APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

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I. INTRODUCTION

A. Planning Situation

One of the primary responsibilities of the Forest Service is to decide how best to manage National Forest lands to produce the goods and services the public desires. These lands must be managed to provide adequate levels of resources and services for both current and future uses. Because National Forest lands and the natural resources they contain are valuable to society, commitments to various uses represent significant and far-reaching decisions.

The Nez Perce National Forest is located in north-central Idaho and contains 2,218,040 acres of diverse land forms and vegetation. The wide variety of seral and climax-type vegetation communities that exist support a rich and varied wildlife community. The timber industry is important to the local economy. In addition, the Forest provides an attractive setting for recreationists who spend money for supplies and services.

Planning under the National Forest Management Act (NFMA) responds to the increasing complexity and social significance of the Forest and magnitude of the analysis and management decisions. The Forest's major planning goal is to provide enough information to help decisionmakers determine which combination of goods, services, and land assignments will maximize net public benefit (see Section IV for a discussion of net public benefits). The regulations (36 CFR 219) developed under NFMA provide the analytical framework within which these decisions are made.

The National Forest Management Act and its regulations also state that the requirements of the National Environmental Policy Act (NEPA) and its regulations (40 CFR 1500-1508) must be applied in this analysis process. The NEPA regulations require that the environmental effects of a proposed action and alternatives to that proposed action must be disclosed in an environmental impact statement (EIS).

B. Planning Process

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management, principally: a) land management planning requires that processes formerly used to make individual resource decisions must be combined into integrated management decisions, and b) new mathematical modeling techniques are used to represent the elements of the land management problem and to help identify the most efficient pattern of management. This is discussed in the NFMA regulations and on page I-2 of the EIS as a 10-element planning process. This Appendix is concerned with describing the analysis phase of this process, which are elements 3, 4, 5, and 6. The judgment phases, elements 1, 2, 7, and 8, are described in Chapters I and II and in Appendix A of the EIS. The execution phases, elements 9 and 10, are presented in the Forest Plan.

The analytical elements are as follows:

1. Inventory Data and Information Collection (Step 3)

The interdisciplinary team determined what data were necessary, based on the issues and concerns. Data collection is part of normal Forest operations. Existing data were used whenever possible and supplemented with new data where required to help resolve sensitive issues or management concerns. Data (including resource capability areas and acreages; resource supply and demand; and expected outputs, values, and costs resulting from management prescriptions) are needed for formulation of the models used in the analysis of the management situation, formulation of alternatives, monitoring, and other phases of the planning process. These data are on file in the Forest Supervisor's headquarters.

2. Analysis of the Management Situation (AMS) (Step 4)

This analysis brings existing information together, puts it into a total Forest perspective, and states the problem the various alternatives should resolve. It examines supply analysis, market assessments for forest and rangeland outputs, and determines suitability and feasibility for meeting needs. A computer model (FORPLAN) was built to address a number of specific requirements, including benchmarks, preliminary to the formulation of alternatives. They include a) the projection of the Forest's current management program; b) determining the Forest's ability to produce a range of goods and services, from minimum management to maximum production; c) evaluating the feasibility of reaching the national production goals (RPA targets) and social demands identified as issues and concerns; and d) monetary benchmarks which estimate the output mix which maximizes present net value of resources having an established market value or an assigned value. The AMS provides the information necessary to formulate a range of reasonable alternatives.

3. Formulation of Alternatives (Step 5)

The information gathered during the first four planning action elements is combined and analyzed to formulate alternative plans suitable for evaluation and presentation in the environmental impact statement. The alternatives reflect a range of resource management direction. Each identified major public issue was addressed in one or more alternatives. The programs formulated represent the most cost-efficient way of attaining the objective set forth for each alternative. This process provides a basis for identifying the alternative that comes nearest to maximizing the priced component of net public benefits, consistent with the resource integration and minimum management requirements. Nonpriced outputs are also considered.

4. Estimation of Effects of Alternatives (Step 6)

The physical, biological, economic, and social effects of each alternative were estimated including how each responds to the range of goals and objectives assigned by the Resource Planning Act (RPA) Program. The Forest computer model estimates many of the anticipated consequences of changes in the flow of goods and services from the Forest in terms of resource output levels. Other effects examined outside the model include ecological and social considerations. Specifically, the analysis includes: a) direct effects; b) indirect effects; c) coordination with other Federal, State, local, and Indian tribe land use plans; d) other environmental effects; e) energy requirements and conservation potential;

f) natural or depletable resource requirements and conservation potential; g) urban quality, historic and cultural resources; and h) means of mitigation.

II. INVENTORY DATA AND INFORMATION COLLECTION

A. Resource Data Development

1. Capability Areas

This is the first step in the analysis phase of the planning process. Inventory data are needed for developing the planning model used in the analysis of the management situation, the formulation and evaluation of alternatives, and monitoring of accomplishments. The interdisciplinary team collected and assembled the amount of data necessary for making management decisions. Some data existed prior to initiation of the NFMA Forest planning effort while other data were collected to supplement information needed to resolve public issues and concerns. The basic storage cell in the computerized data base is the capability area which is defined by physical and biological attributes identified on the ground. It may be further delineated by political boundaries. Capability areas represent lands delineated to estimate responsiveness to various management practices, resource values, output coefficients, and multiresource or joint production functions (FSM 1920.5). On the Nez Perce, 13,074 capability areas were delineated by:

- Proclaimed Forest
- State
- County
- Ranger District
- Legally designated areas, e.g., classified wilderness, Wild and Scenic River corridors
- Timber compartment boundaries
- Landtypes grouped into ecologic land units (includes habitat types)
- Land classes grouped by similar geologic landforms

The result of the delineation steps described above was overlaid with the photo-interpreted stands done in the 1973 timber inventory. This resulted in subdivisions of capability areas called "cells." Each cell had a unique condition class assignment.

2. Analysis Areas

Capability area cells were then grouped to establish 480 analysis areas. They are grouped on the basis that:

- Analysis areas need not be a contiguous area.
- Issues and concerns are related to specific resources and the uses of those resources.

3. Production Coefficients

Specific resource outputs and uses such as timber harvest and wildlife are analyzed in the planning process in response to the issues and concerns. The

resource data for each capability area in the analysis area were combined to form the basis for a number (production coefficient) that serves as a measure of a physical property. Major production coefficients used on the Nez Perce are expressed in the following units:

- Thousand Cubic Feet (MCF) of timber per acre
- Thousand Recreation Visitor Days (MRVD) per acre
- Thousand Animal Unit Months (MAUM) of grazing per acre
- Thousands of Elk (M Elk) per acre
- Thousand Acres Roadless (M Acres)
- Miles of Road per acre

Fish and sediment production are calculated outside the FORPLAN model (see Section III-G).

4. Suitable Lands

The Forest used specific data to determine the acres that are tentatively suitable for management practices. All areas are considered available for some form of recreation and some type of wildlife use. Roadless area size and evidence of human activity were used to determine wilderness suitability. Forest habitat type, elevation, and legal status were used to determine areas tentatively suitable for timber production. Forest habitat type, elevation, and aspect were used to determine areas tentatively suitable for domestic livestock management practices and use by elk for winter or summer range.

A breakdown of tentatively suitable lands by productivity class and condition class can be found in Table III-13 of the EIS.

Table B-1
Tentatively Suitable Lands (Acres)

Land Category	Acreage
1. Total Net Forest	2,218,040
2. Non-Forest (Includes Water)	245,323
3. Forest Land 10 Percent Stocked With Trees (Item 1 minus Item 2)	1,972,717
4. Forest Land Withdrawn	
Wilderness, Wild and Scenic Rivers, Research Natural Areas	766,224
Hells Canyon RNA (administered by Wallowa-Whitman, R-6)	57,173
5. Forest Land Producing Less Than 20 Cubic Feet/Acre/Year[1] or Inadequate Information	78,906
6. Forest Land	
a. Not Technologically Suited	0
b. Irreversible Resource Damage	0
c. Restocking Not Assured	0
7. Tentatively Suitable Land (Item 3 minus Items 4, 5, 6a, 6b, 6c)	1,070,414

1/ Lands not capable of producing at least 20 cubic feet/acre/year were determined prior to September 30, 1982 (36 CFR 219.29b).

5. Assignments and Scheduling

Condition class (existing vegetation) data were used to help lay out scheduling of management activities over time for the various alternatives considered in detail.

6. Monitoring

Forest planning data used to develop the key production coefficients will also be used to help monitor implementation activities. Forest planning data provides a base or standard from which changes that result from implementation of the Forest Plan can be measured.

7. Plan Implementation Programs

The Forest planning data base provides biological and physical data that will help develop subsequent programs for plan implementation. As more information is available, the data base will be updated and improved.

B. Sources of Data

Sources of existing inventory data used in the analysis are as follows:

- Forest Service Manual, Management Information Handbook (MIH 1309.11) provides definitions for outputs, activities, effects, and other information.
- Forest Habitat Types of Northern Idaho and Eastern Washington, J. Daubenmire, 1952, 1968.
- Landtypes - USDA - Forest Service, Region 1 Guidelines.
- Nezperce National Forest Management Plan - Timber Compartment Map, 1979.
- Nezperce National Forest Administrative Boundaries Map, 1980.
- Roadless Area Review and Evaluation (RARE II) Final Environmental Impact Statement, January 1979, USDA - Forest Service.
- Forest Service Manual, Range Analysis, Handbook 2009.21, Chapter II, sections 260-263.
- Forest Inventory System, FINSYS.
- Recreation Information Management Handbook (RIM), FSH 2309.11.
- Transportation Systems Inventory (TIS).
- Elk and livestock forage information was adopted from Range Analysis Handbook, FSH 2209.21-R1; Wildlife Surveys Handbook, FSH 2609.21; Clipping Studies (USDA Forest Service, nd); Production Coefficients and Economic Guidelines for Big Game and Livestock (Reid, 1981, July 1); research conducted locally (Pierce, 1983, Hershey and Leege, 1982).

- Economics. Stumpage value was based on bidder transaction evidence for 1974 to 1980; price trends from Haynes and Adam (1980); other resource values (price trends) from 1980 RPA reports; costs developed by Forest personnel as documented in planning records: Directory of Management Practices, 1984; economic impact analysis from INPLAN I/O Model (1983); social impact analysis from independent sociological analysis (Bacigalupi, 1980).

- Fisheries inventory data generated through literature by: Murphy and Metsker, 1962; Mallet, 1974; Martin, 1975 and 1976; Forest Service Habitat Survey, 1975 through 1980; fisheries research conducted by Shepard and Bjornn, 1981; R1/R4 fish and watershed models, Stowell, et al., 1983, and USDA Forest Service, 1981.

- Landtypes delineated on aerial photographs with field verification in the mid to late 1970s and transferred to U.S.G.S. topographic maps. These landtypes were aggregated from landform associations to landform groups to landclasses. Landforms were used in the final capability area delineations in 1980. These landclasses have been re-aggregated into landclass groupings. Forest management activities by landclass groupings are used in the sediment yield and economic calculations.

- Riparian areas identified on U.S.G.S. topographic maps in 1980. Additional acreages of wetlands were related to an appropriate landclass.

- Major Forest hydrologic boundaries delineated based on the U.S.G.S. Hydrologic Unit Map. These watersheds were further divided and subdivided into third to fifth order watersheds on U.S.G.S. topographic maps and on the Forest Travel Plan map in 1979.

- A summary of all pre-1980 road construction and timber harvest activity on the Forest by third to fifth order watershed. This treatment inventory was utilized in sediment and water yield calculations.

- Sediment yields for baseline conditions, and existing and proposed forest management activities (timber harvesting and road construction) predicted by USDA (1981a; 1981b; 1981c).

- Water yields for baseline conditions, and existing and proposed Forest management activities (timber harvesting and road construction) estimated by former Nez Perce hydrologists and USDA (1975-1983).

- The main channels of most third to fifth order watersheds were typed (A, B, or C) by USDA (1980). This information was used in the water yield and fishery habitat calculations, and in the establishment of fishery/water quality objectives.

- Minerals potential statistics based on: Geoplan, 1974-75, Nez Perce I and II Contract Reports; Green, W.R., 1972, Mineral Belts of Idaho: Idaho Bureau of Mines and Geology, I.C. #22; Koehler, S.W., 1978, Petrogenesis of the Gold Vein at Florence, Idaho: Ph.D. thesis, U. of I.; USFS (Minerals and Geology), 1980, RARE II Minerals Potential Map; O&G lease applications, 1982, Nez Perce NF; Ross, C.P. 1936, Metal and

Coal Mining Districts of Idaho: IBMG Pamphlet #57; USBM, Current Mining Claims Recordation; USBM, 1981, Minerals Industry Location System.

- Forest Habitat Types of Northern Idaho, editorial draft, S. Cooper, K. Neiman, R. Steele, 1985.

III. THE FOREST PLANNING MODEL (FORPLAN)

A. Overview

The planning model consists of information and various analytic techniques combined to address planning questions and issues. The major analytic model is called FORPLAN.

FORPLAN is a linear program that assigns unique sets of management activities to specific areas of the Forest to compare the productivity of measurable goods and services towards a specific goal called an "objective function."

The specific areas of the Forest are delineated by land characteristics which have a fairly uniform response to the management activities. These specific areas are called "analysis areas." The management activities are combined into compatible sets representative of the multiple uses that could apply to the analysis areas. These sets of management activities are called "management prescriptions."

In the Nez Perce National Forest model, from 2 to 10 management prescriptions are available to be assigned to each of the 480 analysis areas.

When FORPLAN is run, it assigns only those management prescriptions to the analysis areas which produce the goods and services that achieve the objective function in an optimal way given the objective function and constraints used. It also schedules the production of the goods and services over time.

Alternatives are generated by applying constraints either to produce a specified range of goods and services, to allow only a specified range of goods and services, or to allow only a specified set of management prescriptions to be assigned to specific analysis areas. These constraints are designed to achieve or maintain a situation considered necessary to meet the overall goal of the alternative. The conditions set by the constraints are satisfied before the objective function is optimized. The analysis of all alternatives had the same objective function -- maximize the present net value. In other words, after meeting all constraints, the FORPLAN model allocated the remaining opportunities in a way that produced the most economic value. Some benchmarks had other objective functions that will be described in Section VI.

As a result of public comments, additional analysis and several changes have been made since the Draft EIS. The additional analysis is summarized below:

- Alternative G (Preferred Alternative) was modified to maintain a stable harvest level over the planning horizon.

- Alternative G was modified by limiting timber harvesting to those timber prescription/analysis area combinations which showed a positive present net value.

