	99.1	85.8	35.6	39.5	28.2
1989	92.1	100.0	95.4	99.5	87.0	36.0	39.9	28.6
1990	91.7	100.0	94.9	99.2	86.3	34.9	38.8	27.5
1991	91.7	100.0	96.3	99.9	88.0	41.5	45.4	34.0

Table 12. Embryo survival, summer rearing capacity, and winter carrying capacity of trout in Twentymile Creek on October 1 of each year modeled for alternatives B and G. (There are no anadromous species in Twentymile Creek.)

	Embryo survival (%)	Summer rearing capacity (%)	Winter carrying capacity (%)
Year	Trout	Trout	Trout
Alternative B-Minimum Management			
1984	93.9	83.5	17.9
1985	94.3	91.6	30.4
1986	94.4	91.2	28.0
1987	94.5	92.2	33.1
1988	94.5	93.6	38.9
1989	94.4	93.9	39.5
Alternative G-Maximum Management			
1984	93.9	83.5	17.9
1985	94.2	90.6	28.2
1986	94.3	90.5	26.4
1987	94.4	91.7	32.5
1988	94.4	93.2	38.1
1989	94.3	93.6	38.6

Table 13. The percentage change and difference between the first and last year modeled in Tenmile Creek for alternatives A, B, D, and E ("+" equals increase and "-" decrease).

Limiting factor	Percentage change between years 1 and 3				Percentage difference
	Alternatives				
	A	B	D	E	
Embryo Survival					
Trout	-1.28	-1.28	-1.28	-1.28	0
Steelhead	-1.28	-1.28	-1.28	-1.28	0
Chinook salmon	+3.73	+3.73	+3.73	+3.73	0
Summer rearing capacity					
Trout	+8.14	+8.14	+8.14	+8.14	0
Steelhead	+2.32	+2.32	+2.32	+2.32	0
Chinook salmon	+6.37	+6.37	+6.37	+6.37	0
Winter carrying capacity					
Trout	+47.49	+47.49	+47.49	+47.49	0
Steelhead	+42.45	+42.45	+42.45	+42.45	0
Chinook salmon	+61.16	+61.16	+61.16	+61.16	0

Table 14. The percentage change and difference between the first and last year modelled in Tenmile Creek for alternatives B and E ("+" equals increase and "-" equals decrease).

Limiting factor	Percentage change between years 1 and 7		Percentage Difference
	Alternatives		
	B	E	
Embryo Survival			
Trout	-2.13	-2.34	0.21
Steelhead	-2.13	-2.34	0.21
Chinook salmon	+3.73	+3.73	0
Summer rearing capacity			
Trout	+14.61	+15.33	0.72
Steelhead	+ 4.43	+ 5.27	0.84
Chinook salmon	+13.78	+14.43	0.65
Winter carrying capacity			
Trout	+137.43	+131.84	5.59
Steelhead	+118.40	+114.15	4.25
Chinook salmon	+189.26	+180.99	8.27

Table 15. The percentage change and difference between the first and last year modeled in Twentymile Creek for alternatives B and G ("+" equals increase and "-" equals decrease).

Limiting factor	Percentage change between years 1 and 6		Percentage Difference
	Alternatives		
	B	G	
Embryo Survival			
Trout	+0.53	+0.43	0.10
Summer rearing capacity			
Trout	+12.46	+12.10	0.36
Winter carrying capacity			
Trout	+120.67	+115.64	5.03

E. USE OF RESEARCH

Research in the Gospel-Hump area was used in the following manner.

The basic field work completed by research people was incorporated into the Forest Plan data base. Principally, this was in the area of fisheries and sediment production inventory.

Fish carrying capacities by streams by channel types were established by Dr. Ted Bjornn's group and were used in the Gospel-Hump Plan and throughout the rest of the Nezperce Forest.

Sediment production from road construction, as measured by the research group, was used to test sediment production equations already in use and which were derived from previous Intermountain Forest & Range Experiment Station research (6). The equations were in agreement and it was not necessary to adjust.

Wildlife research was used to predict the probable effects upon elk and moose populations over the alternatives tested, and this, in turn, was used to help choose the preferred alternative.

Wildlife research also led to the development of the moose/yew-wood management prescription and the standard and guidelines for road closures after harvest.

Wildlife research will continue to be used in finer detail when conducting and designing specific projects through environmental analysis procedures.

Failure of the SNOWSED model was one of the disappointments of this joint research-planning effort. It was just not possible to accurately model all of the complex interactions of sediment production and transport. However, important steps have been taken, and future work may perfect the model.

The SNOWSED model predictions were not depended upon in the selection of the preferred alternative. See the evaluation of the SNOWSED model included in appendix B.

IV. GLOSSARY

A

<u>AA</u>	See analysis area.
<u>Acre-Equivalent</u>	A unit of habitat output related to fish or wildlife habitat improvement projects. Acre-equivalents are based on the number of acres of habitat that are influenced by 1 acre of habitat actually modified by the habitat improvement project. For example, an acre of winter range burned is credited with influencing 4 acres of summer range.
<u>Acre-Foot</u>	A water or sediment volume measurement term, equal to the amount of water which would cover an area of 1 acre to a depth of 1 foot (325,851 gallons or 43,560 cubic feet).
<u>Activity Fuels</u>	Logging debris generated from any activity on the Forest which causes fire potential such as firewood gathering, precommercial thinning, timber harvesting, and road construction.
<u>Affected Environment</u>	The biological and physical environment that will or may be changed by actions proposed and the relationship of people to that environment.
<u>Age-Class Diversity</u>	The location and/or proportionate representation of different age classes in a forest. Age-classes are generally defined in terms of stands and not individual trees under even-age management. Age-class diversity implies tree size diversity.
<u>Allocation</u>	The assignment of management prescriptions to particular land areas to achieve the goals and objectives of the alternative.
<u>Allotment</u>	See range allotment.
<u>Allowable Sale Quantity</u>	The quantity of timber that may be sold from the area of land covered by the Forest Plan for a time period specified. This quantity is usually expressed on an annual basis as the average annual allowable sale quantity.
<u>Alternative</u>	In Forest planning, a mix 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 a specified decision. An alternative need not substitute for another in all respects.
<u>Alternative, No Action</u>	An alternative that maintains established trends of management direction.
<u>Amenity (Amenity Value)</u>	A resource which does not have market values and/or which is not a commodity. Amenity values include threatened and endangered species, recreation, old-growth, nongame wildlife, water, soil, and so on.
<u>Anadromous Fish</u>	Those species of fish that mature in the sea and migrate into streams to spawn. Includes salmon and steelhead trout.
<u>Analysis Area</u>	A grouping of homogenous land areas, formed from the land and resource inventory data comprising the data base. Similarities are in terms of common capabilities to produce resources and susceptibility to impacts. Analysis areas need not be contiguous areas of land.
<u>Analysis of the Management Situation</u>	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.
<u>Animal Unit Month (a.u.m.)</u>	The quantity of forage required by one mature cow (1,000 lbs.) with calf for 1 month.

Arterial Roads

Roads comprising the basic access network for National Forest System administrative and management activities. These roads serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. 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.

Available Forest Land
(Available, Capable and
Suitable)

Land that has not been legislatively withdrawn or administratively withdrawn from timber production by the Secretary of Agriculture or Chief of the Forest Service.

B

Base Timber Harvest
Schedule (Base Sale
Schedule)

The timber harvest schedule in which the planned sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade of the planning period and is not greater than the long-term sustained yield capacity.

Benchmark

An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints.

Benefit/Cost Ratio

Measure of economic efficiency, computed by dividing total priced benefits by total economic costs. Usually both benefits and costs are discounted to present.

Best Management
Practices

Standard practices or procedures or a combination of procedures as determined after problem assessment, examination of alternative procedures, and public participation to be the most effective, practical means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

Big Game

Those species of large mammals normally managed as a sport hunting resource.

Big Game Winter Range

The area available to and used by big game through the winter season.

Biological Potential

The maximum possible output of a given resource limited only by its inherent physical and biological characteristics.

Biological Growth
Potential

The average net growth attainable in a fully stocked natural area of forest land.

Board Foot

A unit of timber measurement equaling the amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide. Trees and logs are usually measured in board feet and totals are expressed in thousands of board feet (MBF) or millions of board feet (MMBF).

Broadcast Burn

Allowing a controlled fire to burn over a designated area within well-defined boundaries, for reduction of fuel hazard, as a silvicultural treatment, or both.

Browse

Twigs, leaves, and young shoots of trees and shrubs which animals feed on; in particular, those shrubs which are utilized by big game animals for food.

C

<u>CA</u>	See capability area.
<u>Capability</u>	The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon current site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fires, insects, and disease.
<u>Capability Area</u>	A capability area is an identifiable, locatable, contiguous area of land whose inherent characteristics dictate that the response or effects of management will be relatively the same for all acres within that area considering each suitable management prescription and the stated decision variables.
<u>Capable Lands (Available, Capable and Suitable)</u>	Those portions of the Forest that have an inherent ability to support trees for timber harvest and produce at least 20 cubic feet/acre/year of wood fiber.
<u>Capital Investment</u>	Costs of constructing commonly used roads, facilities, and treatments to resources accruing benefits over time.
<u>CEQ</u>	See Council on Environmental Quality.
<u>CFR</u>	Code of Federal Regulations
<u>Clearcutting</u>	Harvesting of all trees in one cut in an area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand, or strip large enough to be mapped or recorded as separate age classes in planning. Regeneration is obtained through natural seeding, or through planting or direct seeding.
<u>Climax Forest</u>	A plant community representing the culmination of natural succession and growth stages.
<u>Climax Ecosystem</u>	The final or stable biological community in a developmental series; self-perpetuating and in balance with the physical habitat.
<u>CMAI</u>	See Culmination of Mean Annual Increment.
<u>Coefficient (Cost, Value, Yield)</u>	These are the costs for producing various Forest resources, the value of products or use, and the outputs from the Forest used in the FORPLAN computer model.
<u>Collector Roads</u>	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.
<u>Commercial Forest Lands</u>	Forest land that is producing or capable of producing crops of industrial wood and has not been reserved or deferred. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. This includes both accessible and inaccessible areas. Permanently inoperable or nonstocked areas are excluded because they are unsuitable for silvicultural management. Conversely, nonstocked areas that are stockable and otherwise meet this definition are included.