- Alternative G was modified by adding additional suitable acres from East Meadow Creek, West Meadow Creek, and Rackliff-Gedney roadless areas.

- Alternative G was modified to compare and evaluate the effect of using 60 acres available for harvest per mile of new road construction in the first decade rather than 40 acres per mile.

- Sensitivity analysis was performed to estimate the impact that different timber price assumptions would have on land assignments and the economics of timber management using the FORPLAN model. Also, updated recreation/ wildlife values were used to estimate any impacts on land assignments and economic efficiency. This analysis was done on the Max PNV benchmark, Alternative D, and Alternative G. For additional information on this analysis, see Appendix D.

Summary of changes to alternatives since the Draft EIS:

The boundaries for the Mallard and Gospel-Hump roadless areas were adjusted to the original RARE II boundaries. This change was in response to the public concern that this Forest adjusted the RARE II boundaries because of timber sale and road construction activities which were expected to take place, but have not at this time.

Constraints common to all alternatives remain unchanged. Additional constraints were applied to Alternative G (Preferred Alternative) to meet specific resource and economic objectives. These constraints have been designed to meet the following objectives:

- Increase fish/water quality objectives in 64 drainages;

- Increase prescribed burning on deer/elk winter range from 2,700 acres to 5,000 acres per year during the Plan period (1988-1997);

- No scheduled road construction or timber harvesting activities in the West Meadow Creek roadless area during the Plan period (1988-1997), except for the portion which is west of the hydrologic divide between Meadow Creek and the Red River and American River drainages;

- Manage approximately 13,300 acres of the Silver Creek-Pilot Knob roadless area without additional roads and with no scheduled timber harvest;

- Make timber management prescriptions available for approximately 11,000 acres of tentatively suitable land in the Rackliff-Gedney roadless area;

- Include all riparian areas in the suitable timber base, but review harvesting activities on these area during implementation of the Forest Plan.

B. The Analysis Process and Analytical Tools Used

Preliminary analyses leading to the use of FORPLAN included predictions of resource production (timber, elk, fish, forage, water, and sediment). Several models were used to arrive at these predictions including the Fish Response to Sediment Yields in Idaho Batholith Watersheds (Stowell, et al., 1983), and the Timber Stand Prognosis Model (Intermountain Forest and Range Experiment Station, Stage, 1973). A social impact assessment study and the identification of baseline socio-economic conditions were also used.

Analysis leading up to FORPLAN included designing management prescriptions, assigning practices to prescriptions, developing management costs for each practice, and predicting resource outputs and benefits. Outputs predicted include timber yield, elk forage, range forage, water yield, sediment, roads, fisheries, costs, and benefits. The volume figures displayed by alternatives in this Appendix represent sawlog volume from FORPLAN reports. The non-interchangeable volume component of the allowable sale quantity for the Plan period (first decade) must be added to the sawlog volume. Refer to Table II-14 in Chapter II for the non-interchangeable volume component by alternative.

FORPLAN was then used to determine optimal assignments and scheduling of management prescriptions for each analysis area. This overall process is key to cost-efficient resource allocation. Cost-efficiency was considered by the interdisciplinary team while they were developing a realistic and flexible set of management prescriptions. Professional judgment played a major role. Major decisions that resulted from the preliminary analysis include the following that apply to all prescriptions:

All roads will be constructed and maintained to Forestwide standards (Nez Perce National Forest Plan, 1987). Variations occur by landtypes. Riparian areas will receive special emphasis. Costs range from $33,000 to $107,000 per mile (1978 dollars) depending on landclass, slope, soil stability, and road class. Road construction design standards were developed to maintain minimum management requirements for soil and water resources and anadromous fisheries habitat protection.

Timber sales are planned and will be administered according to Forestwide standards, including coordination with cultural, visual, wildlife, fishery, soil, and water resources. All harvesting is planned to ensure meeting prescription objectives, including minimum management requirements. Timber slash disposal and reforestation activities will take place in all prescriptions which include timber harvesting.

Wildlife habitat management includes practices to ensure adequate browse production on winter range and cover/forage ratios on summer range, as outlined in the North Idaho Elk Coordinating Guidelines. Access controls to protect wildlife were also included.

Limited livestock improvements and maintenance were included in all appropriate prescriptions, to maintain or enhance the current program.

FORPLAN was utilized to provide the basis for optimal land assignments and management prescription selection and scheduling for each analysis area. This process results in selection of the most cost-efficient management

prescriptions and land assignments that meet a given set of constraints and an objective function of maximizing present net value. An economic input-output model (INPLAN) was used to estimate the employment and income impacts of Forest outputs and activities on the regional and local areas. Direct, indirect, induced, and total impacts are estimated for each alternative.

A social impact assessment and the identification of baseline socio-economic conditions were developed for the local area. In addition, economic (cost) efficiency analysis was used to determine the benefits, costs, and tradeoffs associated with varying levels of goods and services produced on the Forest. This analysis is detailed in Section IV.

C. Identification of Analysis Areas

The rationale for delineating the analysis areas is shown in Table B-2. Each level is further described in this section.

Table B-2
Delineation of Analysis Areas
(Levels)

Analysis Area Level	FORPLAN Level Identifier	Reason for Delineation
Ranger Districts and Current Status	1	Administrative needs, prediction of collector road costs, and miles of road. Prediction of sediment. Legal and administrative constraints. Identification of lands not available for timber production. Identification of Gospel-Hump Multipurpose Resource Development area.
Land Class	5	Collector and local road costs and logging costs. Prediction of sediment.
Timber Productivity	4	Prediction of timber outputs over the long term.
Roaded or Roadless	3	Collector and local road costs and logging costs. Prediction of sediment. Primitive recreation. Consideration of roadless areas for wilderness.
Existing Vegetation	6	Predict timber outputs on the short term.

1. Level 1 Criterion--Ranger Districts and Current Status

This criterion was used to identify administrative boundaries including Ranger Districts, Gospel-Hump Multipurpose Resource Development Area (MRDA), and lands not available for timber production (wilderness, Wild & Scenic River corridors, Research Natural Areas). It was also used to predict the cost and miles of collector road construction, Forestwide sediment production, dispersed recreation capacity, wildlife habitat, and management costs. It is responsive to issues regarding fish and wildlife habitat protection, the effects of timber harvesting and road construction on these resources, and addresses the management of the MRDA on the Forest. Level 1 identifiers used are shown in Table B-3.

Table B-3
Level 1 Identifiers
(Number and Description)

Identifiers	Number	Description
D1	1	Salmon River Ranger District (RD)
D4MRDP	4	Clearwater RD-MRDA portion
D4OTHR	5	Clearwater RD-other than MRDA portion
D5MRDP	6	Red River RD-MRDA portion
D5OTHR	7	Red River RD-other than MRDA portion
D7	9	Selway RD
D8MRDP	10	Elk City RD-MRDA portion
D8OTHR	12	Elk City RD-other than MRDA portion
SELBIT	13	Selway-Bitterroot Wilderness
RNR	14	Frank Church-River of No Return Wilderness
GHUMP	15	Gospel-Hump Wilderness
MFW&S	16	Selway Wild and Scenic River and Middle Fork Clearwater Wild and Scenic River
SALW&S	17	Salmon Wild and Scenic River
RAPW&S	18	Rapid Wild and Scenic River
OHARNA	19	O'Hara Research Natural Area
MOORNA	20	Moose Meadows Research Natural Area
GOSCOR	21	Corridors to Gospel-Hump Wilderness
NBCRNA	22	Proposed No Business Creek Research Natural Area

2. Level 3 Criterion--Roaded or Roadless Status

This criterion was used to delineate between roaded (RDED) and roadless (RDLS) areas on the Forest. This classification was necessary to aid in predicting resource outputs for dispersed recreation, road construction, sediment, and management costs. It is responsive to issues regarding the amount and types of roadless area management on the Forest, the types of recreation opportunities that will be available, management of fish and wildlife habitat, and the degree of timber development that is responsive to local, regional, and national needs.

3. Working Group Criterion--Timber Productivity Classes

This criterion was used to define the biological potential of varying land groupings on the Forest, and to link this potential to the response coefficients for timber, range, and wildlife as a result of treatments performed in the prescriptions. In addition, it was used to predict management costs for these resources. This criterion is responsive to issues concerning levels of timber harvest, range outputs, wildlife, and fisheries potential. Working group identifiers are shown in Table B-4.

Table B-4
Working Group Identifiers
(Number and Description)

Working Group Identifier	Number	Description
PC7	1	Noncommercial forest land which produces less than 20 cubic feet of industrial wood products per acre per year.
PC8	2	Nonforest lands. These include foothill grasslands, mountain meadows, rock, and water.
PC3	3	Commercial forest lands capable of producing between 120-164 cubic feet of industrial wood products per acre per year.
PC4	4	Commercial forest lands capable of producing between 85-119 cubic feet of industrial wood products per acre per year.
PC5&6	5	Commercial forest lands capable of producing between 20-84 cubic feet of industrial wood products per acre per year.

4. Land Class Criterion

This criterion was used to define the physical characteristics of varying landforms on the Forest, and to link these characteristics to the response coefficients for timber, range, road construction and costs, sediment production, and management costs. This criterion is responsive to issues concerning timber management and road construction, sediment production and its related effects on fisheries, wildlife, and forage production for grazing. Land class identifiers are shown in Table B-5.

Table B-5
Land Class Identifiers
(Number and Description)

Land Class Identifier	Number	Description
10	1	This land class is typically composed of landforms associated with stream bottoms. Slopes are generally from 0-10 percent, and vegetation is on the moist end of the habitat type spectrum. This land class is typically composed of riparian areas.
22	2	This land class is composed of landforms ranging from rolling hills to ridges with flat or convex ridgetops and steep side canyons. Slopes range from 0-60 percent and the predominant vegetation is wet to dry forest types.
32	3	This land class is composed of landforms with convex ridgetops and steep side slopes ranging from 40-50 percent. These landforms are generally at higher elevations on the Forest. The predominant vegetation on these sites is dry forest types.
61	4	This land class is typically composed of landforms associated with deeply incised canyons. It also includes glacial cirques and areas with unstable soils. Slopes range up to 100 percent. Forest-type vegetation predominates.

5. Condition Class Criterion - Existing Vegetation

This criterion was used to identify existing timber conditions on the Forest. This information was used to predict response coefficients for timber, cover/forage relationships, old growth, grazing, and management costs. It is responsive to timber, wildlife, and grazing issues. Condition, size, and stocking classes were aggregated into the nine condition classes shown in Table B-6.

Table B-6
Condition Class Identifiers
(Number and Description)

Condition Class Identifier	Number	Description
SAW	2	Timber stands over 80 years of age.
POL	3	Timber stands between 40 and 79 years of age.
SS	4	Timber stands under 40 years of age.
NCF	5	Noncommercial forest lands.
NF	6	Nonforest lands.
MTNME	7	Mountain meadows.
FTGR	8	Foothill grasslands.
NS	9	Nonstocked commercial forest lands.
NONE	10	Classified areas (wilderness, Wild and Scenic Rivers, Research Natural Areas)

D. Identification of Prescriptions

1. Overview

The National Forest Management Act (NFMA) regulations define management prescriptions as "management practices selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219.3). Generally, a multiple-use management prescription is a set of treatments or practices to develop and/or protect some combination of resources on a particular landtype.

2. Design of Management Prescriptions

The interdisciplinary team (ID Team) reviewed the public issues and concerns, used professional judgment, and consulted existing policy and legislative direction and research for guidance in developing cost-efficient multiple-use resource management prescriptions. This set of prescriptions portrays a broad range of management emphasis, intensities, management practices, standards, and guidelines. The management standards and guidelines needed to accomplish the goals of a prescription include the necessary mitigation and resource coordination measures that are required by existing laws, regulations, and policies. The management standards and guidelines will be contained in the Forest Plan, and are available from the Forest planning records.

Completed prescriptions received full review, discussion, and revision as necessary by the ID team. For the ID team review, the core team prepared the following criterion against which the ID team evaluated each prescription:

- Does this prescription adequately convey what the desired future condition will be of land managed under it?

- Does the prescription provide the technical management direction needed by a land manager to achieve the stated future condition?

- Does the prescription provide the information needed for developing costs and outputs for FORPLAN?

- Does the prescription address the planning issues and concerns?

To fully explore appropriate and practical ways of managing the Forest for a variety of resource uses, cost-efficiency considerations were used to guide the development and assignment of management prescriptions to various parts of the Forest (referred to as "analysis area" in FORPLAN). Within the rules and limitations of the model, the team considered all management prescriptions appropriate for each of the analysis areas on the Forest. The team based the assignment of management prescriptions on the land's inherent capability for resource production.

Prescriptions were designed to explore a full array of management options. Current management practices were described in the prescriptions to define practical and reasonable methods of implementing management. In addition, certain prescriptions were designed to maximize production of individual outputs, given the constraints of protecting all other resources at minimum legal or biological levels. This permitted analysts to study the productive potential of the Forest. True multiple-use prescriptions are also used to address land use conflicts, issues, and concerns. Prescriptions must be created so that the relative cost-efficiency of alternatives can be explored. "Cost-efficient use" of Forest land may be achieved by: (a) managing some areas of land for several purposes simultaneously; (b) managing some areas of land with a single output emphasis; and (c) leaving some areas of land in a minimal state of management. In order to find a cost-efficient management pattern, each of these three types of prescriptions was an option for each landtype represented in the model.

From this basic set of management prescriptions applied to the land, the Forest team developed yield and cost tables for use in modeling each prescription in FORPLAN. These prescriptions were used for the development of both benchmarks and alternatives after additional screening to ensure the cost-efficiency of the prescriptions necessary for development of cost-efficient alternatives.

Alternatives having similar outputs for some resources may differ widely in how the land is assigned to various prescriptions and in where the assignments take place. These differences are apparent when comparing the alternative maps.

3. Purpose, Criteria, and Assumptions for Prescription Categories

The prescriptions can be grouped into general categories by major resource element or application. The categories are timber, fisheries-recreation, visual, wildlife, old-growth, special areas, grazing, riparian, wilderness, and custodial management.

The purposes of specific prescriptions within each category are to portray a management activity presently being practiced on the Forest, to respond to a particular issue or group of issues, and to provide a range of management options that could be applied to various land areas.

Mathematical relationships existing between prescriptions are also examined. This information is useful in the explanation of tradeoffs that occur when numerous prescriptions interact within individual alternatives. Forest planning records contain detailed information.

a. Timber Category

(1) Purpose

The category of timber prescriptions was developed to provide an option for this type of management activity on every acre of land that was identified as being "tentatively suitable" for that use.

(2) Criteria and Assumptions

- Provide a range of timber management intensities for existing and regenerated stands through the application of commercial and precommercial thinning, final harvest methods, and stand entry time.
- Provide an option for conventional or aerial logging systems.
- Apply even-aged silvicultural systems.
- Recognize and provide for other resource uses compatible with timber production at full yields.
- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

b. Fisheries - Recreation Category

(1) Purpose

The category of fisheries-recreation prescriptions was developed to address two issues: habitat management for westslope cutthroat trout and anadromous fisheries; and to provide an option for placing emphasis on dispersed nonmotorized recreation opportunities in present roadless areas. The prescriptions include options to maintain a watershed in a roadless condition or to provide for timber management within standards designed to maintain the fish habitat at high levels.

(2) Criteria and Assumptions

- Design the prescriptions for application to currently roadless drainages only.

- Each roadless area would have as an option for management a prescription that maintained the area in a roadless condition.

- Recreation prescriptions were prepared for the entire spectrum of recreation opportunities.

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

c. Visual Category

(1) Purpose

The category of visual management prescriptions was developed to address the major issue of visual quality objectives (VQO) pertaining to timber harvest operation. The purpose was to provide an array of options for timber harvesting which would include VQOs for retention and partial retention. These prescriptions were designed to answer the question of how timber harvesting could be modified to maintain scenic quality in sensitive areas.

(2) Criteria and Assumptions

- Use the basic concepts and research findings contained in the USDA Forest Service Handbook (No. 462) "Manage for Retention VQO," and appropriate current silvicultural practices.

- Design the prescriptions to provide for other resource uses compatible with timber production under retention and partial retention VQOs.

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

d. Wildlife Category

(1) Purpose

The category of wildlife prescriptions was developed to address the major issue of big-game management, primarily elk. The purpose was to provide an array of options ranging from management exclusively for big game through a series of prescriptions that provided for timber production along with various levels of elk production. The wildlife-timber prescriptions were designed to answer the question of how these two resources could be managed jointly on areas important for both.

(2) Criteria and Assumptions

- Use the basic concepts and research findings contained in the North Idaho Elk Coordinating Guidelines (Idaho Department of Fish and Game).

- Design the prescriptions for use on key and regular big-game summer range and key big-game winter range.

- Provide for other uses compatible with big-game management objectives.

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

e. Old-Growth Category

(1) Purpose

Old-growth prescriptions were developed to address the issue of managing tentatively suitable timber lands for old-growth-dependent species of plants and animals. The purpose was to provide for suitable existing and future old-growth habitat while still permitting timber harvesting to occur. The prescriptions were designed to answer the question of what levels of old-growth habitat must be managed Forestwide in order to maintain minimum viable populations of old-growth-dependent species.

(2) Criteria and Assumptions

- A minimum level of old-growth habitat of 10 percent Forestwide or 5 percent per prescription watershed will be maintained for dependent species. Timber harvesting may occur in other old-growth areas.

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

f. Special Area Category

(1) Purpose

A "special area" prescription was developed for application to Research Natural Areas. This prescription was designed to provide continued management of existing special areas, such as the O'Hara Research Natural Area, and an option for designating additional areas for the same type of management.

(2) Criteria and Assumptions

- Where existing uses are in effect and no change in management is contemplated, pattern the management practices after the current approved direction.

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

g. Grazing Category

(1) Purpose

The category of grazing prescriptions was developed to address the level of grazing management intensity to be applied on riparian and nonriparian lands assigned exclusively to range management. The purpose was to provide

alternative levels of grazing investments for improvements, betterment, etc. and to see how these levels would affect animal unit month (AUM) outputs on both riparian and nonriparian grazing lands.

(2) Criteria and Assumptions

- Design grazing intensities to minimize the adverse effects on other resources (i.e, fisheries, riparian, wildlife).

- Develop standards, guidelines, and costs using commonly accepted management practices currently in use.

h. Riparian Category

(1) Purpose

The category of riparian prescriptions was developed to address the issue of protection of riparian areas for benefiting resources while still maintaining opportunities for other management (i.e., timber harvests). The purpose was to provide an array of options for riparian area management ranging from production of no controllable outputs to limited production aimed at riparian zone protection.

(2) Criteria and Assumptions

- Provide a range of intensities for riparian area management which will include production of controllable outputs (i.e., timber).

- Develop standards, guidelines, and costs, using commonly accepted management practices currently in use.

i. Wilderness Category

(1) Purpose

The category of wilderness prescriptions was developed to address the issue of how to manage the three wildernesses existing under Nez Perce National Forest administration and to recognize existing recreation uses that would continue in the Wild and Scenic River corridors.

(2) Criteria and Assumptions

- The wilderness prescription would be applied to the classified wildernesses.

- The Wild & Scenic River corridors have specific prescriptions reflecting management costs and practices.

- Wilderness prescriptions are applied to roadless areas under consideration for proposed wilderness.

j. Custodial Category

(1) Purpose

Several prescriptions were developed for application to nonforest lands and lands not suitable for timber production due to low productivity or regeneration problems. Included in this category is a minimum level or custodial management prescription for lands that are to be managed in their current state, deferring investment in timber production for the Plan period.

(2) Criteria and Assumptions

- Provide for a mix of uses, excluding timber management, that are compatible with surrounding land assignments.

4. Use of Cost-Efficiency in Developing Prescriptions

Cost-efficiency was considered in developing prescriptions in the following manner: objectives, standards, and guidelines were established for each prescription by resource element. Given the objective of the prescription, costs were estimated under each resource element to meet the standards or guidelines of the prescription. Costs of producing the outputs that would result from implementing the prescription were developed and compared to the benefit values also produced. Prescriptions were carried forward if they were cost-efficient in achieving prescription end products. Three basic assumptions used in developing prescription costs were:

- Costs experienced in implementing past practices were a reasonable basis from which to predict future costs.

- The funding for production of outputs would include only the necessary support funding.

- No great changes in future budget levels could be predicted and any change experienced would be related to the production of the resource outputs.

5. List of Prescriptions

Following are the prescriptions used in FORPLAN (a more detailed description of each prescription is available from the Forest planning records).

T1 Timber
Prescription: Low-Level Timber Management - Clearcut Harvest Type
Goal: Manage timber at a low level of intensity per acre (stocking control through planting or precommercial thinning); use clearcut harvest type.

T2 Timber
Prescription: Low-Level Timber Management - Shelterwood Harvest Type
Goal: Manage timber at a low level of intensity per acre (stocking control through planting or precommercial thinning); use shelterwood harvest type.

T3 Timber
Prescription: Moderate-Level Timber Management - Clearcut Harvest Type
Goal: Manage timber at a moderate level of intensity per acre (stocking control through planting or precommercial thinning plus one commercial thinning); use clearcut harvest type.

T4 Timber
Prescription: Moderate-Level Timber Management - Shelterwood Harvest Type
Goal: Manage timber at a moderate level of intensity per acre (stocking control through planting or precommercial thinning plus one commercial thinning); use shelterwood harvest type.

T5 Timber
Prescription: High-Level Timber Management - Clearcut Harvest Type
Goal: Manage timber at a high level of intensity per acre (stocking control through planting or precommercial thinning plus two commercial thinnings); use clearcut harvest type.

T6 Timber
Prescription: High-Level Timber Management - Shelterwood Harvest Type
Goal: Manage timber at a high level of intensity per acre (stocking control through planting or precommercial thinning plus two commercial thinnings); use shelterwood harvest type.

T8 Timber
Prescription: Minimum-Level Timber Management - Clearcut Harvest Type
Goal: Manage timber through a minimum level of stocking control per acre (final harvest and regeneration); use clearcut harvest type.

T9 Timber
Prescription: Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage timber through a minimum level of stocking control per acre (final harvest and regeneration); use shelterwood harvest type.

T10 Timber
Prescription: Maintenance Area Timber Management
Goal: This prescription will be assigned to account for areas that are maintenance (nonstocked). This prescription does not reforest the area.

T11 Timber
Prescription: Backlog Area Timber Management
Goal: This prescription will be assigned to account for areas that are backlog (nonstocked). This prescription does not reforest the area.

T12 Timber
Prescription: Minimum-Level Timber Management - Clearcut Harvest Type
Goal: Manage timber at a minimum level through a salvage thinning prior to final harvest; use clearcut harvest type.

T13 Timber
Prescription: Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage timber at a minimum level through a salvage thinning prior to final harvest; use shelterwood harvest type.

F1 Fisheries
Prescription: Minimum-Level
Goal: To provide a level of goods and services consistent with a maintenance level of management for the purpose of protecting anadromous fish habitat.

V1 Visual
Prescription: Retention Visual Quality Objectives (VQO) - Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage the landscape to meet the visual quality objective (VQO) of retention (R) with minimum-intensity timber management; use shelterwood harvest type.

V3 Visual
Prescription: Partial Retention VQO - Moderate-Level Timber Management - Clearcut Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention (PR) with moderate-intensity timber management; use clearcut harvest type.

V4 Visual
Prescription: Partial Retention VQO - Moderate-Level Timber Management - Shelterwood Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention (PR) with moderate-intensity timber management; use shelterwood harvest type.

V8 Visual
Prescription: Partial Retention VQO - Minimum-Level Timber Management - Clearcut Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention with minimum-intensity timber management; use clearcut harvest type.

V9 Visual
Prescription: Partial Retention VQO - Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention with minimum-intensity timber management; use shelterwood harvest type.

V10 Visual
Prescription: Partial Retention VQO - Minimum-Level Timber Management - Clearcut Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention with minimum-intensity timber management; salvage harvest prior to final harvest; use clearcut harvest type.

V11 Visual
Prescription: Partial Retention VQO - Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage the landscape to meet the VQO of Partial Retention with minimum-intensity timber management; salvage harvest prior to final harvest; use shelterwood harvest type.

W1 Wildlife
Prescription: Permanent Browse Management for Winter Range
Goal: Maintain existing deer and elk winter range to produce permanent winter forage.

W2 Wildlife
Prescription: Deer and Elk Winter Range and Moderate-Level Timber Management - Clearcut Harvest Type
Goal: Maintain existing deer and elk winter range to produce winter forage and cover; moderate-intensity timber management; use clearcut harvest type.

W3 Wildlife
Prescription: Deer and Elk Winter Range and Moderate-Level Timber Management - Shelterwood Harvest Type
Goal: Maintain existing deer and elk winter range to produce winter forage and cover; moderate-intensity timber management; use shelterwood harvest type.

W5 Wildlife
Prescription: Deer and Elk Winter Range and Minimum-Level Timber Management - Clearcut Harvest Type
Goal: Maintain existing deer and elk winter range to produce winter forage and cover; minimum-intensity timber management; use clearcut harvest type.

W6 Wildlife
Prescription: Deer and Elk Winter Range and Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Maintain existing deer and elk winter range to produce winter forage and cover; minimum-intensity timber management; use shelterwood harvest type.

W9 Wildlife
Prescription: Moose Winter Range and Minimum-Level Timber Management
Goal: Manage Pacific yew plant communities for moose winter range through appropriate silvicultural treatment.

W11 Old-Growth (OG-1)
Prescription: Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Provide suitable habitat for all old-growth-dependent species. Harvest will be deferred until replacement stands reach the old-growth category in the 10th decade. Harvest will be clearcut or shelterwood. Firewood cutting will not be allowed except after or as part of harvest.

W12 Old-Growth (OG-2)
Prescription: Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Provide suitable habitat for old-growth-dependent species (replacement stand). No harvest will be allowed in the first 15 decades. Firewood cutting must be prohibited during this same period.

N1 Special Areas
Prescription: Minimum-Level Timber Management
Goal: Manage Research Natural Areas for non-manipulative research.

G1 Grazing
Prescription: Low Investment, Grazing
Goal: Manage grazing of riparian meadows and mountain meadows with a moderate level of resource protection and low intensity of grazing.

G2 Grazing
Prescription: Moderate Investment, Grazing
Goal: Manage grazing of riparian meadows and mountain meadows with a moderate level of resource protection and a moderate intensity of range management using moderately complex grazing systems.

G3 Grazing
Prescription: High Investment, Grazing
Goal: Manage grazing of riparian meadows and mountain meadows with a high level of resource protection and a high intensity of range management using intensive grazing systems where necessary.

G4 Grazing
Prescription: Low Investment, Grazing
Goal: Manage grazing of mountain grasslands and noncommercial timberlands, with low-intensity range management using simple management systems that will maintain a static trend of range condition.

G5 Grazing
Prescription: Moderate Investment, Grazing
Goal: Manage grazing of mountain grasslands and noncommercial timberlands with a moderate-intensity range management that obtains proper utilization of forage and maintains an upward trend in range condition.

G6 Grazing
Prescription: High Investment, Grazing
Goal: Manage grazing of mountain grasslands and noncommercial timberlands with high intensity of range management that obtains proper utilization of forage and improves the trend in range condition and increases carrying capacity.

RIP2 Riparian
Prescription: Riparian Area and Minimum-Level Timber Management - Shelterwood Harvest Type
Goal: Manage riparian areas to maintain water quality and fish and wildlife habitat; minimum level of stocking control; use shelterwood harvest type.

RIP3 Riparian
Prescription: Riparian Area and Minimum-Level Timber Management - Unregulated Harvest Type
Goal: Manage riparian areas to maintain water quality and fish and wildlife habitat with unregulated timber harvest.

RIP4 Riparian
Prescription: Riparian Area and No Grazing
Goal: Manage nonforested riparian areas to maintain water quality and fish and wildlife habitat; allow no grazing.

WIL1 Wilderness
Prescription: Low-Level Management
Goal: Maintain the quality of the Selway-Bitterroot Wilderness through a low level of management.

WIL2 Wilderness
Prescription: Moderate-Level Management
Goal: Maintain or enhance the quality of the Selway-Bitterroot Wilderness through a moderate level of management (current situation).

WIL3 Wilderness
Prescription: High-Level Management
Goal: Maintain and enhance the quality of the Selway-Bitterroot Wilderness through a high level of management.

WIL4 Wilderness
Prescription: Low-Level Management
Goal: Maintain the quality of the Gospel-Hump Wilderness through a low level of management.

WIL5 Wilderness
Prescription: Moderate-Level Management
Goal: Maintain or enhance the quality of the Gospel-Hump Wilderness through a moderate level of management (current situation).

WIL6 Wilderness
Prescription: High-Level Management
Goal: Maintain and enhance the quality of the Gospel-Hump Wilderness through a high level of management.