<u>Commercial Thinning</u>	Thinning is an intermediate step in even-aged management. It is a cutting made in an immature stand primarily in order to accelerate diameter increment but also, by suitable selection, to improve the average form of the trees that remain without permanently breaking the canopy. It can also be used to increase forage for some species of wildlife. Commercial thinning produces merchantable material of at least the same value as the direct costs of harvesting.
<u>Commodity Output</u>	Goods or services normally bought and sold in a market after at least one stage of production before final consumption, i.e., timber.
<u>Common Minerals</u>	See Minerals, Common.
<u>Concern</u>	See Management Concern.
<u>Condition Class</u>	Description of the existing tree vegetation as it relates to size, stocking density, and age.
<u>Consumptive Use</u>	Uses of a resource that reduce the supply. Examples of some consumptive uses of water are irrigation, domestic, and industrial use.
<u>Corridor (Utility Corridor)</u>	A linear strip of land identified for the present or future location of a transportation or utility right-of-way within its boundary.
<u>Cost Efficiency</u>	The usefulness of specified costs to produce specified outputs (benefits), using determined by maximizing the present net value.
<u>Council on Environmental Quality</u>	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.
<u>Cover/Forage Ratio</u>	The ratio of tree cover (usually conifer types) to foraging areas (natural openings, clearcuts, etc.).
<u>Critical Habitat</u>	Key land areas used by wildlife for forage and reproduction.
<u>CRM</u>	Cultural resource management.
<u>Crown Closure</u>	The amount of cover provided by tree crowns over a given area, expressed in percent.
<u>Cubic Foot</u>	The amount of timber equivalent to a piece of wood 1 foot by 1 foot by 1 foot.
<u>Culmination of Mean Annual Increment (CMAI)</u>	The age at which the volume of a stand of timber no longer increases.
<u>Cultural Resources</u>	Prehistoric and historic evidence of human behavior. Such evidence is a nonrenewable resource and may be manifested in areas, sites, buildings, memorials, or objects of social or historic value.
D	
<u>Deferred Forest Land</u>	Productive forest lands withdrawn from cutting until further classification has been determined, i.e., areas of potential resource protection.
<u>Deficit Timber Sale</u>	A timber sale in which the costs associated with producing the primary product(s) plus the profit margin are greater than the selling value of the same product(s).
<u>Demand Analysis</u>	A study of the factors affecting the schedule of demand for a good or service, including the price-quantity relationship, if applicable.
<u>Departure</u>	In order to meet overall multiple-use objectives, the Secretary of Agriculture may establish an allowable sale quantity for any decade that departs from the projected long-term average sale quantity that would otherwise be established.

<u>Developed Recreation</u>	A relatively small, distinctly defined area where facilities are provided for concentrated public use (campgrounds, picnic areas, swimming areas).
<u>Diameter Breast Height (d.b.h.)</u>	4.5 feet above ground height.
<u>Discount Rate</u>	An interest rate that reflects the cost or time value of money. It is used in discounting future costs and benefits.
<u>Dispersed Recreation</u>	That portion of outdoor recreation use which occurs outside of developed sites, in the unroaded and roaded Forest environment.
<u>Diversity</u>	The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan.

E

<u>Endangered Species</u>	Plant or animal species identified by the Secretary of Interior as endangered in accordance with the 1973 Endangered Species Act.
<u>Ending Inventory Constraint (EIC)</u>	Constraint to ensure that the total timber volume left at the end of the planning horizon will equal or exceed the volume that would occur in a managed forest.
<u>Even-Aged Silviculture</u>	The combination of actions that result 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 ages between trees forming the main canopy level of the stand will not exceed 20 percent of the age of the stand at maturity. Cutting methods include: <u>Clearcutting</u> - The removal, in a single cut, of all trees in stands larger than seedlings. <u>Shelterwood Cutting</u> - The removal of all trees in a series of two or more cuts over a period of not more than 20 years. <u>Seed Tree Cutting</u> - Similar to clearcutting, except that a few of the better trees of the desired species are left scattered over the area to provide seed for regeneration.

Even Flow Maintaining a relatively constant supply of timber from year to year.

F

<u>Final Cut</u>	Removal of the last seed bearers or shelter trees after regeneration is considered to be established under a shelterwood system.
<u>Fixed Costs</u>	Costs that are not attributable to a varying level of output. With respect to Forest planning, these costs include nondeferrable activities for insuring public safety, environmental protection, and to maintain capital assets at agreed-upon levels of service.
<u>Flood Plain</u>	The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year.
<u>Forage</u>	Forage refers specifically to all browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvesting for feeding.

Forest and Rangeland
Renewable Resources
Planning Act

An Act of Congress requiring the preparation of a program for the management of the National Forest's renewable resources and of land and resource management plans for units of the National Forest System. It also requires a continuing inventory of all National Forest System lands and renewable resources.

FORPLAN

A linear programming system used for developing and analyzing Forest planning alternatives.

Forest-Wide Management
Guideline

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

Plants, both living and dead, and woody vegetative materials which are capable of burning.

Fuel Hazard

An accumulation of vegetative fuel that has a high risk of ignition or difficulty of suppression.

Fuel Treatment

The rearrangement or disposal of natural or activity fuels to reduce the fire hazard.

Full Service Management

Management of developed recreation facilities to provide optimum maintenance.

G

Grazing Allotment

See Range Allotment.

Guideline

An indication or outline of policy or conduct.

H

Habitat Type

An aggregation of all land areas potentially capable of producing similar plant communities at climax.

I

Indicator Species

A species selected because its population changes indicate effects of management activities on the plant and animal community. A species whose condition can be used to assess the impacts of management actions on a particular area.

Integrated Pest
Management

Activities undertaken to control insect and disease infestations in tree stands, given consideration for other resource values.

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.

Issue

See Public Issue.

K

Key Winter Range

The smaller portion of the total year's range where big game animals find food and/or cover during severe winter weather. "Key winter" areas limit the number of animals the range can support.

L

<u>Landtype</u>	An area of land classified on the basis of geomorphic principles. An understanding of geologic processes (as reflected in land surface form and features), individual kinds of soil, and the factors which determine the behavior of ecosystems (i.e., climate, vegetation, relief, parent materials, and time) is used as the basis of this classification system.
<u>Landtype Group</u>	A logical grouping of landtypes that facilitates resource planning.
<u>Leasable Minerals</u>	See Minerals, Leasable.
<u>Linear Programing</u>	A mathematical method used to determine the most effective allocation of limited resources between competing demands when both the objective (e.g. profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities (e.g., $y=a+bx$).
<u>Local Roads</u>	Roads constructed and maintained for, and frequented by, the activities of a given resource element. Some use 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.
<u>Locatable Minerals</u>	See Minerals, Locatable.
<u>Long-Term Sustained Yield Capacity (LTSY)</u>	The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified intensity of management consistent with multiple use objectives.

M

<u>M</u>	Thousand.
<u>MM</u>	Million.
<u>MBF</u>	Thousand Board Feet.
<u>MMBF</u>	Million Board Feet.
<u>MMCF</u>	Million Cubic Feet.
<u>Management Action</u>	Any activity undertaken as part of the administration of the Forest.
<u>Management Area</u>	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.
<u>Management Concern</u>	An issue or problem requiring resolution, or a condition constraining the range of management practices. These are identified by Forest Service personnel in the planning process.
<u>Management Direction</u>	A statement of multiple use and other goals and objectives, the management prescriptions, and the associated standards and guidelines for attaining them.
<u>Management Emphasis</u>	The primary management intent of a multiple use management prescription.
<u>Management Intensity</u>	The management practice or combination of management practices and their associated costs designed to obtain different levels of goods and services.
<u>Management Practice</u>	A specific measure, action, or treatment.

<u>Management Prescription</u>	Management practices and intensities selected and scheduled for application in a specific area to attain multiple use and other goals and objectives.
<u>Marginal Component</u>	The portion of the regulated commercial forest land on which it is presently not feasible (economically or technologically) to manage for timber harvest because of soil constraints, difficulties in establishing tree regeneration, or excessive developmental costs.
<u>Marginal Cost</u>	The change in total costs associated with a given change in output.
<u>Market Benefits</u>	Resources valued in terms of what people are willing to pay for them as evidenced by market transactions.
<u>Maximum Modification</u>	See Visual Quality Objectives.
<u>Mean Annual Increment</u>	The total increase in girth, diameter, basal area, height, or volume of individual trees or a stand up to a given age divided by that age.
<u>Minerals, Common</u>	Common rock, gravel, and sand deposits used generally for road construction and maintenance.
<u>Minerals, Leasable</u>	Coal, oil, gas, phosphate, sodium, potassium, oil shale, sulphur, and geothermal steam.
<u>Minerals, Locatable</u>	Those hardrock minerals which are mined and processed for the recovery of the minerals; often metallic. May include certain nonmetallic minerals and uncommon varieties of mineral materials such as valuable and distinctive deposits of limestone and silica. May include any solid, natural inorganic substance occurring in the crust of the earth, except for the common varieties of mineral materials and leasable minerals.
<u>Minimum Level of Management</u>	A benchmark level used to develop alternatives.
<u>Minimum Viable</u>	See Viable Population.
<u>Modification (VQO)</u>	See Visual Quality Objectives.
<u>Monitoring and Evaluation</u>	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.
<u>Multiple Use</u>	The management of all renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily with the combination of uses that will give the greatest dollar return or the greatest unit output.

N

<u>NDSY</u>	See nondeclining sustained yield.
<u>NEPA</u>	National Environmental Policy Act.
<u>NFMA</u>	National Forest Management Act.

<u>Net Public Benefits</u>	An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield.
<u>No-action Alternative</u>	The most likely condition expected to exist in the future if the current management direction would continue unchanged.
<u>Noncommodity Outputs</u>	A resource output that cannot be bought and sold.
<u>Nonconsumptive Use</u>	Those uses of resources that do not reduce the supply. For example: Nonconsumptive uses of water include hydroelectric power generation, boating, swimming, etc.
<u>Nondeclining Sustained Yield</u>	A level of timber production in which the planned sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade.
<u>Nonmarket Benefits</u>	Goods and services valued in terms of what reasonable people would be willing to pay rather than go without the output. Those obtaining the outputs do not pay all or part of what they would be willing to.
<u>Nonstocked</u>	Deforested land where woody vegetation is less than 15 feet tall and produces less than 40 percent crown cover as determined by photogrammetry.