WIL7 Wilderness
Prescription: Low-Level Management
Goal: Maintain the quality of the Frank Church-River of No Return Wilderness through a low level of management (current situation).

WIL8 Wilderness
Prescription: Moderate-Level Management
Goal: Maintain or enhance the quality of the Frank Church-River of No Return Wilderness through a moderate level of management.

WIL9 Wilderness
Prescription: High-Level Management
Goal: Maintain and enhance the quality of the Frank Church-River of No Return Wilderness through a high level of management.

W&S1 Wild & Scenic
Prescription: Wild and Scenic River Management - Unregulated Harvest Type
Goal: Maintain the quality of the designated "recreation" portion of the Selway River with unregulated timber harvest.

W&S2 Wild & Scenic
Prescription: Wild and Scenic River Management - Unregulated Harvest Type
Goal: Maintain or enhance the quality of the designated "recreation" portion of the Selway River with unregulated timber harvest.

W&S3 Wild & Scenic
Prescription: Wild and Scenic River Management - Unregulated Harvest Type
Goal: Maintain and enhance the quality of the designated "recreation" portion of the Selway River with unregulated timber harvest.

W&S4 Wild & Scenic
Prescription: Low Investment
Goal: Maintain the quality of the designated "wild" portion of the Salmon and Rapid Rivers.

W&S5 Wild & Scenic
Prescription: Moderate Investment
Goal: Maintain or enhance the quality of the designated "wild" portion of the Salmon and Rapid Rivers.

W&S6 Wild & Scenic
Prescription: High Investment
Goal: Maintain and enhance the quality of the designated "wild" portion of the Salmon and Rapid Rivers.

Table B-7 illustrates how the Forestwide standards were incorporated into the multiple-use management prescriptions used in the FORPLAN analysis.

Table B-7
Comparison of Prescriptions to Forestwide Standards

Table B-7
Comparison of Prescriptions to Forestwide Standards

			Timber Management		
	Road Density Mi/Sq.Mi.	Regulated Harvests	Reforestation within 5 years	Rotation Period (Years)	Size of Opening Acres
Timber	0-4.5	Yes	Yes	80-120	40
Range	NA	No	NA	NA	NA
Winter Range (Burning)	NA	No	NA	NA	40
Winter Range (Timber Harvesting)	0-4.5	Yes	No	120-160	40
Partial Retention	0-4.5	Yes	Yes	80-120	40
Retention	0-4.5	Yes	Yes	80-120	40
Riparian (Unregulated)	NA	No	NA	NA	NA
Riparian (Regulated)	0-4.5	Yes	Yes	100-120	2-5
Old Growth	0-4.5	Yes	Yes	200-250	40
Fisheries/ Wildlife/ Dispersed Recreation	0	No	NA	NA	NA
Wilderness	0	No	NA	NA	NA
Moose Winter Range	0-4.5	Yes	No	200	20
Min Level	NA	No	NA	NA	NA

Firewood Harvesting	Utilization Percent	Quality Objective	Recreation ROS Class	Mitigation Percent
Yes	35	Mod.-Max-Mod.	Roaded Natural	60
NA	28-45	Full Range VQOs	SP-RN	NA
NA	35	Mod.-Max.-Mod.	SP-RN	NA
Yes	35	Mod.-Max.-Mod.	RN	60
Yes	35	Partial Retention	RN	60
Yes	35	Retention	RN	60
NA	35	Full Range VQOs	SP	NA
Yes	35	Full Range VQOs	RN	70
No	35	Mod.-Max.-Mod.	SP-RN	60
NA	35	Full Range VQO's	SP	NA
NA	35	Preser-vation	P	NA
Yes	35	Mod.-Max.-Mod.	RN	60
NA	35	NA	SP-RN	NA

E. Development of Timber Harvest Options and Intensities

Timber harvest options were developed for FORPLAN by considering the types of silvicultural treatments that are technologically feasible given the management practices presently in use. Yield tables were developed to predict yields for those silvicultural treatment regimes that were considered feasible, utilizing the Growth Prognosis Model. Costs and revenues associated with these regimes were also developed.

Initially, all options were considered for all tentatively suitable acres. Initial analysis, outside the FORPLAN model, pointed out several areas where specific combinations of timber condition classes, degree of development (roads), and certain timber options were infeasible or improbable based on current or anticipated practices. Examples are extensive salvage operations in currently unroaded areas and intensive management of stands beyond culmination of mean annual increment (CMAI). Based on this, logic was developed to assign a range of timber prescriptions to all analysis areas tentatively suitable for timber management.

Cost-efficiency was considered in the development of timber management options in a manner similar to the process used for developing management prescriptions (see Use of Cost-Efficiency in Developing Prescriptions, B-27). Objectives, standards, and guidelines were established for each timber option shown in the following list. These included cultural practices to be used (reforestation methods, precommercial thinning, commercial thinning), final product size, logging system limitations, and minimum management requirements. In addition, variables such as initial stocking levels and the timing of treatments were evaluated. The costs of these variables were analyzed based on the costs experienced from similar practices in the past. These costs and the objectives of each level of timber intensity option were used to establish the most cost-efficient means for each option considered. As noted above, biological limitations such as site productivity also played a key role in the final determination of timber management options, i.e. not all intensities of management can be implemented on all timber sites.

Allowable entry dates (rotation lengths) for timber stands were derived based on an analysis of the time required to achieve 95 percent of the CMAI. All stands classified as sawtimber are at or beyond the CMAI and therefore available for entry beginning in the first decade. Early entry dates for other condition classes (poletimber, seedling-sapling, and regenerated) vary by productivity class, condition class, and timber management option. Based on the sample stands used to develop the timber yield tables for each management option, the average age when 95 percent of the CMAI was reached was determined. This was used for the early entry date (minimum rotation length).

As part of the benchmark analysis (see Section VI), rotations were also developed based on when the average tree size in a stand reached the minimum size for merchantability. This minimum size is that found in the timber utilization standards proposed in the Regional Guide. Since existing sawtimber stands were already available for immediate entry under CMAI standards, no changes were necessary. For timber management options on poletimber, seedling-sapling, and regenerated condition classes, early entry dates were determined using a combination of two criteria. The first was when the 80th percentile stand diameter equaled or exceeded the minimum diameter in the

proposed standards. The second criterion was if the total stand volume equaled or exceeded 5,000 MBF/acre. This criterion is based on a minimum feasible operational limit used earlier in the process to evaluate commercial thinning opportunities. Both criterion were applied to the sample stand projections, and the one resulting in the older stand age was used as the early entry date.

Following is a list and brief description of the timber options used in the FORPLAN model:

MINCLR Minimum intensity management using clearcutting as the primary harvest method. No management activities are planned prior to the final harvest. This option is available for existing stands, so no regeneration practices are planned.

MINSHE Same as above, except shelterwood is used as the primary harvest method.

SALCLR Minimum intensity of timber management, except that one entry can be made prior to the final harvest (clearcut) to remove current mortality.

SALSHE Same as above, except final harvest method is shelterwood.

LOWCLR Low intensity management with clearcutting as final harvest method. Planting with precommercial thinning is the only activity planned prior to final harvest.

LOWSHE Same as above, but with shelterwood final harvest.

MODCLR Moderate intensity timber management with clearcutting as the final harvest method. Planned practices are planting with precommercial thinning (age 20) and one commercial thinning prior to the final harvest. Dates of commercial thinnings vary by productivity class.

MODSHE Same as above, except shelterwood is used for the regeneration harvest.

HIGHCLR High intensity timber management with clearcutting as the final harvest method. Planned practices prior to the final harvest are planting with precommercial thinning (age 20) and two commercial thinnings. The dates of the commercial thinnings vary by productivity class.

HIGHSHE High intensity timber management with shelterwood regeneration harvest. Other practices are the same as above.

F. Development of Yield Coefficients

1. Overview

This section describes how the yields of each resource were calculated. Additional information regarding each resource can be found in the respective background papers on file in the Forest planning records.

2. Timber

Yield tables for the Forest Management Plan were developed by projecting timber management inventory stand data using the Growth Prognosis Model. The Regional Office also developed a program by which groups of stands could be simulated, the summaries saved, and then weighted together to get a single yield table for that particular group. The advantage of this method over projection of a single representative stand lies in the weighting procedure. Each stand has a weighting factor based on the sampling procedure used in the Timber Management Inventory. A weighted yield table utilizing individual stand projections, species mix, tree diameter, and weighting factors results in a more accurate projection for the Forest than a single representative stand projection.

3. Range

a. Primary Range

Forage production was expressed in dry weight for all vegetation types found on the Forest. Percent utilization for livestock varied with the intensity of range management as follows:

Low Intensity	=	28 percent
Moderate Intensity	=	35 percent
High Intensity	=	45 percent

The calculation of forage yield by Animal Unit Month (AUM) for primary range per decade was:

$$\text{AUM/acre} = \frac{(S)\ (\text{use factor})}{720}$$

Where S = Total pounds dry weight forage yield per decade; Use factor = Percent utilization allowed for livestock; and 720 = Pounds dry weight forage required per AUM.

b. Transitory Range

Forage production for transitory range was estimated for clearcut and shelterwood timber harvest and varied by timber productivity classes. An allowable use standard of 35 percent was maintained for all vegetation types. Forage production was assumed to have a 20-year life with maximum production of 10 years.

Calculation of the forage yield was:

$$l = a + (n-1)\ d$$

Where l = last year's cumulative total yield; a = first year's total yield; d = increment or annual change; and n = total number of years. Total forage at the end of n years (S) equals n/2 (a + l).

The calculation of AUMs is the same as for primary range.

4. Main Access Roads (Arterial and Major Collector Road Construction)

The miles required and costs for the construction of main access roads are reported in FORPLAN. Main access roads are defined as the arterial and major collector routes required to provide the basic access to large undeveloped areas of the Forest. Main access roads average 1/2 mile per square mile of land area and an estimated total of 300 miles will be required under this Plan. Seventy percent are assumed to be constructed in the first decade and 30 percent in the second decade, which is the annual rate of 21 miles through the first decade and 9 miles in the second decade.

This management practice includes arterial road preconstruction, arterial road construction engineering, arterial road construction, arterial road reconstruction, collector road preconstruction, collector road construction engineering, collector road construction, and collector road reconstruction.

Main access roads were modeled in FORPLAN in the following manner: from analysis of five undeveloped areas on the Forest, the average density required to open the areas for resource development is 0.5 mi/mi^2 (see 1920 memo, Arterial Road Development dated 5/14/81). The construction pattern for these major access routes is 70 percent in the first decade and 30 percent in the second. The remaining collector-local road system would be built during the project development phase. Arterial and major collector roads are assumed to have a 60-year life, and reconstruction costs are 30 percent of initial construction costs.

5. Local and Minor Collector Road Construction/Reconstruction

Total miles of local and collector road construction are reported in FORPLAN. Roads are modeled as built during the first entry of existing stands. Each area is classified with the existing road density as either undeveloped (existing density is 0.0 mi/square mile), partially developed (existing density is 2.0 mi/square mile), or totally developed (existing density is 4.0 mi/square mile). The miles of road required to totally develop an area are modeled as built during the first entry.

Since the FORPLAN outputs tended to put the required road construction in the later decades, the data was adjusted outside of FORPLAN to provide a more realistic distribution of the construction during the earlier decades, and to relate the miles of road to timber harvest. The total miles for each alternative were not changed. The factors used are shown in Table B-8.

Table B-8
Road Density Coefficients
(Miles/MMBF)

	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037	2038-2047	2048-2057	2058-2067	2068 on
Coefficients	0.60	0.45	0.30	0.25	0.20	0.20	0.15	0.10	0.05

The road construction costs were developed from actual Forest cost records for the period of fiscal year 1978-1981. Costs were adjusted for inflation and include a road reconstruction cost for existing roads.

6. Road Maintenance

Road maintenance mileage considered in Forest planning is based on the amount of new and existing road mileage being used during the planning period. Normally about 30 percent of the road mileage is closed or unmaintained. FORPLAN modeling assumes a cost of $212/mile/year and that once a road is constructed it will be maintained throughout the planning horizon. Road maintenance includes five levels of maintenance. Also included are bridge and major culvert projects. In 1980, an estimated 1,860 miles of road were in the total system base.

Either road maintenance costs need to be adjusted outside of the FORPLAN Model, or the initial road closure assumptions must be modified. During the planning process, it became necessary to revise basic assumptions and develop road management standards for system closures. The projected road closure mileage during the first decade will equal or exceed the annual construction mileage. Road system miles after the first decade will level out so that the total system will not exceed 1 mile per square mile considering the total suitable timber acres. Road maintenance costs will then be computed utilizing a stable system base of 1,500 miles at an increased maintenance level commensurate with public use and safety. Maintenance cost will need to be further adjusted to reflect a custodial maintenance for restricted road closures (Level 1).

7. Dispersed Recreation

Dispersed recreation yield coefficients express potential capacity in recreation visitor days per acre (RVD/acre). The process for determining potential capacity was derived from "Recreation Opportunity Inventory and Evaluation," R-1-75-006, June 1974, also known as ROS.

In general, the process worked as follows: basic output levels were determined for each ROS class, physical characteristics of land were identified that affect its capacity to support recreation use, the degree of positive or negative influence of these characteristics was estimated and a multiplier was assigned to each, and the base output level was multiplied against all of the multipliers, or factors, to obtain final yield coefficients, which are shown in Table B-9.

Table B-9
Dispersed Recreation Yield Coefficients
(RVD/Acre/Decade)

ROS Class	Area	RVD/Acre/Decade
Semiprimitive Nonmotorized(SPNM)	Salmon River/Selway	5.0
	Clearwater/Red River/Elk City	2.0
Semiprimitive Motorized (SPM)	Red River/Selway	30.0
	Salmon River/Clearwater/Elk City	5.0
Roaded Natural Appearing (RNA)	Salmon River/Clearwater/Red River/Selway	100.0
	Elk City	40.0

Physical characteristics included size, percent of year usable, and amount of area usable for recreation. Capacity estimates were based on existing travel

facilities, recreation developments, and visitor group sizes per acre or per mile of roads and trails. The final coefficients fell within a range of coefficients suggested by the Northern Region for each ROS class.

The capacities arrived at by applying the coefficients do not reflect use or demand. They are gross averages and are useful primarily for comparing the potential capacity to provide dispersed recreation output in a relative sense under different management emphases.