O

<u>Off-Road Vehicle</u>	Any vehicle capable of being operated off an established road or trail.
<u>Old-Growth</u>	A stand of trees that is past full maturity and showing decadence; the last stage in forest succession.
<u>Opportunity Cost</u>	An opportunity cost is calculated as the difference between the present net value of the alternatives and the present net value of the maximum PNV benchmark.
<u>ORV</u>	See Off-Road Vehicle.
<u>Outputs</u>	Goods, end products, or services that are purchased, consumed, or utilized directly by people. A broad term for describing any result, product, or service that a process or activity actually produces.
<u>Overmature Timber</u>	Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.
<u>Overstory</u>	That portion of the Forest of more than one story which forms the uppermost canopy.

P

<u>PAOT</u>	Persons-at-one-time; used to reflect the capacity of developed recreation sites.
<u>Partial Retention</u>	See Visual Quality Objectives.
<u>PC</u>	See Productivity Class.
<u>Permitted Grazing</u>	Use of a National Forest range allotment under the terms of a grazing permit.
<u>Person Year (Work Year)</u>	A person year equals 2,080 hours of work time. A person year may be one person working yearlong or several persons filling seasonal positions.

<u>Planning Criteria</u>	Standards, tests, rules, and guidelines by which the planning process is conducted and upon which judgments and decisions are based.
<u>Planning Horizon</u>	The 150-year time frame analyzed in the Forest planning process.
<u>Planned Ignition</u>	A fire started by a deliberate management action.
<u>PNV</u>	See Present Net Value.
<u>Practice</u>	See Management Practice.
<u>Precommercial Thinning</u>	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. This practice is also important for lowering stand susceptibility to mountain pine beetle.
<u>Preparatory Cut</u>	Removal of trees near the end of a rotation so as to permanently open the canopy and enlarge the crowns of seed bearers, with a view to improving conditions for seed production and natural regeneration, as typically in shelterwood systems.
<u>Prescribed Fire</u>	A wildland fire burning under specified conditions which will accomplish certain planned objectives. The fire may result from either planned or unplanned ignitions. Plans for use of unplanned ignitions for this purpose must be approved by the Regional Forester.
<u>Prescription</u>	See Management Prescription.
<u>Prescription</u>	A predesignated set of criteria established for the use of prescribed fire to accomplish specific land and resource management objectives.
<u>Present Net Value</u>	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.
<u>Preservation (VQO)</u>	See "Visual Quality Objectives."
<u>Presuppression</u>	Activities required in advance of fire occurrence to ensure effective suppression action. Includes (1) recruiting and training fire forces; (2) planning and organizing attack methods; (3) procuring and maintaining fire equipment; and (4) maintaining structural improvements necessary for the fire program.
<u>Priced Benefits</u>	Benefits which can be assigned a dollar value, whether they are market or non-market values. Market values include stumpage value of timber. Non-market values include the user's willingness-to-pay for recreation experiences.
<u>Priced Outputs</u>	Resource outputs that have marked or assigned dollar values.
<u>Production Potential</u>	The capability of the land or water to produce life-sustaining features (forage, cover, aquatics).
<u>Productivity Class</u>	Productivity is a classification of forest land in terms of capacity for cubic annual growth per acre (culmination of mean annual increment in fully stocked natural stands).
<u>Public Issue</u>	A subject or question of widespread public interest identified through public participation relating to management of National Forest System lands.
<u>Purchaser Credit</u>	The dollar amount allowed in a timber sale contract for construction or reconstruction of specified roads.

R

<u>Range Allotment</u>	A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.
<u>Range, Key Winter</u>	See Key Winter Range.
<u>Range, Transitory</u>	See Transitory Range.
<u>Range Vegetation Types</u>	Nezperce NF types include: P-1, mountain grassland; P-2, mountain meadow and riparian meadow; P-5, browse-mountain shrub; P-6, conifer.
<u>RARE II</u>	See Roadless Area Review and Evaluation II.
<u>Real Dollar Value</u>	A value from which the effect of change in the purchasing power of the dollar has been removed.
<u>Recreation Capacity</u>	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.
<u>Recreation Information Management (RIM)</u>	A computer-oriented system for the management of information about recreation places managed by the Forest Service, facilities that are placed on those places, and the uses made of both by people. It furnishes current information on the identification, location, dimensions, condition, and recreation-use of each recreation site and area in the National Forest System.
<u>Recreation Opportunity Spectrum (ROS)</u>	A system for planning and managing recreation resources that recognizes recreation activity opportunity, recreation setting opportunity, and recreation experience opportunity along a spectrum or continuum.
<u>Recreation Types</u> -	<u>Developed Recreation</u> - The type of recreation that occurs where modifications enhance recreation opportunities and accommodate intensive recreation activities in a defined area. <u>Dispersed Recreation</u> - 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.
<u>Recreation Visitor Day</u>	One visitor day equals 12 hours (one person for 12 hours, or 12 people for 1 hour, or any combination thereof).
<u>Reforestation</u>	The renewal of forest cover by seeding, planting and natural means.
<u>Regeneration</u>	The renewal of a tree crop, whether by natural or artificial means.
<u>Regeneration Harvest</u>	Removal of trees intended to encourage renewal or improvement of a tree crop.
<u>Region</u>	For regional planning purposes, the standard administrative region of the Forest Service administered by the responsible official for preparing a regional plan; the area to be covered by a regional plan. (For socio-economic analyses: Idaho, NezPerce, Lewis, and Clearwater Counties.)
<u>Regulated</u>	The commercial forest land, and its inventory, that will be organized for timber production under the principle of sustained yield. The harvest of timber from this land will be regulated to achieve multiple long-range objectives, such as maintaining a setting for recreational activities, rotating forage production areas and wildlife habitat, increasing water yield, and increasing the growth and utilization of timber for the Nation's supply.

<u>Release Cutting</u>	Frees a young stand of desirable trees not past the sapling stage from the competition of undesirable trees that threaten to suppress them. A cleaning is a form of release cutting that removes trees the same age as the young stand. A liberation cutting is a form of release that removes older, larger trees that overtop a more desirable younger stand.
<u>Research Natural Area</u>	An area which is as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes; commercial and general public use is not allowed.
<u>Retention (VQO)</u>	See Visual Quality Objectives.
<u>RIM</u>	See Recreation Information Management.
<u>Riparian</u>	Land areas which are directly influenced by water. Usually have visible vegetative or physical characteristics showing this water influence. Streamsides, lake borders, or marshes are typical riparian areas.
<u>Riparian Areas</u>	Streams, lakes, ponds, wetlands, flood plains, and their associated aquatic and riparian ecosystems.
<u>Roadless Area</u>	Undeveloped Federal land within which there are no improved roads or roads maintained for travel by means of motorized vehicles intended for highway use.
<u>Roadless Area Review and Evaluation (RARE) II</u>	The assessment of "primitive" areas within the National Forests as potential wilderness areas as required by the Wilderness Act. This refers to the second such assessment, which was documented in the final environmental impact statement of the Roadless Area Review and Evaluation, January 1979.
<u>Road Credits</u>	Credits timber purchasers receive applied toward the sale price of timber in exchange for building the roads needed for access.
<u>Road Maintenance Levels</u>	Levels are described as follows: <ul style="list-style-type: none"> a. Level 1: Road normally closed to vehicle traffic. b. Level 2: Road open for limited passage of traffic but not normally suitable for passenger cars. c. Level 3: Road open for public traffic including passenger cars, but which may not be smooth or comfortable. d. Level 4: Road suitable for all types of vehicles, generally smooth to travel and dust-controlled. e. Level 5: Smooth and dust-free road, with a skid resistant surface if paved.
<u>Road Management</u>	The administrative decisions on the location and timing of road and trail closures.
<u>Rotation</u>	The planned number of years between the formation or regeneration of a crop or stand and its final cutting at a specified stage of maturity.
<u>RPA</u>	See Forest and Rangeland Renewable Resources Planning Act.
<u>RPA Program</u>	The recommended direction for long-range management of renewable resources of National Forest System lands. This direction serves as the basis for the Regional targets assigned to the Forest. The development of this direction is required by the Forest and Rangeland Renewable Resources Planning Act.
<u>RVD</u>	See Recreation Visitor Day.

S

<u>Sale Schedule</u>	See Timber Harvest Schedule.
<u>Salvage Harvest</u>	The exploitation of trees that are dead, dying, or deteriorating (e.g., because overmature or materially damaged by fire, wind, insects, fungi, or other injurious agencies) before their timber becomes worthless.
<u>Sawtimber</u>	Trees suitable in size and quality for producing logs that can be processed into lumber.
<u>Scoping Process</u>	The public and management activities used to determine the range of actions, alternatives, and impacts to be considered in an environmental impact statement.
<u>Sediment</u>	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.
<u>Seed Tree Cut</u>	Removal of trees in a mature stand so as to affect permanent opening of its canopy (if there is no preparatory cutting to do this) and so provide conditions for securing regeneration from the seed of trees retained for that purpose; the first of the shelterwood cuttings under a shelterwood system.
<u>Seedling/Sapling</u>	A forest successional stage in which trees less than 5 inches in diameter are the predominant vegetation.
<u>Selection Cutting</u>	The annual or periodic removal of trees (particularly mature trees), individually or in small groups, from an uneven-aged forest in order to realize the yield and establish a new crop of irregular constitution.
<u>Seral Vegetation</u>	The vegetation that occupies a site following disturbance. This vegetation will not reproduce itself without continued disturbance.
<u>Shelterwood Cutting</u>	Designed to establish a new crop under a remaining portion of the old stand, providing both a seed source and protection of the site and seedlings.
<u>Silvicultural Systems</u>	The entire process whereby forests are tended, harvested, and replaced. It includes all cultural management practices performed during the life of the stand such as regeneration cutting, fertilization, thinning, improvement cutting, and use of genetically improved tree seeds and seedlings to achieve multiple resource benefits. Systems are classified as even-aged and uneven-aged.
<u>Site Preparation</u>	Production capability of specific areas of land.
<u>Slash</u>	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.
<u>Small Game</u>	Birds and small mammals normally hunted or trapped.
<u>Snag</u>	Standing dead tree larger than 6 inches in diameter at breast height.
<u>Social Analysis</u>	A phase in the planning process which (1) identifies groups (whether formally organized or not) who may be affected by or have an interest in planning decisions; (2) gathers and quantifies (objectively when possible) both the preferences of these groups and possible consequences of proposed alternatives on these groups; (3) evaluates the role of social group preferences and consequences in resource allocation decisions; and (4) determines how a given plan should be formulated (or adjusted) so as to respond to these evaluations and to generally define social equity criteria.
<u>Social Stability</u>	The maintenance of existing interactions between local groups, which are affected by the continuity of social and economic values within a community.
<u>Soil Productivity</u>	The capacity of a soil to produce a specific crop such as fiber and forage, under defined levels of management. It is generally dependent on available soil moisture, and nutrients and length of growing season.

Special 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.

Standard A principle requiring a specific level of attainment, a rule to measure against.

Stream Order Stream order is a measure of the position of a stream in the hierarchy of tributaries. The order of a stream is always one higher than the order of its largest tributary. For example, first-order streams are those which have no tributaries. Second-order streams are those which have only first-order channels as tributaries. The third-order stream receives as tributaries only first- and second-order channels.

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 (Technically), Land (Available), Capable, and Suitable) Land for which technology is available that will ensure timber production without irreversible resource damage to soils, productivity, or watershed conditions. There is reasonable assurance that such lands can be adequately restocked as provided in CFR 219.13(H)(3).

Suppression (Fire) All the work of extinguishing or confining a fire, beginning with its discovery.

Sustained Yield The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairing the productivity of the land.

T

Temporary Road A road that will be physically obliterated and seeded after its primary use is completed (i.e., spur road for logging); it will not be used again.

Thermal Cover Cover used by animals to ameliorate 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) A species or subspecies of animal or plant whose prospects of survival and reproduction is in immediate jeopardy or likely to become so within the foreseeable future. Threatened species are identified by the Secretary of Interior in accordance with the 1973 Endangered Species Act.

Tiering Tiering refers to the coverage of general matters in broad environmental impact statements with subsequent statements covering more narrow topics or environmental analysis. Project environmental assessments are "tiered" to the Forest Plan EIS.

Timber Base The lands within the Forest capable, available, and suitable for timber production.

Timber Harvest Schedule The quantity of timber planned for sale and harvest, by time period, from the area of land covered by the Forest Plan. The first period, usually a decade, of the selected harvest schedule provides the allowable sale quantity. Future periods are shown to establish that sustained yield will be achieved and maintained.

Timber Production The growing, tending, harvesting, and regeneration of regulated crops of industrial wood. Industrial wood includes logs, bolts, or other round sections cut from trees for industrial or consumer use, except fuelwood.

Timber Stand Improvement (TSI) A loose term comprising all intermediate cuttings made to improve the composition, constitution, condition, and increment of a timber stand.

Trailhead The parking, signing, and other facilities available at the terminus of a trail.

Transitory Range

Land that is suitable for grazing use only 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.

Two-Step Shelterwood

An even-aged silvicultural system in which the old crop (shelterwood) is removed in two successive cuttings in order to provide a source of seed and/or protection for regeneration.

U

Understory

The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth.

Uneven-aged
Silviculture

The combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection.

Individual Tree Selection Cutting - Involves the removal of selected trees of all size classes on an individual basis.

Group Selection Cutting - Involves the removal of selected trees of all size classes in groups of a fraction of an acre up to 2 or 3 acres in size.

Unplanned Ignition

A fire started at random by either natural or human causes, or a deliberate incendiary fire.

Unproductive Forest
Land

Forest land of such low site quality that it is generally not capable of producing 20 cubic feet per acre per year of industrial wood products. Synonymous with noncommercial forest land.

Unregulated Harvest

This harvest is not charged against the allowable sale quantity. It includes occasional volumes removed that were not recognized in calculations of the allowable sale quantity, such as cull or dead material and noncommercial species and products. It also includes all volume removed from nonsuitable areas. Harvests from nonsuitable areas will be programmed as needed to meet multiple use objectives other than timber production and for improvement of administrative sites.

Unsuitable Lands

Lands not allocated to timber management, or not suitable as determined through the suitability analysis.

Utility Corridor

Corridor of land which is designated for energy transmission lines.

Utilization Standards

Standards guiding the use and removal of timber. They are measured in terms of diameter at breast height (d.b.h.) and type of the tree inside the bark (top d.i.b.) and the percentage of "soundness" of the wood.

V

Viable Population

A wildlife or fish population of sufficient size to maintain its existence over time in spite of normal fluctuations in population levels.

Visual Quality
Objectives (VQO)

A desired level of excellence based on physical and sociological characteristics of an area. Refers to the degree of acceptable alteration of the characteristic landscape.

(a) Preservation - Allows only ecological changes. Management activities, except for very low visual impact recreation facilities, are prohibited. This objective applies to specially classified areas, including wilderness.

(b) Retention - Provides for management activities that are not visually evident. Management activities are permitted, but the results of those activities on the natural landscape must not be evident to the average viewer.

(c) Partial Retention - Management activities may be evident to the viewer, but must remain visually subordinate to the surrounding landscape.

(d) Modification - Management activities may visually dominate the natural surrounding landscape, but must borrow from naturally established form, line, color, and texture.

(e) Maximum Modification - Land management activities can dominate the natural landscape to greater extent than in the modification objective, except as viewed from background when visual characteristics must be those of natural occurrences within the surrounding area.

Visual Resource

The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors.

VQO

See Visual Quality Objectives.

W

Wallow

A depression, pool of water, or wet area produced or utilized by elk or moose during the breeding season.

Water Yield Increase

Additional water released to the Forest streams as a result of Forest management activities.

Wet Areas

Often referred to as "moist sites," they are very important components of elk summer range. These sites, often occurring at the heads of drainages, may be wet sedge meadows, bogs, or seeps. Sites near water are important because the forage they produce is highly nutritious and heavily utilized by elk.

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.

Wildfire

Any wildland fire that requires a suppression response.

Withdrawal

An order removing specific land areas from availability for certain uses.

Work Year Equivalent

Approximately 2,000 working hours. May be filled by one person working yearlong or several people filling seasonal positions.

Y

Yarding

The operation of hauling timber from the stump to a collection point.

Z

Zone of Influence

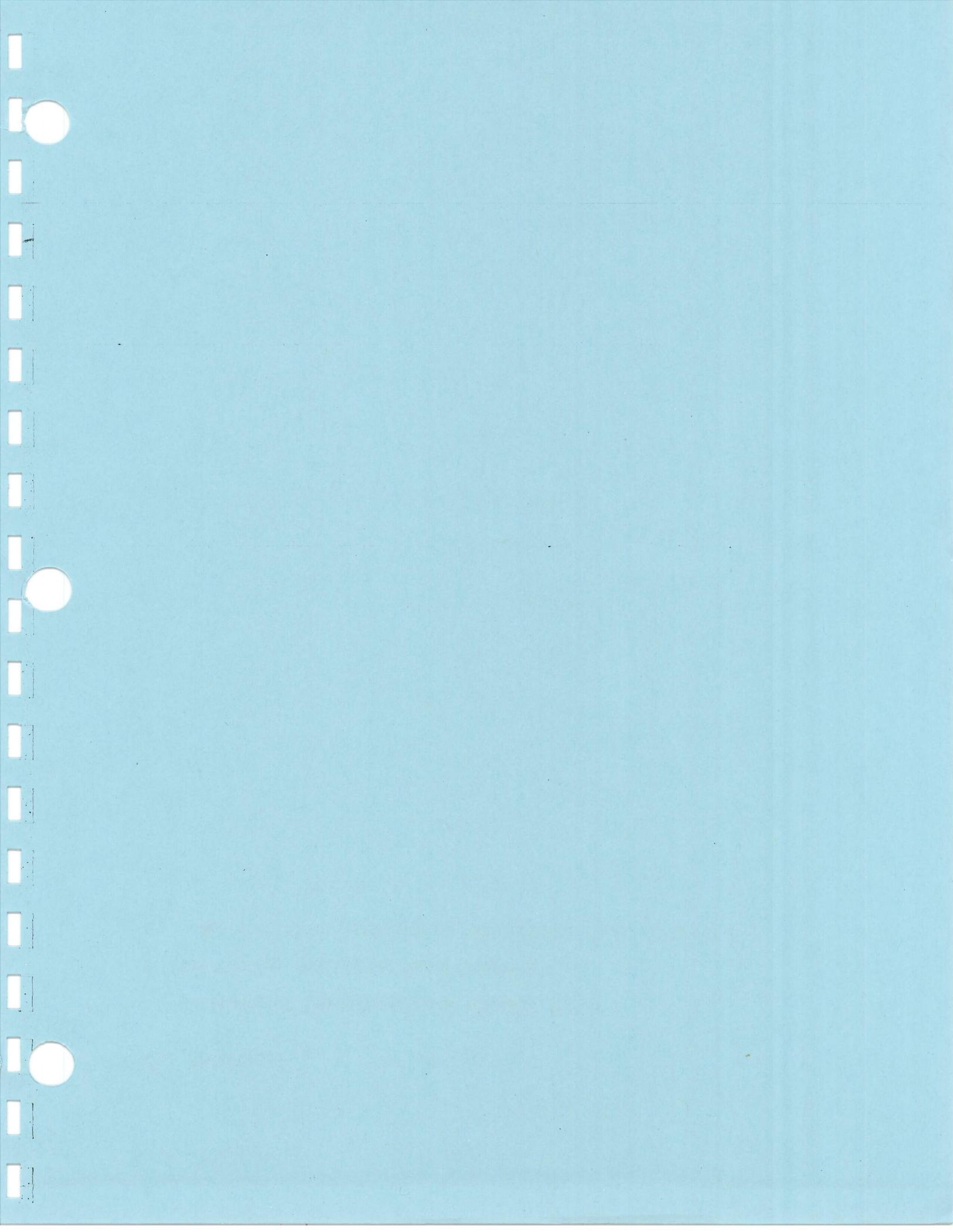
The geographic area surrounding and intermingled with National Forest lands wherein people live whose lives are most directly impacted by forest management decisions and activities.