8. Wilderness

Wilderness recreation yield coefficients for the three classified wildernesses were developed from 1980 Recreation Information Management use figures adjusted over time, using Pacific Northwest River Basin Commission estimates of increases in demand. Outputs for the three classified wildernesses were assumed to remain constant for all alternatives. Projections were only made for 50 years, so the output was held constant beyond the fifth decade. These coefficients are displayed in Table B-10.

Table B-10
Wilderness Yield Coefficients
(RVD/Acre/Decade)

Wilderness	Acres	1980-1990	1990-2000	2000-2010	2010-2020	2020-on
Selway-Bitterroot	560,088	1.0	1.2	1.3	1.5	1.7
Gospel-Hump	200,464	1.6	1.9	2.3	2.7	3.0
Frank Church-RONR	105,736	2.4	2.8	3.5	3.9	4.5

9. Other Classified Areas

Yield coefficients were based on the 1980 Salmon River Management Plan for the Salmon Wild and Scenic River, and on the Recreation Opportunity Inventory (ROI) potential capacity process for the Middle Fork Clearwater River, Rapid River, the two Research Natural Areas, and the Gospel-Hump Corridor. These are shown in Table B-11. Outputs were assumed to remain constant for all decades for all alternatives.

Table B-11
Other Classified Area Yield Coefficients
(RVD/Acre/Decade)

Classified Area	All Decades
Salmon Wild and Scenic River	126.0
Middle Fork Clearwater Wild and Scenic River	653.4
Rapid River	5.0
O'Hara Research Natural Area	5.0
Moose Meadows Research Natural Area	2.0
Gospel-Hump Corridor	30.0

10. Developed Recreation

Yield coefficients were not determined for developed recreation.

11. Elk

Forage is assumed to be the limiting factor on winter ranges. Therefore, potentials were determined solely on the basis of forage production. Winter forage comprises both herbaceous plants (grasses and herbs) and browse.

Potential key and regular elk winter ranges were delineated according to the relationship of elk winter distribution to changing snow depths (Leege, 1977) and a review of Idaho Department of Fish and Game's 1960-79 winter surveys. Key winter range is that portion of the winter range where snow depths are less than 1.5 feet on most days of an average winter. These areas are usually below 4,100 feet in elevation. Regular winter range has snow depths less than 2.0 feet, but greater than 1.5 feet on most days of an average winter. These areas are usually between the 4,100 and 4,500-foot elevation.

The following assumptions were used in estimating elk winter range capacity and yields.

- Forage is the limiting factor on winter ranges.
- Elk are present on winter range for a 3-month period (90 days each year) on shrubland ranges and a 4-month period (120 days) on grassland ranges.
- Forage consumption per elk on winter range is 7 pounds (air-dry) per day (630 pounds each year) and 10 pounds per day on grassland ranges.
- Proper use is 65 percent of available forage on shrubland ranges and 75 percent on grassland ranges.
- Regular winter range will produce 75 percent of the winter elk capacity that key winter range produces on both shrub and grass ranges.
- Elk yield values will reflect forage allowances for mule and white-tailed deer.

The Forest planning records contain details on how these assumptions were used to calculate carrying capacity and develop yield tables.

G. Analysis Done Outside FORPLAN

This section describes how the yields for resources were adjusted, modified, and calculated outside of the FORPLAN model. Additional information regarding these analyses can be found in the respective background papers on file in the Forest planning records.

1. Range

Since primary range is considered fully occupied, any increases in livestock grazing are attributed to timber harvest in transitory range. Based on this assumption, timber harvest acres for clearcut and shelterwood units were totaled for each alternative and decade (future intermediate excluded). Transitory Animal Unit Month (AUM) production was calculated by applying these acres to yield tables designed for transitory range (previously explained in Yield Table

Summary). Total range output was determined by adding transitory and primary AUMs together.

2. Roads

Adjustment needs became apparent when FORPLAN outputs tended to underestimate the miles of local roads and costs required to harvest the scheduled acres in the first few decades of the planning horizon. Within FORPLAN, the required road construction costs associated with harvesting a particular analysis area are linked only to the area for harvest, only those roads within the analysis area are built, and only their costs are reported. Thus, the model does not include the miles of local road construction required in order to reach a particular harvest area. As a consequence, the total road miles are not accounted for throughout the planning horizon. Total road mileage required for harvest is underestimated in the first decades because the miles of road required to get to the analysis area are not accounted for. Likewise, the model overestimates road construction in later decades, because road density is higher in those areas which were "passed through" in earlier decades, but that FORPLAN views as being essentially unroaded.

The following methodology was developed to provide an approach that will be consistent with the magnitude of outputs that are directly related to road building in FORPLAN, and provide a pattern of road building that is consistent with present management and costs.

The first step in this analysis was to determine what validity could be placed on the miles of road constructed in the FORPLAN model with respect to timber harvested. After analyzing the situation, it became apparent that while FORPLAN was not representing the timing of road building well, it did report total miles of road built in the planning horizon adequately. This was illustrated by reviewing the historic road densities as they pertained to total miles of road that could be constructed on the Forest. Assuming that "fully roading" the nonclassified portion of the Forest would constitute building approximately 4 mi/sq.mi. of roads on 1,244,000 acres, or 1,944 sq.mi., then:

> 1,944 sq.mi. at 4 mi./sq.mi. = 7,776 or 7,800 miles of road for the Forest. Assuming that 1,800 miles of road exist, those alternatives that have all nonclassified acres available for timber harvest should have approximately 6,000 miles of road left to be constructed. Original analysis showed that total road miles for these alternatives ranged from 6,160 to 5,190 miles, and substantiated this argument.

The 1984 Transportation Inventory shows the Nez Perce to have 2,053 miles of road. This value was not changed to update FORPLAN analysis factors. (Road mileages per decade for the FORPLAN analysis were obtained from Economics Report No. 5, "Nontimber Costs & Prices," LeDuc, 4/14/82.) It was assumed that Alternatives C, E, and H, with reduced acres available, showed a proportionate share of road miles in accordance with this analysis.

Since total road miles reported in FORPLAN seemed appropriate, it was assumed that what was needed was a method for reallocating the miles to fit a more representative road building network. It was assumed that this schedule would show a decreasing number of miles of road being built each decade beginning in the first decade, thus substantiating the "cumulative" theory, and producing only

minor mileage of roads being built by the end of the planning horizon. This was accomplished by tying road mileage to volume of timber harvested per period.

There are two reasons for this approach: data on miles of road constructed to volume of timber harvested already existed, thus establishing a starting point; and the information could be easily obtained to make the adjustments from the FORPLAN outputs.

A review of historical data showed that approximately 0.81 mile of local road was built or reconstructed for every million board feet of timber harvested between 1978-1981. These ratios are shown in Table B-12. This data was obtained from Forest records of reconstruction and construction road mileages in relation to volume of timber sold (LeDuc, 6/82).

Table B-12
Unit Mileage of Local Road Construction/Reconstruction, FY 78-81 (Ratios)

Fiscal Year	Equivalent Road Construction (miles)[1]	Volume of Timber Sold(MMBF)	Ratio Mi/MMBF
78	40.5	105.2	.38
79	102.7	107.2	.96
80	78.7	102.4	.76
81	38.2	39.9	.96
Average road density			.76
Weighted average road density			.81

1/ Equivalent road miles are equal to the total local road construction miles plus 1/3 (3 to 1 ratio) of the local reconstruction miles.

The assumption was made that the density of local road construction constitutes only 75 percent of the total road density (based on a 3 to 1 ratio of construction to reconstruction miles) and hence, a density of 0.6 miles per million board feet (MMBF) was used as the base value for road density for the first decade in all alternatives.

The next step in the process was to determine what road density values should be used to predict local road miles being constructed in the later decades. It was important that these coefficients should not only portray the cumulative road construction stratification, but also predict total road mileages consistent with what the corresponding FORPLAN outputs showed. Through trial and error, the coefficients shown in Table B-13 were derived and were felt to meet these requirements.

Table B-13
Required Road Density by Decade
(Coefficients - Mi/MMBF)

	1988-1997	1998-2007	2008-2017	2018-2027	2028-2037	2038-2047	2048-2057	2058-2067	2068 on
Coefficient	.60	.45	.30	.25	.20	.20	.15	.10	.05

Multiplying the coefficient for a given decade by the average annual harvest for that decade yields the "adjusted" local road mileage, reported as annual average or, if multiplied by 10, the decade total. For example, if the annual harvest for period 2 is 100 MMBF and the "required road density" coefficient is .45, then the adjusted local road total is 45 miles/year or 450 miles/decade. Table B-14 summarizes the information used to obtain the adjusted road data.

For each decade, the miles of local road construction predicted in FORPLAN are compared to those of the adjusted methodology. As can be seen, the adjusted road miles more closely represent the decreasing trend in road construction over time, while still predicting the total miles of local road construction within acceptable limits (variation in adjusted miles to FORPLAN miles is 2 to 6 percent).

During the evaluation it was found that the road density coefficient was not always a true reflection of road development planning. Variances in annual harvest volumes and scheduling could deviate road density for out-year entries. Each benchmark and alternative was evaluated separately and compared for similarities in suitable acres, entry timing, and entry demands by other resource objectives. These evaluations resulted in manipulation of coefficients. Total roading needs remained within acceptable levels although decade trends would change.

Table B-14
Example of Alternative Adjustments by Decade - Alternative D

Decade[1]	Required Road Density[2]	Miles of Road From FORPLAN[3] (Miles/Year/Decade)	Volume Harvested (MMBF)[4]	Adjusted Road Miles[5] (Miles/Year/Decade)
1	60	(99) 78	157	(115) 94
2	45	(43) 34	198	(98) 89
3	30	31	243	73
4	25	34	244	61
5	20	23	248	50
6	20	18	250	50
7	15	88	243	36
8	10	0	241	24
9	5	29	239	24
10	5	20	246	12
11	5	57	244	12
12	5	37	238	12
13	5	44	232	12
14	5	0	246	12
15	5	99	239	12

Annual Total Road Miles from FORPLAN	622	Annual Total Adjusted Road Miles[10]	603
Total New Construction	6220	Total Adjusted New Const.	6030
Total All Roads	8020	Total Adjusted All Roads	7830

1/ Figures in this table are planned in Decade 1 and projected in all other decades.
2/ Table B-13
3/ Economic Report 5 - Roads (1800 - decade total)
4/ Harvest Report 3 (Volumes M/CUFT - Periodic)
5/ Volume column 4 times column 2 density
6/ Adjusted Road Miles Column 5 minus Fortran Road Miles Column 3
7/ Economic Report 7 - Logging
8/ Total of Column 7 divided by total of (Column 3 minus Arterial-Collectors Mileage 30)
9/ Unit Costs Column 8 multiplied by adjusted Road Miles Column 5 (Local Miles Only)
10/ Represents a 3-percent change from FORPLAN

Net Change in Road Miles[6]	Total Road Costs From FORPLAN ($ Million/Yr/Decade)[7]	Estimated Unit Cost/ Mile[8]	Adjusted Road Costs ($ Million/Yr/Decade)[9]
+16	2.0000	72365	6.800
+55	2.4203	72365	6.440
+42	2.4412	72365	5.280
+27	2.8227	72365	4.410
+27	2.5016	72365	3.620
+32	1.6163	72365	3.620
-52	5.0421	72365	2.610
+24	1.7558	72365	1.740
-5	3.9855	72365	1.740
-8	2.7140	72365	0.870
-45	2.9838	72365	0.870
-25	2.2903	72365	0.870
-32	4.1582	72365	0.870
+12	0.7343	72365	0.870
-87	5.3727	72365	0.870
	Total Costs 42.8400		Adjusted Costs 41.480

Once local road mileages were predicted, approximations of road costs were analyzed. It was apparent that since the actual road mileages had been altered f FORPLAN, the corresponding costs per decade would also change. Three procedures were analyzed to determine an acceptable cost estimation. First, the per-decade local road construction and reconstruction costs were checked to see if they coul be used to predict the costs of the adjusted road construction miles. Analysis showed that, when viewed on a unit basis, the costs in FORPLAN were comparable to the average road construction cost for fiscal years 1978-1981 of $63,396 per mile in 1978 dollars. (Costs based on price adjustments from Federal Highway Administration "Highway Bid Price Index", for 1978-81. Fiscal year data were obtained from Regional Office records, LeDuc, 5/28/82). Table B-15 summarizes th costs.

Table B-15
Local Road Costs by Alternative
(1978 Dollars)

Alternative	Total Road Cost From FORPLAN ($Million)	Total Local Roads (Mi)	Unit Cost($)
A	226.032	2330	97009
C	326.335	3950	82616
D	414.80	5730	72391
E	412.199	5130	80351
F	364.072	4260	85463
G	358.85	4250	84435
G1	367.970	4670	78794
H	248.137	3000	82712
H1	295.351	2970	99445
I	293.519	3650	80416
J	348.252	4610	75543
K	370.85	4350	85253
L	369.67	4810	76854
Max PNV	447.10	5710	78301
Min Lvl	0	2058	0

As can be seen, FORPLAN costs are significantly higher than the Forest average. This is because the FORPLAN costs include estimates for reconstruction, which is assumed to occur at the initial entry of every fully roaded existing stand or all regenerated stands. It was felt that this would not pose a serious problem for cost estimates since the model was programmed to predict these costs already. Therefore, the unit road cost for each alternative was used to predict the per-decade road costs for that particular alternative. Table B-14 illustrates these costs. These values are calculated by multiplying the per-decade road mileage by the unit cost per mile to obtain the total value. For instance, in alternative D1B, the total miles of roads built per year in decade 2 is 89, and the unit cost is $72,365 per mile. Therefore, the total cost of constructing and reconstructing local roads is $6,440,000 per decade.

3. Recreation

a. Developed Recreation

Developed recreation was not analyzed in FORPLAN. No yield tables were built to express developed recreation RVDs (Recreation Visitor Days).

Developed recreation outputs were expressed as current supply (capacity level) until projected demand exceeded supply. Once projected demand exceeded supply, the outputs were expressed as that projected demand because the assumption was made that the Forest can and will increase its developed recreation capacity to meet demand.

Demand was projected by applying the Pacific Northwest River Basin Commission growth rates to 1979 Recreation Information Management (RIM) use data. Projections were only made for 50 years, so the output was held constant beyond the fifth decade, as shown in Table B-16.

Table B-16
Developed Recreation Outputs
(Thousand RVD/year)

Planned	Projected			
1988-1997	1998-2007	2008-2017	2018-2027	2028-on
186.0	186.0	188.2	218.3	253.8

Current supply was expressed as maximum optimal capacity, which is 40 percent of theoretical capacity: 40% x 465.0 MRVD/year (from 1980 RIM data) = 186.0 MRVD/year.