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VI. APPENDICES

- A. Section 4 of the Endangered Wilderness Act
- B. Critique of the SNOWSED Watershed Model
- C. Comparison of Effects Between Alternatives E, G, H, and H-2



APPENDIX A

Section 4 - Endangered American
Wilderness Act

↘ GOSPEL-HUMP AREA

note.

SEC. 4. (a) (1) In furtherance of the purposes of the Wilderness Act, certain lands in the Nezperce National Forest, Idaho, which comprise about two hundred and six thousand acres, as generally depicted under the category "Wilderness" on a map entitled "Gospel-Hump Planning Unit" and dated January 1978, are hereby designated as wilderness

16 USC 1132
note.

and therefore, as components of the National Wilderness Preservation System.

(2) Certain other contiguous roadless lands which comprise about ninety-two thousand acres, as generally depicted on said map as "Management Areas" shall be managed in accordance with the multipurpose resource development plan required by this section.

(3) Certain other contiguous roadless lands which comprise about forty-five thousand acres, as generally depicted on said map as "Development Areas" shall be immediately available for resource utilization under the existing applicable Forest Service land management plans.

Advisory
Committee.
Establishment.

(b) (1) Within ninety days after enactment of this Act, the Secretary shall appoint a seven-member Advisory Committee (hereinafter referred to as the "Committee") on the management of the Gospel-Hump Area who shall advise the Secretary as to the progress of the fish and game research program, and the multipurpose resource development plan required by this section, and who shall evaluate the results of the research program and development plan on an ongoing basis.

Members.

(2) The Committee shall be comprised of two members of the timber industry who purchase timber from the Nezperce National Forest, two members from organizations who are actively engaged in seeking the preservation of wilderness lands, and three members from the general public who otherwise have a significant interest in the resources and management of the Gospel-Hump Area.

Travel expenses.

(3) Committee members shall serve without pay except that while away from their homes or regular places of business in performance of services for the Committee, members of the Committee shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in the Government service are allowed under section 5703 (b) of title 5 of the United States Code.

(4) The Secretary shall provide that the Committee shall meet as soon as practicable after all the members are appointed, but in no case later than one hundred and fifty days after the enactment of this Act. Subsequently, the Committee shall meet every one hundred and eighty days, or as often as the Secretary deems necessary.

Termination.

(5) The Committee shall terminate one hundred and fifty days after transmittal of the completed multipurpose resource development plan required under this section.

Fish and game
research
program.

(c) (1) The Secretary shall cooperate with agencies and institutions of the State of Idaho, and with the Secretary of the Interior, in conducting a comprehensive fish and game research program within the Gospel-Hump Area and surrounding Federal lands in north-central Idaho. The Secretary shall assure that this research program includes detailed investigations concerning resident and anadromous fisheries resources (including water quality relationships) and the status, distribution, movements, and management of game populations, in order to provide findings and recommendations concerning integration of land management and development with the protection and enhancement of these fish and game resources.

Grants.

(2) To carry out the comprehensive fish and game research program, the Secretary is authorized to make grants of funds to agencies and institutions of the State of Idaho and to provide the assistance of personnel from agencies under his jurisdiction.

(3) The Secretary shall assure that the comprehensive fish and game research program is scheduled and progressing on a timely basis so that findings and recommendations are fully integrated in preparation of the multipurpose resource development plan required by this section.

(d) (1) Within four years after enactment of this Act, the Secretary shall implement a multipurpose resource development plan for development of the Federal lands identified on the map referenced in this section as "Management Areas".

Multipurpose
research
development
plan.

(2) The multipurpose resource development plan shall comply with the provisions of the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528) and the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476; 16 U.S.C. 1601) as amended, and shall conform in all respects to the provisions of the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600), including the regulations, guidelines, and standards promulgated pursuant to those Acts. In preparing the multipurpose resource development plan, the Secretary shall take particular care to gather and integrate detailed field data on soil types and soil hazards, and to consider timber volumes, timber site classes, and productivity. The current findings and recommendations of the comprehensive fish and game research program and other available information shall be integrated into the preparation of the multipurpose resource development plan. The multipurpose resource development plan may be periodically revised to accommodate new information as it becomes available.

(3) In preparing the multipurpose resource development plan, the Secretary shall assure adequate public involvement, and he shall make full use of the recommendations of the Committee established by this section.

(4) One year after the date of enactment of this Act and every year thereafter, the Secretary shall review the multipurpose resource development plan being prepared in accordance with this section to determine which lands, if any, might be scheduled for development prior to the completion of the final multipurpose resource development plan.

(5) The Secretary shall publish a notice of the completion of the multipurpose resource development plan or a portion thereof in the Federal Register and shall transmit it to the President and to the Senate and House of Representatives. The completed multipurpose resource development plan or relevant portions thereof shall be implemented by the Secretary no earlier than ninety days and no later than one hundred and fifty calendar days from the date of such transmittal.

Completion
notice.
Publication in
Federal Register.
Transmittal to
President and
Congress.

(e) The Secretary shall prepare a wilderness management plan for the Gospel-Hump Wilderness designated pursuant to this section, taking into account the findings of the comprehensive fish and game research program.

Wilderness
management
plan.

(f) Within thirty days after the date of enactment of this Act, the Secretary shall include the timber resources on the lands identified on the map referenced in this section as "Development Areas" and "Management Areas" within the annual allowable timber harvest level for the Nezperce National Forest.

(g) Nothing in this Act shall prevent within the Gospel-Hump Wilderness Area any activity, including prospecting, for the purpose of gathering information about mineral or other resources, if such activity is carried on in a manner compatible with the preservation of the wilderness environment. Furthermore, in accordance with such program as the Secretary of the Interior shall develop and conduct in consultation with the Secretary, the Gospel-Hump Wilderness Area shall be surveyed on a planned recurring basis consistent with the concept of wilderness preservation by the Geological Survey and the Bureau of Mines to determine the mineral values, if any, that may be present, and the results of such surveys shall be made available to the public and submitted to the President and the Congress.

Mineral value
survey,
availability to
public.
Submittal to
President and
Congress.

Appropriation
authorization.

(h) There are hereby authorized to be appropriated after October 1, 1978, such funds as may be necessary to carry out the comprehensive fish and game research program and the multipurpose resource development plan authorized under this section. Appropriations requests by the President to implement the multipurpose resource development plan shall express in qualitative and quantitative terms the most rapid and judicious manner and methods to achieve the purposes of this Act. Amounts appropriated to carry out this Act shall be expended in accordance with the Budget Reform and Impoundment Control Act of 1974 (88 Stat. 297).

31 USC 1301
note.

ADMINISTRATION OF WILDERNESS AREAS

16 USC 1131
note.
Effective date.

SEC. 5. Subject to valid existing rights, each wilderness area designated by this Act shall be administered by the Secretary in accordance with the provisions of the Wilderness Act: *Provided*, That any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this Act: *Provided further*, That with respect to the Gospel-Hump Wilderness Area designated by section 4(a)(1) of this Act, all references under section 4(d)(3) of the Wilderness Act of 1964 to December 31, 1983, shall be deemed to be December 31, 1988, and any reference to January 1, 1984, shall be deemed to be January 1, 1989: *Provided, however*, That all activities resulting from the exercise of valid existing mineral rights on patented or unpatented mining claims within the Gospel-Hump Wilderness Area shall be subject to regulations prescribed by the Secretary as he deems necessary or desirable for the preservation and management of this area.

16 USC 1133.

FILING OF MAPS AND DESCRIPTIONS

SEC. 6. As soon as practicable after enactment of this Act, a map and a legal description of each wilderness area shall be filed with the Committee on Energy and Natural Resources of the United States Senate and the Committee on Interior and Insular Affairs of the House of Representatives, and each such map and description shall have the same force and effect as if included in this Act: *Provided*, That correction of clerical and typographical errors in each such legal description and map may be made. Each such map and legal description shall be on file and available for public inspection in the Office of the Chief of the Forest Service, Department of Agriculture.

Approved February 24, 1978.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 95-540 (Comm. on Interior and Insular Affairs) and No. 95-861 (Comm. of Conference).

SENATE REPORTS: No. 95-490 (Comm. on Energy and Natural Resources), and No. 95-626 (Comm. of Conference).

CONGRESSIONAL RECORD:

Vol. 123 (1977): Sept. 12, considered and passed House.
Oct. 20, considered and passed Senate, amended.

Vol. 124 (1977): Feb. 8, Senate agreed to conference report.
Feb. 9, House agreed to conference report.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS:

Vol. 14, No. 8 (1978): Feb. 24, Presidential statement.



United States
Department of
Agriculture

Forest
Service

Intermountain Experiment Station
Moscow, ID 83843

o: 4100 Timber Management Research

Date: July 19, 1982

Subject: SNOWSED critique

To: Ed Laven, Nezperce N.F.

As we agreed at the July 7th meeting, a committee was set up to critique the SNOWSED watershed model and its application to the Gospel-Hump research program. This committee consists of Al Stage, Walt Megahan, Jack King and myself from INT, and Larry Tennyson from the Univ. of Idaho. Enclosed is a review draft of the critique. I would appreciate you sending it on to your hydrology, fishery and planning staff for comment. A final copy will go to Simons and Li, the model developers.

We are also finishing the Gospel-Hump research report, including a section about what we feel are the inadequacies in the model as they apply to the comparison of alternatives. I'll send this on to you tomorrow morning.

Thanks.

MELINDA MOEUR
Research Forester

cc:
Gibbs
Megahan
Stage
King
Tennyson

RECEIVED
NEZPERCE NF

JUL 20 1982

APPENDIX B

B-i



19-78

Critique of SNOWSED Watershed Model and Its Application to
the Evaluation of Gospel-Hump Alternatives

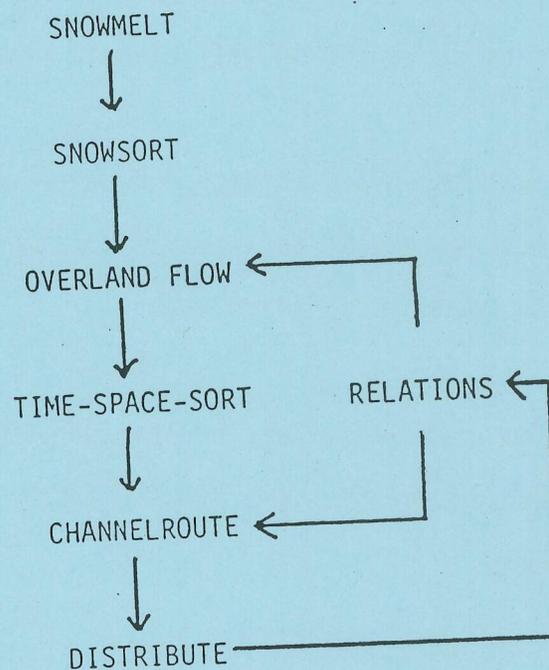
SNOWSED is a computer program which simulates the physical processes for the routing of water and sediment in forested watersheds. It was developed at Colorado State University under a Forest Service contract, intended for application to the Gospel-Hump research program. The model was intended to produce specific estimates of sediment deposition and scouring by size fraction within several stream channel types. This made it the necessary link for evaluating the effect of proposed management activities on fishery production in specific habitat types within Gospel-Hump drainages.

Simulating the Gospel-Hump activities was the first time this model had been used, and this application took place without prior extensive testing. Inevitably, certain deficiencies exist in the SNOWSED model, both in the model formulation and its application, making the reliability of its results questionable at best. We feel it is necessary to outline these problems so that they may be kept in mind when reviewing the predictions of sediment and fish production for the Gospel-Hump alternatives.

Subprogram critique

SNOWSED is actually several linked computer programs, each of which handles a specific task or group of tasks in the simulation. Model deficiencies are described for specific subprograms. The logical flow through the set of programs is diagrammed as:

SNOWSED SUBPROGRAM STRUCTURE (time loop through the system is one year)



SNOWMELT - This program is essentially the Leaf-Brink model (1973) which generates runoff from melting snow and rain events based on input of daily climatic data.

- No standard procedures are currently available for extrapolating climatic data from one location to another. Red River Ranger Station weather records were used, since no long-term onsite data was available for Gospel-Hump drainages. Resulting inaccuracies in timing and distribution of rain and snow influence the shape of the hydrograph and resulting sediment transport.

- Threshold temperatures in the model do not separate rain from snow events adequately. Consequently, storm hydrographs which should be occurring are often not simulated because the program is accumulating the precipitation as snowfall. The important rain-on-snow events occurring in this climate may not be modeled.

- This subprogram was developed in high elevation watersheds in Colorado and needs refinement for application to modified-maritime winter conditions found in northern Idaho.

SNOWSORT - This program divides the day's total snowmelt and rainfall among the intervals defined by the time steps within a day for input to the overland flow model.

- The distribution of melt and rain into 3-hour time steps within a day is not adequately modeled. For example, rain is currently distributed uniformly over the 24-hour period, which reduces the likelihood of intensities sufficient to produce overland flow.

OVERLANDFLOW - This program routes both water and sediment off of the watershed planes. The water is routed via subsurface or surface flow using kinematic wave techniques. Sediment is detached and transported off the planes by the surface runoff component based on tractive force formulae.

- The subsurface flow routing procedure did not work on receipt of this model. The subsequent corrections supplied by the model developers require further testing and review.
- This program does not allow for prediction of landslides and other mass wasting events under natural or managed situations. (The contract to develop the model did not request consideration of mass-wasting events, although their occurrence may greatly increase stream sedimentation.)
- The surface routing procedure does not allow for the concentration of surface runoff in draws, ephemeral streams, etc. Surface runoff and the erosion it generates are uniform over the entire plane. This greatly affects the amount and sizes of particles carried to the stream. In particular, it biases the particle size distribution toward the small particle sizes.
- All surface runoff generated by excess melt or rain is routed to the stream within the same day that the excess is produced. This

daily hydrograph limits the naturally integrated flow response of the watershed in time and space. Therefore, unrealistic high peak flows are often simulated.

-- The soil moisture bookkeeping in the model is suspect. Hand calculation of the water balance over selected time periods is not in agreement with model output. Additionally, there is some evidence that the number of planes and nodal points per plane affect the water budget. That is, the same drainage area split into different numbers of overland flow planes may produce different amounts of water.

TIMESPACESORT - This program sorts the hydrograph and sediment by channel segment for input to the channel routing model.

-- There appear to be no logical problems with this program, although its inefficiency may contribute to the high cost of executing the program.

CHANNELROUTE - This program routes water and sediment through the channel system. Water is routed as a function of channel characteristics and water input. Sediment transport capacity and subsequent actual transport is calculated using the Meyer-Peter-Mueller formula and the Einstein formula. Both deposition or scouring of the channel may occur, as can armoring of the channel bottom.

-- The channel bottom particle size distribution is assumed to be uniform throughout the channel. Likewise, any deposition or scour of material affects only the average particle size distribution. Local alterations of bottom materials, which may be very important in governing fisheries habitat, are not modeled.

-- This program cannot model a pool environment. Water surface is assumed parallel to the channel bottom so that input of a negative channel bottom slope, which occurs in a pool, causes the model to abort. Representation of a pool with a single cross-section does not describe the condition of a depression in the channel bottom. Since the fisheries biologists identify the overwinter pool environment as a factor limiting fish populations, this model deficiency is critical.

-- State variables describing channel slope are not updated until the end of the run, so that effects caused by within-season changes in channel geometry and changes in particle size distribution are ignored.

RELATIONS - This program uses actual channel cross-section measurements to calculate coefficients describing relationships between channel flow area, wetted perimeter and top width. These relationships, used in both the overland flow and channel routing models, have a significant impact on calculations which determine sediment transport in channel segments.

- Channel segments are necessarily long (as great as 20,000 ft) to reduce computing costs. A channel segment can be described by only one cross-section. This results in loss of resolution and creates a problem in selecting "representative" cross-sections for large channel segments.

- Critical fishery reaches, for which high resolution is demanded, can also be described by only one cross-section.

DISTRIBUTE - This program recomputes channel cross-sections by distributing the aggradation or degradation predicted by CHANNELROUTE. Redistributed cross-sections are input to the RELATIONS program to compute new channel coefficients.

- DISTRIBUTE never ran correctly and was abandoned. This must be considered as a major deficiency because without it, critical fishery reach cross-sections cannot be updated from one year to the next within a run. If a channel is significantly aggraded or scoured during a run, the sediment transport properties can no longer be considered realistic.

MODEL APPLICATION

SNOWSED is a large, complex, new model developed for use in the Gospel-Hump Area of northern Idaho. The majority of the effort with this model to date has been in development. Even though SNOWSED was designed to be a physical process model, many of its components still require empirical calibration. Our lack of experience in dealing with this model must be considered when reviewing the output. The Gospel-Hump estimates are first-time model run results and, for a large part, reflect our lack of knowledge about the sensitivity of many of the input parameters. Over 100 parameters are required for each watershed plane/channel segment combination, of which over 70 are coefficients which affect the calibration of the run. It is possible, using coefficient values entirely within the range of reason, to force the model to produce a wide range of results. The systematic evaluation of parameter values and resulting model behavior is an essential part of any modeling process. The extensive calibration procedure needed to make SNOWSED estimates more reliable has not been accomplished yet. Before this model is useful as a planning tool, a great deal of effort should be given to model application. This should include calibration of the model components with existing data from monitored watersheds; the collection of additional data, especially channel data, for calibration purposes; and an extensive testing phase on a variety of situations.

As applied to the Gospel-Hump watersheds, several major deficiencies were encountered. Some of these were not necessarily deficiencies in the model but stemmed from a lack of knowledge of how best to apply the model.

-- Most first and second order streams are not modeled as channels. They are incorporated into the watershed planes. Therefore, it was necessary to "force" surface runoff to occur on the planes to carry sediment to the main stream channels. Sediment field data from Horse Creek was used to aid in this application for an average water year. Extensive calibration and testing with these data was not done prior to extrapolation to the Gospel-Hump Area. Additionally, forcing the model to generate surface runoff on the planes created abnormal streamflow responses. We suspect the resulting flashiness in which sediment input from surface planes is coupled with a large runoff spike causes the channel to clean itself--in other words, fine sediment is being flushed out of the system during the same periods that surface erosion into the channel is occurring. This is a most critical deficiency in the application of the model and requires much more thought and effort before reasonable results can be expected.

-- The area of disturbance of roads used in the model was slightly less than actual, and the mitigation measures applied to the roads were assumed to occur at time 0 in the simulation. Thus there was no estimate of sediment produced during construction and before the mitigation treatments take effect. The model inputs need

restructuring to better simulate the timing of practices in the field and the actual magnitude of disturbance.

-- There is a large number of coefficients within the model that can be adjusted by the user. However, various combinations of a reasonable set of coefficients can produce quite different results. Again, this points out the need for extensive calibration and testing. Also, a uniform methodology for model application which specifically describes procedures for coefficient adjustment is needed. Much more field data should be collected to evaluate perturbation effects on at least some of the more important coefficients in the model.

COST

The model is presently very expensive to run, especially considering the costs of trial runs needed to obtain adequate calibration. Some potential improvements have been discussed, including restructuring the code to make it more computationally efficient and to include a scheme for varying the time step so that hydrologically "unimportant" periods can be modeled in less resolution than events of interest. Both of these are major research jobs requiring extensive time and effort. The decision has been made among INT research personnel to make limited changes that affect model behavior, then clean it up and document it so that future work is facilitated. There are no plans to adjust any estimates for Gospel-Hump evaluations.

Comparison with R-1, R-4, Sediment Estimates

As stated, the SNOWSED model is not currently producing reliable estimates of the size distribution of deposited or scoured material and is, therefore, not accurately portraying sediment impacts on fish. However, we have not yet addressed the question of reliability of total sediment production estimates. We need to compare the estimates of total sediment production (and also relative changes in total sediment between Gospel-Hump alternatives) at the mouths of the modeled watersheds with the sediment yields predicted by the R-1, R-4 guidelines. This comparison will establish whether the two methodologies are inconsistent.