Outputs were assumed to remain constant for all alternatives and benchmarks.

b. Nonwilderness Dispersed Recreation

Nonwilderness dispersed recreation outputs were determined by subtracting the amount of wilderness RVD per decade (from FORPLAN) from the total amount of dispersed RVD per decade (from FORPLAN).

c. Semiprimitive Recreation

For the first 5 decades, semiprimitive recreation outputs were expressed as potential RVDs in roadless analysis areas receiving non-timber prescriptions PLUS potential RVDs in roadless analysis areas receiving timber prescriptions, until the decade of first entry harvest. Following the trend of the first 5 decades, semiprimitive recreation beyond the fifth decade was reduced by 3 percent each decade.

Current potential output of semiprimitive nonmotorized (SPNM) recreation was calculated to be approximately 10 percent of total semiprimitive recreation. The ratio of SPNM to total semiprimitive recreation was held constant for all decades for all alternatives at 10 percent.

Semiprimitive motorized (SPM) recreation outputs were determined by subtracting the amount of semiprimitive nonmotorized RVDs per decade from the total amount of semiprimitive RVDs per decade.

d. Roaded Recreation

Roaded recreation outputs were determined by subtracting the amount of all semiprimitive RVDs per decade from the total amount of nonwilderness dispersed RVDs per decade.

e. Roadless Areas

Acres in each roadless area were multiplied by the yield coefficient for that area to give us RVDs per decade for each roadless area. In alternatives which assigned no additional roadless acres to wilderness, the roadless area output remained as nonwilderness dispersed RVDs. In alternatives which did assign additional roadless acres to wilderness, the roadless area output was changed to wilderness RVDs.

4. Elk

a. Winter Range for Elk

Elk/livestock relations on winter ranges are evaluated on the basis of available forage for key species. These evaluations were made outside the FORPLAN model. Livestock utilization of key species under low, moderate, and high intensities of livestock management is 50 percent, 58 percent, and 70 percent, respectively. Assuming proper use to be no more than 75 percent total utilization and recognizing that key species are the principal forage species for wildlife on winter ranges, utilization available for wildlife under the low, moderate, and high intensities of livestock grazing is 25 percent, 17 percent, and 5 percent, respectively. The Forest's planning files contain detailed information.

b. Summer Range for Elk

Biologists agreed that not all summer range acres had equal potential to support elk and that two stratifications, key range and regular range, would suffice for Forest planning.

The term "key elk summer range" is defined as those areas that can support a high density of elk as a result of inherently ideal habitat conditions. Such conditions include a gentle topography, an abundance of water, and herbaceous vegetation. Adequate security from people must also be available to realize full utilization of key summer range.

Little research has been done to determine the actual animal numbers each range could support. Estimates were derived from experience of biologists working in northern Idaho and from literature review. Biologists determined that regular

range can support one elk per 80 acres (0.0125 elk per acre) at 100 percent effectiveness. These figures assume that habitat conditions are optimum for elk. Few areas, however, provide optimum habitat conditions. To account for factors other than cover/forage ratios, roads, and livestock, a reduction from optimum of 10 percent is used to calculate yields. "Guidelines for Protecting and Evaluating Summer Elk Habitat in Northern Idaho" discusses other factors and the Nez Perce National Forest planning files contain documentation on how this value was determined. These values represent maximum potential carrying capacity. Open road densities and livestock densities are used as a measure of the percentage of actual elk potential on summer ranges.

For analysis purposes, the open road densities in Table B-17 were assumed on the land assignments, with a corresponding percentage of elk habitat effectiveness (potential capacity) on elk summer range:

Table B-17
Elk Habitat Effectiveness
(Percent)

Land Assignment	Miles Road/Sq.Mile (Open Roads)	Habitat Effectiveness (Percent Potential Capacity)
Roadless/wilderness	0	100
High intensity timber management	3	33
Low/moderate intensity timber management	2	55
Other elk summer range	0.25	95

5. Minerals

The minerals information required as part of the Forest Plan, per 36 CFR 219.22(a through f), came primarily from the following sources:

- Information on active mining claims on the Forest, which is kept current by the U.S. Bureau of Land Management. The "Recordation" information is collected under authority of Section 314 of the Federal Land Policy and Management Act. Mining claim locations and proof of annual assessment work is submitted to the BLM by the claimants. The BLM records the information and provides a synopsis to the Forest. The Forest maintains the "Recordation" information supplied by the BLM, actively uses and relies upon it in the administration of various Forest and mining projects, and keeps it available to the public.

- Forest and Regional Office Land Status records were reviewed to determine land status for Outstanding and Reserved mineral rights. Forest planning records were used to establish the locations and acreages for lands that are currently, or proposed to be, withdrawn from mineral entry (i.e., wilderness, Wild and Scenic River, National Recreation Area, administrative).

- Mineral occurrence and potential evaluations were based on evaluation of published and unpublished records, evidence of activity both past and present, and sampling data in some cases. Determination of low, moderate, high, and very high potential ratings is based on guidance and direction received from the Minerals and Geology group of the Regional Office, and was so noted to provide rating continuity across Region One.

6. Sediment Yield

Forestwide, sediment impacts from proposed management activity (road construction and timber harvesting) were calculated using yield tables outside FORPLAN. Coefficients for those yield tables were derived to reflect surface erosional processes that were based on field observations, research, and data from the northern Rockies and the Idaho Batholith (USDA, 1981a; 1981b; 1981c). Relative comparisons between alternatives and indications of trends were produced by this analysis.

To calculate the sediment yields, acres of timber harvest by silvicultural treatment by landclass groupings from FORPLAN and miles of system/main arterial roads were obtained by decade. Miles of road construction were distributed by the landclass groupings that corresponded to the timber harvesting schedule. Coefficients for harvest sediment included weighted averages for anticipated logging systems by landclass grouping. For each alternative, sediment yields for the existing situation, new road construction, proposed timber harvest, and baseline conditions (for the classified and nonclassified portions of the Forest) were summed by decade.

To achieve the minimum management requirement for water quality/fisheries and the various fishery objectives, FORPLAN was constrained by the acres of harvest for decades 1 and 2 and an accessibility constraint. A computerized version of the Guide for Predicting Sediment Yields from Forested Watersheds (USDA, 1981a) that estimates the sediment levels from proposed management activity on third to fifth order watersheds determined these acreage constraints.

7. Water Yield

Impacts from timber harvesting and road construction on Forestwide water yield were estimated using the Equivalent Clearcut Area concept (USDA, 1975). This concept was developed from field observations, research, and data from the northern Rockies on streamflow responses to Forest management activities. The analysis produced reasonable indications of water yield trends; relative differences between alternative actions; and approximate, quantified, and expected outputs for water yield.

To perform the water yield computations, acres of timber harvest by silvicultural treatment from FORPLAN and miles of system/main arterial roads were obtained by decade. The existing and baseline situations were determined from past calculations by the former Nez Perce National Forest hydrologists and by a computerized version of Forest Hydrology, Part II: Hydrologic Effects of Vegetation Manipulation (USDA, 1975) that estimated the water yield situations for all third to fifth order watersheds on the Forest. No peak flow analysis was conducted on any alternatives.

Even though water yield was not an issue or concern, a minimum management requirement in the form of an accessibility constraint was used in FORPLAN to model the legal considerations for the hydrologic integrity of stream channels.

8. Trails

Evaluating trails is complicated because while management guidelines recognize the values of trails, no emphasis has been placed on developing, through construction, new systems for administrative or recreational uses.

Major emphasis has been placed on high-use recreation trails, National Recreation Trail systems, and wilderness access trails. Public involvement has not implied a desire for future development of additional trail systems but concerns have been recognized for increase of user safety, elimination of conflict by trail users, and quality upgrading of existing facilities.

Analysis evaluations for FORPLAN were accomplished using historic Forest maps, transportation (road) mapping, and a visual observation analysis of management operations and effects on given blocks of land.

Land use management through development of road systems has replaced the needs of many Forest trail systems. Continued increases in road systems will continually decrease the need for trail systems.

All existing roadless areas were analyzed for trail needs and user potential. As these roadless areas are developed, the trail system will be decreased to match existing facility inventory in presently developed areas - approximately 1/4 mile per square mile. Most trails in developed areas are replaced by road facilities that serve the recreation traveler or remaining trails provide the user cross-country access between road systems.

An evaluation of trail needs shows that the Forest would maintain a minimum of 1,419 miles of trails and a maximum of 2,342 miles at the end of the planning horizon (150 years), even if the Preferred Alternative is maximum timber harvest. This total includes all present wilderness, National Recreation, and high public demand trail facilities.

Management objectives specify that no new trails are to be added to the system and only those trails designated high use by the Forest task force in 1982 are to be considered residual systems.

Because of the difficulty in determining road access development scheduling, the FORPLAN Effects Data Base only considers an initial and final mileage base. The interim planning horizons will need a project analysis to review trail systems per land unit. This analysis will determine the trail needs as development and public demands change.

9. Energy

Energy consumption was computed outside of FORPLAN. The energy consumption for each alternative is based on the estimated energy use required for Forest Service administrative activities, road construction, road maintenance, timber harvest, recreation use, and grazing permittees. Energy consumption is based on the gallons of gasoline and diesel fuel used in each of the activities. The energy coefficients used are shown in Table B-18.

Table B-18
Energy Coefficients
(Specified Units)

Activity	Coefficient
Developed Recreation	$.015 \times 10^7$ BTU/RVD
Dispersed Recreation	$.010 \times 10^7$ BTU/RVD
Road Maintenance	$.16 \times 10^7$ BTU/Mile
Administrative Sites	928.3×10^7 BTUs annually
Administrative Travel	$1407. \times 10^7$ BTUs annually
Timber Harvest	$.13 \times 10^7$ BTU/MBF
Road Construction	26.3×10^7 BTU/Mile
Range	$.0076 \times 10^7$ BTU/AUM

10. Fish/Water Quality

The quantification of the fish resource was achieved using four data components. One, a stream habitat data base, was developed by Newhouse and Robertson in 1980. This data file was generated through literature (Murphy and Metsker, 1962; Mallet, 1974; and Martin, 1975 and 1976), 1975 through 1980 Forest Service habitat surveys, and personal knowledge. Where data was lacking, streams of first and second order were assumed to have no available habitat due to small size and high gradient. This file describes, by reach (dissimilar stream sections) for each prescription watershed, the fish species present by age class and total available habitat area. Streams are classified as anadromous, resident, or nonresident (no fish). Each reach is channel-typed according to standard Forest Service criteria.

The second data component used was fisheries research conducted by the University of Idaho (Shepard and Bjornn, 1981). These researchers investigated expected fish densities by species, age class, and channel type at full seeding capacity. When combined with the habitat area and species data file, the resulting file yields the Forest's biological potential to produce fish (area x density/species = total fish/species). The primary assumption is that the density of fish in the study area is representative of the entire Forest. This file is referred to as the 'Fisheries Yield Tables'.

The third and fourth data components used in the analysis were the Fish Response and Sediment Yield Guidelines (Stowell et al., 1983 and USDA Forest Service, 1981a). A tie between biological potential (Fisheries Yield Tables) and current habitat potential was made using these analysis tools. The basic premise behind these two models is that roading and logging produce sediment in

excess of natural rates and this excess sediment is detrimental to salmonid populations. The existing watershed data base for sediment yields was run through the fisheries model to get the existing habitat condition, due to management sediment, for each prescription watershed. Current habitat potential is expressed in numbers of anadromous smolt and catachable trout (more than 6 inches). This data file was developed under the assumption that excess sediment delivered to a critical fish habitat was cumulative and little if any recovery in habitat condition has occurred since the activity took place. Current fish habitat potential was then used to compare FORPLAN benchmark and alternative runs.

Once the number of fish the Forest can produce was established, the matter of how the alternatives affect fish populations was a rather complex problem. It was first thought that sediment yields by alternative, as they came out of FORPLAN, could be used through the Fish Response Guidelines. This approach, however, proved to be infeasible for several reasons. Sediment yield tables in FORPLAN had to be repeatedly compromised (condensed) in order to make room in an already overburdened model. This resulted in sediment yields only being available on a Forestwide basis. Forestwide averages tend to dilute results and hide problem areas. Also, they do not allow for close analysis of individual watersheds as previously planned. The solution to this problem was to establish fish habitat objectives by watershed and convert these objectives to a FORPLAN constraint related to sediment yields. In essence, the Fish Response Guidelines were applied in reverse. The question became: for a given level of fish habitat capacity (objective), how much sediment can we produce and still meet this goal?

The fish habitat objectives were established by Rick Stowell (Forest Fisheries Biologist) using the following criterion:

a. Fishery Type:

   (1) Anadromous - Priority 1
   (2) Resident - Priority 2

b. Habitat Condition:

   (1) Pristine - Priority 1
   (2) Degraded - priority 2

c. High importance to public and Idaho Department of Fish and Game's goals - Priority 1

Each priority was given a numerical objective which related to the percent of habitat carrying capacity desired for each category. Objectives varied by drainage and alternative and were set no lower than than 60 percent to provide for viable populations (See Forest planning records). Objectives were set primarily on the above criterion, but personal knowledge of the Forest's fishery resource was also applied. Objectives were set using the following categories:

- Anadromous/Pristine - 100 percent or 90 percent
- Anadromous/Degraded - 80 percent or 70 percent
- Resident/Pristine - 100 percent or 70 percent
- Resident/Degraded - 70 percent
- Highly Important - 100 percent or 90 percent
- Viable Level - 60 percent

Sediment yields used to support the preceding objectives were derived from the Fish Response Guidelines (Table B-19). These sediment yields, referred to as sediment budgets, are the levels of sediment which cannot be exceeded and meet the stated objective. Sediment yields necessary to meet the 90 percent objectives are referred to as threshold levels. Threshold sediment yields are those levels over the natural rate that would not result in a measurable impact to fish habitat. Threshold levels were derived from data collected on the Nez Perce and Clearwater Forests and documented in the Fish Response Guidelines.

Table B-19
Sediment Yields Over the Natural Rate Necessary to Meet Fisheries Objectives by Species and Channel Type
(Percentage)

	Fish Objective - Resident/Steelhead			
Channel-Type	60	70	80	90
A	80	70	60	60
B	75	60	45	40
C	65	50	35	30
	Fish Objective - Chinook			
A[1]	-	-	-	-
B	45	40	35	30
C	30	25	20	15

1/ Chinook production in 'A' channel types does not exist on the Forest.