Recommendations

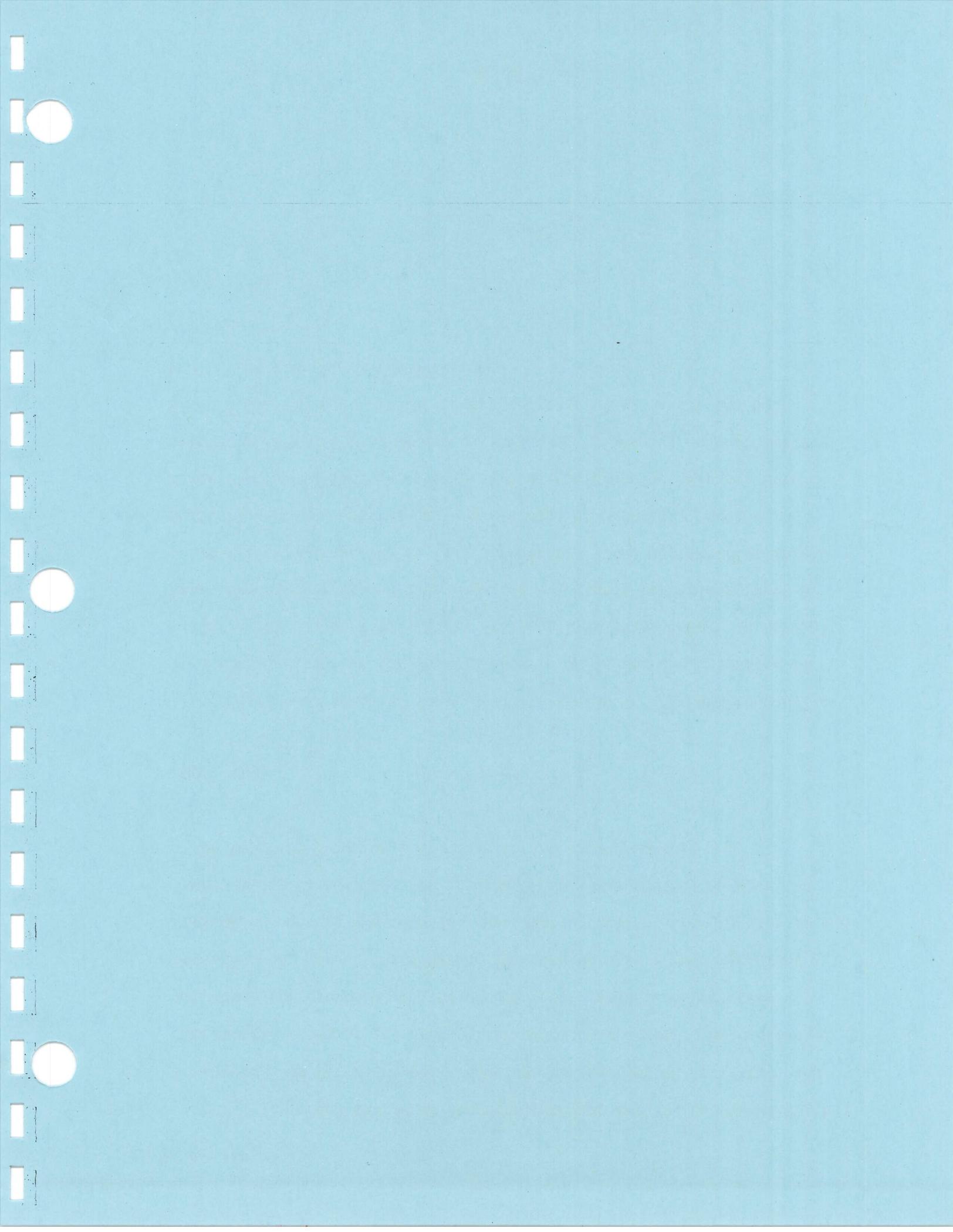
Based on our experience with the application of SNOWSED to the streams in the Gospel-Hump MRDA and on our analysis of the computer program itself, we make the following recommendations:

1. SNOWSED should not be used as a basis for land management decisions at its present stage of development.

2. The model should be thoroughly documented and published so that it can be used for hydrologic research purposes and to facilitate the substantial tasks of calibration for particular areas. The version of the model corresponding to the documentation should include some revisions to improve its behavior and ease of use. These revisions include changes to the submodel representing erosion from the planes and improvements in the transfer of data and program control between the seven separate programs that comprise the present model.

Conclusion

This review tends to focus on deficiencies in the SNOWSED model or in the application of the model; however, it is not our intention to minimize the value of this model or large simulation models in general. Given the specificity of data required on channel conditions (both by habitat type and season) to make appropriate links to fisheries models, physical process modeling has a great deal of promise. However, no model, including SNOWSED, should be used for planning purposes without considerable model testing and calibration. Given the present state of SNOWSED and the needs of the forest managers, this is not the best predictive tool currently available.



Nezpe
Natic
Fores

1920 Land and Resource Management Planning

September 2, 1982

Gospel-Hump Multipurpose Resource Development Plan

Committee Members

At the last committee meeting, you asked that we:

1. Prepare tables and graphs comparing alternatives E, G, H, and the H departure, and mail these to each of you.
2. Include a table that compares the E, G, H, and H departure for the Forest as a whole as well as the MRDP area.
3. Collect and furnish to each of you and the Idaho Congressional staff assistants information on costs incurred during the planning and research .
4. Include a form letter by which each of you will vote as to whether or not the original recommendation for Alternative G is to be reconsidered.

The graphs and tables are included. These are not presented in the same form as that used by the research people, but the graphs compare fish and sediment outputs for the first decade, and wildlife (elk), range, recreation, and timber for the first 5 decades for each of the alternatives E, G, H, and H departures. When the H departure is not shown, it is because the departure is exactly the same as alternative H, which is really the case for nearly everything for the first 5 decades.

The H departure was not selected by the Regional Forester when I met with him on August 20, but it could be selected any time in the next 50 years when we are satisfied that projections are accurate. The departure occurs, you will remember, between the fifth and thirteenth decades.

Our costs for the planning within the MRDP area are:

FY (Fiscal Year) 79 =	\$25,651
FY80 =	11,025
FY81 =	10,218
Estimate to complete FY82 =	8,000
Total =	<u>\$54,894</u>

We have delayed this report awaiting Dr. Stage's accounting. Al has his costs, but is still waiting for the Ogden and Washington office expenses. He said he will mail them to you directly as quickly as he can get them, and he is expecting them any day.

The form letter is enclosed. Please mark whether or not you are for or against reconsideration. If the majority of you favor reconsideration, we will schedule another meeting as quickly as we legally can, keeping in mind that we must advertise in the Federal Register first (this usually takes a minimum of 5 weeks). Please reply by September 15 if you possibly can.

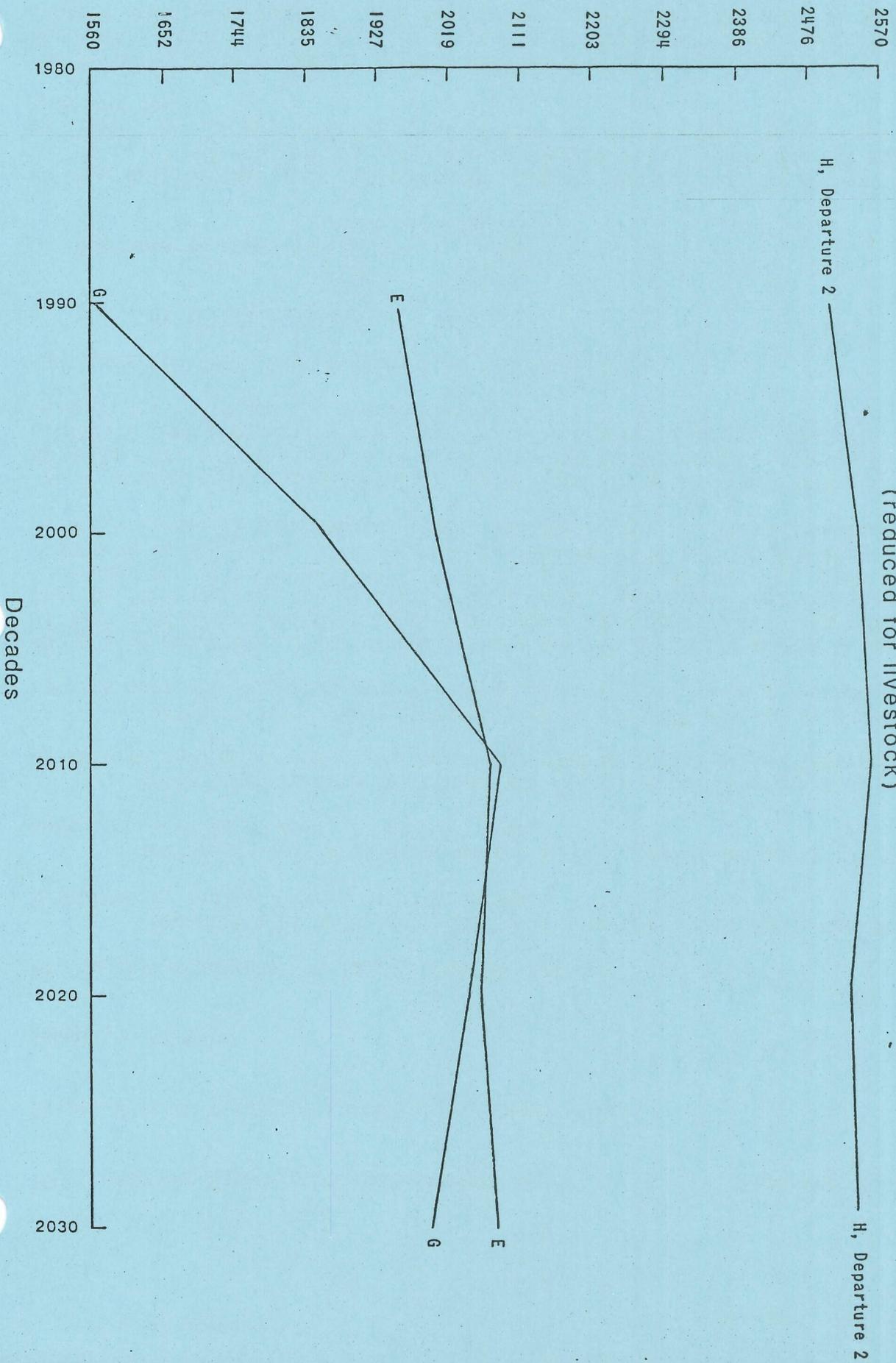
Enclosures

ED LAVEN

Q-1

0-2

Elk Numbers (Winter Range)



CONSUMPTIVE USES OF WILDLIFE (MRDP)

(reduced for livestock)

H, Departure 2

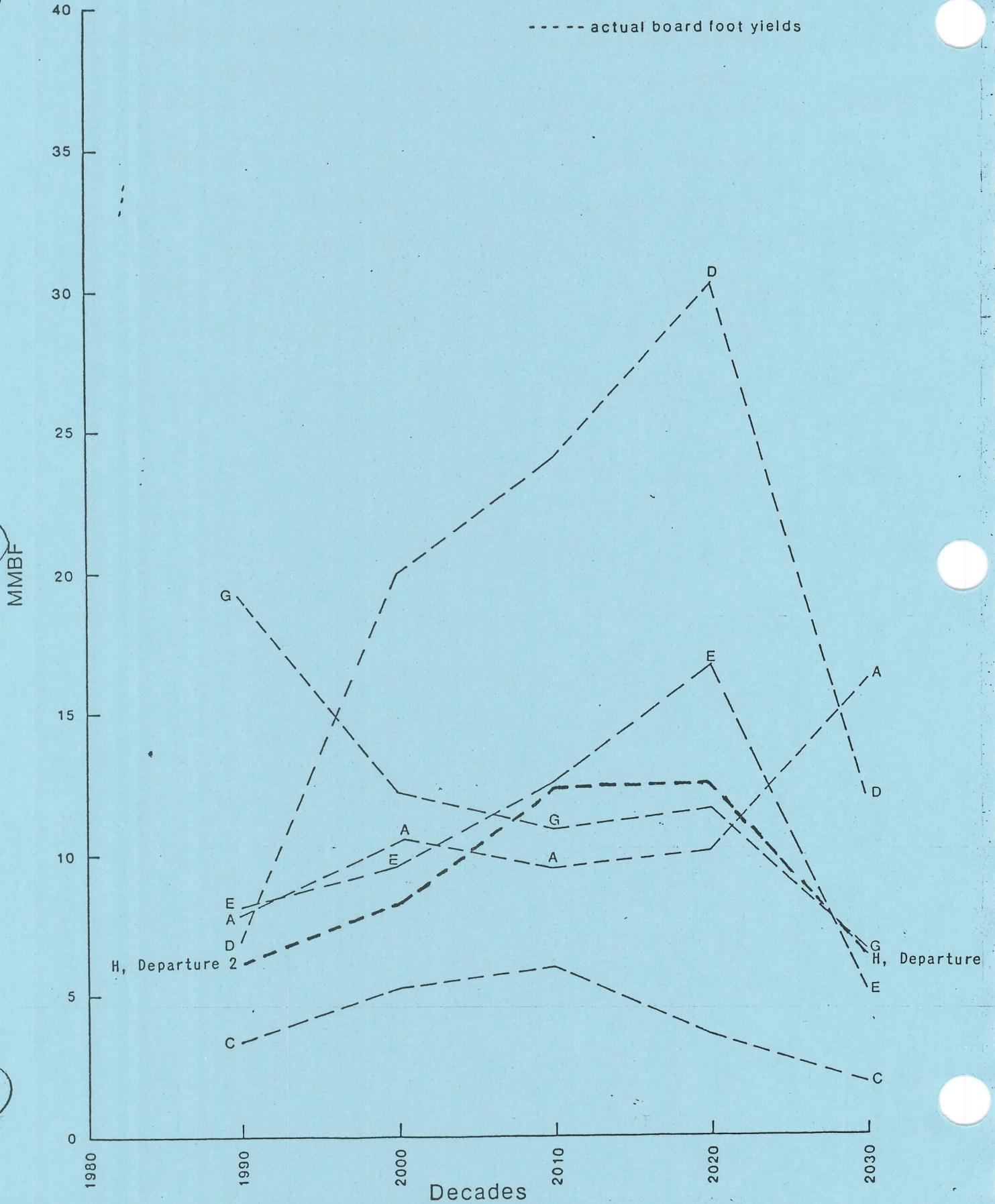
H, Departure 2

Decades

1980 1990 2000 2010 2020 2030

Decades	Range (a.u.m.'s)				Dispersed Recreation (MRVD's)			
	E	G	H	H-2	E	G	H	H-2
1	164	176	215	215	124.6	41.0	69.7	68.3
2	164	192	222	222	132.9	59.5	77.4	76.0
3	164	212	222	222	148.3	65.9	82.5	81.2
4	164	216	222	222	157.9	75.0	89.4	88.1
5	164	216	222	222	165.2	83.0	97.8	95.3

AVERAGE ANNUAL TIMBER SALE VOLUME - MRDP



Estimated Impacts of Alternative H on Stream Sedimentation for Various Prescription Watersheds
(Via Nezperce Sediment Prediction Model)

Watershed Name (Watershed Number)	AREA (Square Mile)	Natural, Background Sediment (Tons/Year)	1982-1991 Increase in Sediment Over Natural, Background Sediment										
			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	
Lower Johns Cr. (305-01-01)	8.35	254	0	0	0	0	0	2.2	0.9	0.3	0.3	0.2	0.2
Middle Johns Cr. (305-01-02)	19.50	586	0	0	0	0	18.7	8.8	3.2	2.5	2.1	2.1	2.1
Frank Brown Cr. (305-01-03)	7.10	143	0	0	0	0	0	0	0	0	0	0	0
Lower Twentymile Cr. (305-02-11)	11.75	214	24.4	13.7	145.5	60.7	30.2	28.6	26.6	24.5	24.5	Not Estimated	Not Estimated
W. Fk. Twentymile Cr. (305-02-12)	4.62	140	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Upper Twentymile Cr. (305-02-09)	6.32	113	0	0	0	0	0	0	0	0	0	0	0
Lower Tenmile Cr. (305-02-03)	11.24	323	3.2	3.2	3.2	27.2	44.5	19.4	11.3	10.1	8.8	8.8	Not Estimated
Sixmile Cr. (305-02-06)	8.27	150	13.0	13.0	13.0	122.9	63.5	32.2	29.9	26.7	23.6	23.6	Not Estimated
Morgan Cr. (305-02-10)	3.53	100	0	0	0	0	0	0	0	0	0	0	0

Estimated Impacts of Alternative E on Stream Sedimentation for Various Prescription Watersheds
 (Via Nezperce Sediment Prediction Model)

Watershed Name (Watershed Number)	AREA (Square Mile)	Natural, Background Sediment (Tons/Year)	(% Increase in Sediment Over Natural, Background Sediment)									
			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Lower Johns Cr. (305-01-01)	8.35	254	0	0	0	0	0	38.3	15.3	5.5	4.9	4.2
Middle Johns Cr. (305-01-02)	19.50	586	0	0	0	0	18.6	6.4	20.0	8.4	4.0	4.0
Frank Brown Cr. (305-01-03)	7.10	143	0	0	0	0	0	0	0	0	0	0
Lower Twentymile Cr. (305-02-11)	11.75	214	24.4	13.7	157.9	72.4	35.1	33.7	45.6	39.2	Not Estimated	Not Estimated
W. Fk. Twentymile Cr. (305-02-12)	4.62	140	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Upper Twentymile Cr. (305-02-09)	6.32	113	0	0	0	0	0	0	0	0	0	0
Lower Tenmile Cr. (305-02-03)	11.24	323	3.2	3.2	3.2	5.8	4.9	36.9	19.6	35.6	20.6	Not Estimated
Sixmile Cr. (305-02-06)	8.27	150	13.0	13.0	13.0	73.0	40.5	23.5	22.2	170.9	87.5	Not Estimated
Morgan Cr. (305-02-10)	3.53	100	0	0	0	0	0	0	0	0	0	0

Estimated Impacts of Alternative G on Stream Sedimentation for Various Prescription Watersheds
(Via Nezperce Sediment Prediction Model)

Watershed Name (Watershed Number)	AREA (Square Mile)	Natural, Background Sediment (Tons/Year)	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
			(% Increase in Sediment Over Natural, Background Sediment)									
Lower Johns Cr. (305-01-01)	8.35	254	0	0	0	0	0	97.6	39.7	17.5	14.3	11.4
Middle Johns Cr. (305-01-02)	19.50	586	0	0	0	0	0	0	0	16.8	7.7	3.0
Frank Brown Cr. (305-01-03)	7.10	143	0	0	0	0	0	0	0	0	0	0
Lower Twentymile Cr. (305-02-11)	11.75	214	24.4	13.7	221.6	97.8	44.2	40.8	136.3	77.3	Estimated	Not
W. Fk. Twentymile Cr. (305-02-12)	4.62	140	3.6	3.6	25.9	12.4	6.8	6.4	20.8	14.7	Not	Estimated
Upper Twentymile Cr. (305-02-09)	6.32	113	0	0	0	0	0	0	77.4	39.3	15.6	Estimated
Lower Tenmile Cr. (305-02-03)	11.24	323	3.2	3.2	3.2	11.6	6.1	54.0	41.8	65.0	37.2	Not
Sixmile Cr. (305-02-06)	8.27	150	13.0	13.0	13.0	98.8	51.6	27.7	25.8	254.7	128.8	Estimated
Morgan Cr. (305-02-10)	3.53	100	0	0	0	63.6	35.2	14.4	32.8	21.0	11.5	Not

The Percent Loss, by 1991, in Fish Habitat Capacity for Alternatives G, E, H, and B.

<u>Watershed Name (Watershed Number)</u>	<u>Alternative</u>	<u>% Loss Winter Range Capacity</u>	<u>% Loss Embryo Survival</u>
Lower Johns Cr. (305-01-01)	G	15-20	
	E	10	
	H	0	
	B	0	
Middle Johns Cr. (305-01-02)	G	---	0
	E	---	10
	H	---	0
	B	---	0
Frank Brown Cr. (305-01-03)	G	0	
	E	0	
	H	0	
	B	0	
Lower Twentymile Cr. (305-02-11)	G	65-75	
	E	40-50	
	H	30-35	
	B	0	
W. Fk. Twentymile Cr. (305-02-12)	G	10	
	E	0	
	H	0	
	B	0	
Upper Twentymile Cr. (305-02-09)	G	15-20	
	E	0	
	H	0	
	B	0	
Lower Tenmile Cr. (305-02-03)	G	---	30-40
	E	---	10-15
	H	---	10-15
	B	---	0
Sixmile Cr. (305-02-06)	G	60-70	
	E	50-60	
	H	30-40	
	B	0	
Morgan Cr. (305-02-10)	G	5-10	
	E	0	
	H	0	
	B	0	