Another feature of the fish/water quality objectives is the concept of entry frequency. Entry frequencies are estimates of the rate of road building activity (activity years per decade) which would also be necessary to meet stated fisheries objectives. The concept applies to the ability of fish habitat to recover toward its original condition after excess sediment has been introduced into the system. It was felt that fish habitat could not recover if the budget or threshold was reached more than once for thresholds and more than two to three times for budgets in any given 10-year period. This methodology is an attempt to address the cumulative impacts issue. By not exceeding sediment levels within the stated frequency, cumulative impacts should not exceed desired objectives.

IV. COST EFFICIENCY AND NET PUBLIC BENEFIT

This section describes how the efficiency criteria and Net Public Benefits (NPB) measures described in Chapter II are derived. This analysis is required by National Forest Management Act regulations (36 CFR, Part 219) and plays an important part in the development and comparison of Forest planning alternatives. After evaluating all public comments on the Proposed Forest Plan and Draft Environmental Impact Statement (EIS), it was decided to do a sensitivity analysis on timber price projections and the valuation of timber, recreation, and wildlife. See Appendix D for the results of this analysis. Table B-20 displays the factors which define Net Public Benefits.

Table B-20
Derivation of Net Public Benefits
(Specified Units)

PRESENT NET VALUE (PNV)
Priced Outputs
Nonmarket Market
(e.g. Recreation) + (e.g. Timber)

\+ = NET PUBLIC BENEFITS (NPB)
(Non-numeric value)

NET SUBJECTIVE VALUE (NSV)
Nonpriced Outputs
Nonquantitative Quantitative
(e.g. T&E Species Quality + (e.g. #Elk)

In response to public comments on timber price projections and values, additional analysis was performed on the Max PNV benchmark, Alternative D, and Alternative G. The purpose of this analysis was to determine what impacts updated values and projections would have on resource output capability and economic efficiency. Additional analysis was also done using updated wildlife/recreation values to determine the impact on present net value and land assignments for Alternative G. For additional information in regard to this sensitivity analysis, see Appendix D.

A. Net Public Benefit (NPB)

Net Public Benefit is the overall value to the nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) of producing priced and nonpriced outputs from National Forest System lands (36 CFR 219.3). Thus, Net Public Benefits represent the sum of net priced outputs (PNV) plus the net subjective value of nonpriced outputs. Net Public Benefit cannot be expressed as a numeric quantity because PNV cannot be numerically added to qualitatively valued nonpriced outputs. Maximization of Net Public Benefits is a goal of the Forest planning process.

B. Present Net Value (PNV)

PNV represents the dollar difference between the discounted value of all priced outputs and all Forest Service costs projected over the 150-year planning horizon. Two discount rates, 4 percent and 7-1/8 percent, were used to represent the real cost of money over time (36 CFR 219.3).

This cost-efficiency measure is part of NPB and is used to determine the net economic value of priced outputs. Priced outputs included in the Nez Perce FORPLAN model were those with estimated market values (timber and range) and assigned nonmarket values (dispersed, developed, and wilderness recreation and recreation activities related to on-site fishing and big-game hunting). Values for special uses and anadromous fishery opportunities attributed to the Forest were also calculated and added to the PNV amounts.
Each benchmark and alternative was designed to achieve the goals and objectives in a manner that produced the greatest PNV. This was accomplished by solving FORPLAN with the objective function of maximizing PNV while meeting the specified constraints of the benchmark alternative. The PNV calculated in FORPLAN is modified by including priced benefits and costs not modeled in FORPLAN. The modified PNVs were used to evaluate the benchmarks and alternatives. The benefits and costs which were not included in FORPLAN were those which do not influence and are not influenced by land assignments and output scheduling. This section describes how the prices and costs were calculated.

1. Priced Output Parameters Used in PNV

a. Discounting

Two discount rates were used to solve FORPLAN and to calculate the economic consequences of the benchmarks and alternatives. The 4-percent rate approximates the real return on corporate long-range investments above the rate of inflation (Row, Kaiser, Sessions, 1981). Inflation is not included in the discount rates, benefits, and costs due to the difficulty of estimating future inflation rates and because inflation is assumed to equally affect both costs and prices. This rate was used to solve FORPLAN in all cases except one and is also the primary rate used to evaluate benchmarks and alternatives. The second rate, 7-1/8 percent, was used to determine sensitivity of the Preferred Alternative to the discount rate by solving FORPLAN at 7-1/8 percent (FSM 1971.5, R-1, ID No. 7). A summary of this information is included in Chapter II. Also, the PNV of all benchmarks and alternatives was recalculated at 7-1/8 percent for comparison purposes. All costs and benefits were discounted from the midpoint of the planning period.

b. Timber Demand Curve

No local demand curve for timber was used in the FORPLAN computer model. None of the available techniques for developing Forest-level demand functions has a strong enough theoretical basis for use in Region 1. Available evidence also indicates that if a reliable Forest-level demand function could be calculated, the elasticity would be such that the use in FORPLAN would not be significant.

As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand Curves," dated 2/3/81), the demand curve is assumed to be horizontal.

As a result of public concerns about the timber supply in Idaho and the effect changes in demand would have on the Preferred Alternative (Alternative G), a study on Idaho's timber supply ("A Report on Idaho's Timber Supply") was completed on February, 1987. The result of this study and additional supply and demand analysis is contained in Appendix D.

c. Real Price Increases

Price trends used for valuing the resources in future decades are long-term estimates which may not reflect short-term market situations. Two price trends were directly incorporated in the FORPLAN computer model for timber values: lumber price and private lumber production costs. These trends reflect the assumption that future demand increases or supply restrictions will increase national product prices. Stumpage values used in the FORPLAN model were the residual of these projected lumber prices and private production costs, and result from the application of both price trends.

Table B-21 summarizes timber price and cost trends that are consistent with the requirements of FSM 1971.4 (R-1 ID No. 5). Cost and price trends displayed in Table B-21 are expressed in terms of proportional annual shifts per decade for 6 decades. The accumulated trend through the sixth decade was used for the seventh decade and beyond. The annual shifts were used to calculate the price and cost multipliers for the midpoint of each decade.

Price trends for valuing range forage and recreation (dispersed and developed) were incorporated into the model by using appended rows and columns to the linear program (LP) matrix. Price trends were also used in valuing anadromous fishery outputs calculated outside of FORPLAN. These include anadromous fishery values for sport and commercial fishing. The price trends were consistent with 1980 RPA assessments of the demand for these resources (FSM 1971.4, R-1, ID No. 6). The price trends for these resources are expressed as proportionate annual shifts in value for the first 5 decades. The accumulated trend in the fifth decade is used for the sixth decade and beyond.

No real cost increases were used to determine anticipated agency costs beyond the base year. However, the average unit costs of many activities will increase through time as more expensive management activities are scheduled. These costs are used in the model. For example, the unit costs of site preparation will increase as steeper and more expensive land classes are harvested.

d. Real Dollar Adjustments

All prices and costs are expressed in first quarter 1978 dollars. The gross national product (GNP) implicit price deflator index is used to inflate or deflate price and cost data to this common base (FSM 1971.32b).

2. Benefits and Costs Used in PNV

Priced outputs determine the dollar benefits used in the PNV calculations. Priced outputs include only those resources that are or could be exchanged in the market place. On the Nez Perce National Forest, only timber and range prices were based on locally estimated market values. Recreation prices are national-level estimates of consumers' willingness to pay. Willingness-to-pay values were derived in the 1980 Resource Planning Act (RPA) Assessment, and represent what consumers would be willing to pay for a recreational experience rather than forego the opportunity. They represent the consumer surplus, or the value above and beyond the actual cost of participation. Anadromous fishery values and special use returns related to the Forest were not included in the FORPLAN model, but their PNV contributions were added later.

Costs used in PNV include both priced output costs and costs built into prescriptions to produce varying levels of nonpriced outputs (discussed in detail later). PNV does not contain the value of all benefits or costs because some are nonpriced outputs; however, the costs to produce these outputs are included.

The compilation and analysis of data used to determine cost and benefit information for the alternatives and benchmarks involved two distinct procedures. First, those costs and benefits which contributed to land assignments and scheduling of prescriptions in the FORPLAN linear program (LP) were compiled and entered into the model through the use of economic yield tables and appended rows and columns to the LP matrix. These tables relate costs and priced output values associated with management practices, production costs, and timber values. The tables were assigned to individual analysis area prescriptions and allowed FORPLAN to assign the most cost-efficient prescription to any given analysis area to meet the constraints of the alternatives or benchmarks. Appended rows and columns to the LP matrix were used to incorporate the price benefits for recreation and range. These benefits were modeled to conform to future real price increases and maximum consumptive ceilings (see "Priced Benefits").

The second procedure in the analysis involved determining the costs and benefits that were not associated with land assignment or prescription assignment, but which were also affected by alternative formulation. These include the costs and/or benefits of site-specific programs (i.e., developed recreation). Estimation of these costs and benefits was done outside the FORPLAN analysis, but they were included in the PNV totals.

A more detailed analysis of the benefits and costs used to determine PNV can be found in the "Directory of Management Practices" package, Nez Perce National Forest planning records.

a. Costs

Agency costs were estimated for the 150-year planning horizon for all benchmarks and alternatives. This section discusses how costs were developed and allocated into the major expenditure categories. Costs were developed by Forest personnel in conjunction with developing standards and guidelines for management prescriptions. Agency cost estimates were determined for all management activities and classified according to FSH 1309.11, Management

Information Handbook (MIH) codes. These individual MIH costs were further combined to define management practices for recreation, wilderness, wildlife, fish, range, timber, water, minerals, human and community development, lands, soils, facilities, and protection. Management practices were used to define the primary unit costs associated with both the FORPLAN and external analyses. Cost estimates were based on 1980 base year activity, and expressed in 1978 dollars. Some costs include expenditures necessary to produce both priced and nonpriced outputs. The costs are based on historical data and professional judgment, and approximate the minimum funds needed to achieve the standards and guidelines in the management prescriptions. Cost data were used in developing feasible and cost-efficient prescriptions, consistent with FSM 1970.2, "Economic and Social Analysis Objectives." The costs which are dependent on land assignment and timber harvest schedule were modeled in FORPLAN. These costs were entered in the economic tables in FORPLAN. By solving FORPLAN to maximize PNV, the cost-efficient level of agency expenditures for these costs was estimated for 150 years. Other or "overhead" costs which were not modeled in FORPLAN were developed by the planning team to meet the objectives of each benchmark and alternative. The actual cost data is discussed later in this section. More detailed information on data sources and FORPLAN modeling procedures is located in the Forest Planning records.

Costs were divided into four broad expenditure categories:

Fixed Costs represent the inescapable costs of managing the Forest in the absence of producing controllable outputs. These are costs associated with meeting minimum management requirements and legal standards, avoiding undue environmental damage, and providing for the safety of incidental users. Fixed costs represent the costs of activities which the Forest must maintain, regardless of any controlled outputs being produced. Fixed costs were assumed to be constant for all alternatives and were calculated outside FORPLAN. Fixed costs did not contribute to the FORPLAN objective function that maximized Present Net Value and do not affect land assignments. However, these costs were added to the Forest costs, present value costs, and PNV outside the model. An average annual fixed cost of 2.024 million dollars was added to each alternative.

Variable or "Allocation" Costs were calculated in FORPLAN and are the costs of Forest Service management practices that vary in amount and timing as well as in response to different landtypes and management objectives. These are the costs associated with assigning a particular set of management activities (prescription) to a given analysis area. Each management prescription has a unique set of variable costs. Variable costs directly influence land assignments and scheduling of resource outputs. Variable costs for each alternative and benchmark are calculated per decade and are contained in the FORPLAN Economic Reports contained in the Forest Planning records. The costs reported include: road, site preparation, sale prep and silvicultural exam, timber stand improvement, reforestation, and nontimber resource management costs.

Overhead Costs represent the cost of activities which did not affect land assignments or scheduling of resource outputs, but are required to produce, enhance, or mitigate more than one resource. For example, the cost of Fire Prevention and Detection is classified as an overhead cost because this activity benefits all resources. Overhead costs comprise a large segment of

the total Forest program, accounting for approximately 30 percent of total agency costs. Overhead costs for each alternative and benchmark did not contribute to the FORPLAN objective function that maximized Present Net Value and do not affect land assignments. However, these costs were added to the Forest costs, present value costs, and PNV external to the model. Overhead costs vary by decade, and vary from $2.128 to $2.208 million dollars annually. Production Costs, also referred to as logging costs, are non-Forest Service logging and manufacturing costs. Production costs were developed using the Nez Perce stumpage valuation equations. These costs were used in the cost-efficiency analysis conducted by the FORPLAN computer model for stumpage price calculations but were excluded from budget calculations because they are purchaser, not Forest Service, costs. Briefly, production costs (PC) were calculated as the residual value between lumber selling price (LP), (log scale) and stumpage value (SV). That is PC ($/MBF) = LP - SV. Production costs vary, depending upon timber yield, species composition, logging method, harvest type, harvest unit size, and d.b.h. class.

Adjustments were made to the local road construction miles needed per decade, necessitating adjustments to road construction and construction engineering costs. The FORPLAN model schedules road construction miles directly proportional to acres of timber harvested. This results in an underestimate of the miles of roads needed in the early decades of the planning horizon because roads are needed to connect the new harvest areas to the existing road system. The total miles of road needed to complete the transportation system for a given alternative remained as calculated by FORPLAN; however, external to the model, some road miles were shifted from later to earlier decades. Associated variable costs were also brought forward.

(1) Cost Data by Resource Component

Costs were associated with each resource output component for timber, roads, range, recreation/wildlife, and other joint costs. The joint costs are not separated into resource, e.g., fire protection, and general administration. Costs are reported as annual averages per decade for each alternative and benchmark.

It is important to note that some of the costs include expenditures required to produce, enhance, or mitigate more than one resource. For example, slash disposal costs may contain a cost to mitigate visual quality. This cost is currently unseparable and appears in the timber category. This illustrates that the costs by resource output do not always have a direct relationship with the benefits by resource. In general, calculating a PNV by individual resource may be misleading.

(a) Timber

Most costs of timber management were considered variable and were calculated in the FORPLAN model. These include the costs of:

- Stand examination
- Reforestation
- Site preparation
- Timber stand improvements
- Sale preparation and administration

Timber costs were entered into the FORPLAN model by the use of the economic yield tables which assign costs to specific management prescriptions. These costs were calculated for each alternative and benchmark per decade and reported in the FORPLAN Economic Reports 1 - "Costs per Acre," 3 - "Cultural Treatment Costs," and 7 - "All Costs." In addition to these activities, the overhead costs for the following practices were added to the total timber costs:

- Timber planning and inventory
- Silvicultural review and evaluation
- Firewood administration
- Insect and disease management
- Genetic tree improvement program

These costs were calculated outside the FORPLAN model and were assumed constant for all alternatives and benchmarks. These costs constitute only a minor portion of the total timber costs and account for $0.120 million dollars annually.

Specifically, annual timber costs calculated for each alternative and benchmark were equal to:

$$\frac{\text{Stand exam costs/decade (calculated as: \$25x [(area in acres of first entry road costs) + (later entry road costs)] = Econ. Report 1}}{10}$$

+

$$\frac{\text{Cultural treatment costs/decade (minus release costs for Decade 1 and other costs for Decade 2) = Econ. Report 3}}{10}$$

+

$$\frac{\text{Site prep and sale prep costs = Econ. Report 7}}{10}$$

+

Annual overhead timber costs/decade ($0.1 million/yr.)

(b) Roads

The costs of preconstruction and construction engineering, road construction, purchaser road credits, and road maintenance were considered variable costs and were entered into the FORPLAN model in the economic yield tables. These costs were reported per decade for each alternative and benchmark in the FORPLAN Economic Reports 1 - "Costs per Acre," 3 - "Cultural Treatment Costs," and 5 - "Nontimber Costs." Local road construction costs (per-acre Logging Costs - Econ. Report 1) were further adjusted to account for an underestimation of road construction for timber harvests in the early decades. The cost of

transportation planning and inventory was added to the total road costs. The cost of this activity is assumed to be constant for all alternatives and benchmarks at 0.04 million dollars annually.

Annual road costs calculated for each alternative and benchmark were equal to:

$$\frac{\text{Preconstruction and construction engineering costs/decade (calculated as: residual of first entry road costs and first entry stand exam costs) = Econ. Report 1}}{10}$$

+

$$\frac{\text{First decade release costs and second decade other cultural treatment costs = Econ. Report 3}}{10}$$

+

$$\frac{\text{Road maintenance costs/decade (scheduled output 9) = Econ. Report 5}}{10}$$

+

Annual adjusted roadbuilding costs/decade

+

Annual overhead road costs/decade ($0.040 million)

(c) Range

The costs of administering and maintaining a range program on the Forest were considered variable costs, and were calculated in the FORPLAN model by use of the economic yield tables. These costs were reported by decade for each alternative and benchmark in the FORPLAN Economic Report 5 - "Non-timber Costs." Range costs include:

- Range planning and inventory
- Range management
- Range forage improvement
- Range structural improvement

An overhead cost of 0.003 million dollars was added to this cost to account for free use grazing permits included in the fixed cost estimates. Because of consumptive demand ceilings on Animal Unit Month (AUM) outputs, and the fact that these program levels can be achieved under most management levels, range costs were assumed to be constant for all alternatives and benchmarks except the minimum level and maximum range benchmarks. Range costs were calculated by applying a fixed unit cost to all inventoried acres of grazing lands.

Annual range costs for each alternative and benchmark were equal to:

$$\frac{\text{Range cost/decade (scheduled output 4) = Econ. Report 5}}{10}$$

+

Annual overhead range costs ($0.003 million)

(d) Recreation/Wildlife

Four recreation/wildlife costs were calculated in the FORPLAN model using the economic yield tables. These are:

- Wild and Scenic River management
- Dispersed recreation management
- Wilderness management
- Big-game habitat management

These costs were considered variable because they do affect land assignments and scheduling of resource outputs, although the costs of Wild and Scenic River and wilderness management were held constant for all alternatives and benchmarks. The costs were reported per decade for each alternative and benchmark in the FORPLAN Economic Reports 5 - "Non-timber Costs," and 7 - "Wildlife Costs." In addition to these costs, the following activities were added to the total recreation/wildlife cost estimates:

- Recreation planning and inventory
- Cultural resource management
- Visual resource planning and inventory
- Developed recreation planning
- Private recreation management
- Threatened and Endangered Species habitat management
- Stream inventories
- Fish habitat restoration and improvement

The costs of many of these activities can vary by alternative and benchmark, although they were considered to be constant overhead costs because they did not influence land assignments or scheduling of resource outputs. The overhead cost estimates account for 0.193 to 0.351 million dollars annually.

Annual recreation/wildlife costs were equal to:

$$\frac{\text{Recreation costs/decade (scheduled output 6) and wildlife costs/decade (scheduled output 7) = Econ Report 5}}{10}$$

+

Annual overhead recreation/wildlife costs/decade ($0.2-0.4 million)

(e) Other

Other costs constitute the balance of activities required to produce, enhance, or mitigate the resource programs already described. These costs are not separable among resource activities, but are necessary components of the Forest program. Other costs were calculated outside the FORPLAN model and account for 3.798 to 3.824 million dollars annually. Other costs include the following activities:

- Water planning and inventory
- Water uses
- Water resource improvements
- Minerals management
- Human resource programs
- Special uses
- Land ownership
- Landline maintenance
- Rights-of-way
- Land management planning
- Soils management
- Trail construction and maintenance
- Fire, Administrative, and Other (FA&O) construction and maintenance
- Fire prevention
- Cooperative law enforcement
- General administration

(2) Budget Costs

Budget costs consist of the estimated appropriated costs of management for each alternative and benchmark. These costs were reported as annual averages for each of the 15 decades. Budget costs were stratified into the following categories.

- Fixed costs
- Planning and inventory costs
- Operation and maintenance costs
- Capital investments

A fifth category, purchaser credit road costs, was added to show the cost of constructing purchaser credit roads for timber harvests. This cost was not included in the total budget costs, but was added to the total agency cost estimates used to calculate PNV. Delineation of what activity costs were included in each category followed the guidelines discussed in FSM 1971.32b (R-1, ID No. 6) and were adapted where applicable. Budget costs were calculated similarly to the method used to determine cost data by resource component. Variable or allocation costs for each budget cost category were summarized from the FORPLAN economic reports by decade for each alternative and benchmark. Overhead costs for each budget cost category were then added to these summaries to determine the total categorical costs. Following is a summary of how each budget cost was determined.

(a) Fixed Costs

As defined, fixed costs represent the inescapable costs of managing the Forest in the absence of producing controllable outputs (see preceding discussion). Fixed costs were assumed to be constant for all benchmarks and alternatives at 2.024 million dollars annually, and were calculated outside the FORPLAN model. Following are the activities which contributed to fixed costs:

- Cultural resource management
- Developed recreation management
- Private recreation management
- Threatened and Endangered Species habitat maintenance
- Recreation horse grazing permits
- Free-use firewood administration
- Water resource administration
- Minerals management
- Special use permits
- Road maintenance (custodial)
- Trail maintenance
- FA&O maintenance
- Fire prevention
- Law enforcement
- General administration

(b) Planning and Inventory Costs

Planning and inventory costs are defined as the costs associated with long-term management planning and resource inventories (FSM 1971.32b, R-1, ID No. 7).

These costs were assumed to be constant for all alternatives and benchmarks, although they do vary by decade from 0.155 to 0.130 million dollars annually. All planning and inventory costs were calculated outside the FORPLAN model, and include the following activities:

- Recreation planning and inventory
- Visual resource planning and inventory
- Timber planning and inventory
- Water resource planning and inventory
- Soils planning and inventory

(c) Operations and Maintenance Costs

Operations and maintenance costs include activities required to keep capital assets at agreed levels of service and availability, and activities required to produce, or incurred as, a result of producing controllable outputs (FSM 1971.32b, R-1 ID No. 7). Operations and maintenance costs were calculated as a summation of decade costs reported in the FORPLAN Economics Reports 5 - "Nontimber Costs," and 7 - "All Costs," for each alternative and benchmark, and a fixed level of overhead costs calculated outside the FORPLAN model. This fixed level of costs varied very little by decade and ranged from 1.675 to 1.678 million dollars annually. Operations and maintenance costs included in the FORPLAN model were derived from the following activities:

- Wild and Scenic River management
- Dispersed recreation management
- Wilderness management
- Deer and elk winter range management
- Range planning and inventory
- Range management
- Timber sale preparation
- Road maintenance

(d) Overhead Operations and Maintenance Costs

These costs added to the FORPLAN costs included the following activities:

- Stream inventories
- Firewood administration
- Water uses
- Water resource improvements
- Minerals management
- Human resource programs
- Land ownership
- Landline maintenance
- Rights-of-way
- Land management planning
- Soils management
- Transportation planning and inventory
- Fire prevention
- Search and rescue
- General administration

Specifically, annual operations and maintenance costs for each alternative and benchmark were calculated as:

$$\frac{0.45 \times [\text{Range cost/decade (Scheduled Output 4)} + \text{Recreation cost/decade (Scheduled Output 6)} + \text{Wildlife cost/decade (Scheduled Output 7)} + \text{Road maintenance cost/decade (Scheduled output 9)}] = \text{Econ Report 5}}{10}$$

$$+$$

$$\frac{\text{Sale prep cost/decade} = \text{Econ Report 7}}{10}$$

$$+$$

Annual overhead operations and maintenance cost/decade($1.675 - $1.678 million)

(e) Capital Investments

Capital investments are the costs associated with construction and reconstruction of arterial and collector roads or jointly used administrative or other facilities with benefits occurring over more than one 5-year planning cycle (FSM 1971.32b, R-1, ID No. 7). Capital investment costs were calculated

as a summation of decade costs reported in the FORPLAN Economics Reports 1 - "Per Acre Costs," 5 - "Nontimber Costs," and 7 - "All Costs, for each alternative and benchmark, and a fixed level of overhead costs calculated outside the FORPLAN model. Local road construction costs (Per Acre Costs - Econ Report 1) were further adjusted for an underestimation of road construction for timber harvests in the early decades, as previously discussed. It was assumed that 30 percent of the cost for local road construction would be funded with Forest Service appropriated funds for each alternative and benchmark.

Following are the activities which constituted capital investments calculated in the FORPLAN model:

- Range forage improvements
- Range structural improvements
- Stand examinations
- Reforestation
- Site preparation - slash disposal
- Timber stand improvements
- Arterial and local preconstruction and construction engineering
- Arterial road construction
- Local road construction (30 percent of total)

Overhead capital investments were assumed to be constant for all alternatives and benchmarks and varied from 0.324 to 0.481 million dollars annually by decade. Overhead capital investments were based on the costs of the following activities:

- Developed recreation management
- Threatened and Endangered Species habitat management
- Fish habitat restoration and improvement
- Genetic tree improvement program
- Trail construction and maintenance
- FA&O construction and maintenance

Specifically, annual capital investments calculated for each alternative and benchmark were equal to:

$$\frac{\text{Stand exam costs/decade (calculated as: \$25 x [(area in acres of first entry road costs) + (later entry road costs)] + preconstruction and construction engineering costs/decade* = Econ Report 1}}{10}$$

*Preconstruction and construction engineering cost/decade are calculated as 0.30 (residual of first entry road costs and first entry stand exam costs/decade).

+

$$\frac{\text{0.55 x range cost/decade (Scheduled Output 4) = Econ Report 5}}{10}$$

+

$$\frac{\text{Site prep and sale prep costs/decade = Econ Report 7}}{10}$$

+

0.30 (annual adjusted roadbuilding costs/decade)

+

Annual overhead capital investments/decade ($0.324 - $0.481 million)

(f) Purchaser Credit Road Costs

The purchaser-incurred costs of constructing and reconstructing local and minor collector roads required for timber harvest operations were included in the cost analysis to provide a true cost estimate of management activities. It is assumed that while these costs are purchaser-incurred, they do constitute government expenditures since timber revenues are paid to the purchaser for construction of these roads. They also constitute a portion of the costs used in assignment and scheduling within the FORPLAN linear program. However, purchaser credit road costs were reported separately because they do not constitute an appropriated fund required for implementation of any given alternative, but are necessary in order to produce timber outputs.

Purchaser credit road costs were derived from the FORPLAN cost estimates for local road construction for each alternative and benchmark (Per Acre Logging Costs - Econ Report 1). These costs were further adjusted for underestimations of road construction for timber harvest in the early decades, as previously discussed. It was assumed that 70 percent of the cost of local road construction for each alternative and benchmark would be funded with purchaser road credits.

Annual purchaser credit road costs for each alternative and benchmark were calculated as:

.70 (Annual adjusted roadbuilding costs/decade)

b. Priced Benefits Used in PNV

Resource outputs to which dollar values were assigned constitute the priced resource benefits included in the PNV calculations. Priced benefits were estimated for the 150-year planning horizon, and reported as annual average values for 15 decades for each alternative and benchmark. Priced benefits fell into two categories: market and nonmarket. Market benefits constitute the resources valued in terms of what people are willing to pay for them as witnessed by market transactions, or which could be traded under market conditions. These included benefits for timber, range forage, developed recreation, commercial anadromous fishing opportunities, land use, power, and minerals (FSM 6531.12b, "Annual Collection Statement").

Nonmarket benefits are defined as goods and services valued in terms of what reasonable people would be willing to pay rather than go without the output. The value represents the marginal willingness-to-pay or the theoretical site rent that could be charged to users in addition to the cost of participation (i.e., equipment, food, lodging, etc.). Nonmarket benefits used in the analysis include dispersed recreation, wildlife (elk), and anadromous fishery/recreation opportunities.

(1) Prescription Assignment

As stated, both market and nonmarket benefits were used in the determination of total priced benefits. However, only certain resource benefits were used to determine the assignment and scheduling of prescriptions in FORPLAN. The reason these resource outputs were used is that their production could be linked to the analysis area/management prescription format. These include timber, dispersed recreation, wilderness, wildlife (elk), and range.

(a) Timber

The total value of both existing and future timber inventories produced on the Forest was derived through the use of the FORPLAN model, and used to predict land assignments and scheduling of prescriptions. Timber values represent the average stumpage value of timber harvested on the Forest. Stumpage value is the difference between lumber's selling price and all production costs. Values reflect differences in timber size, species group, volume per acre, logging method, Northern Region utilization standards, and time of harvest for existing and regenerated timber stands. The values were first computed in dollars per thousand board feet and then converted to dollars per thousand cubic feet using average conversion board foot-cubic foot values weighted by species mix.

A regression analysis of timber sales sold between 1974 and 1980 produced the following equations for predicting stumpage values:

For tractor and cable logging:

$$Y = -349.70 + 0.72009\ X_1 + 62.365\ X_2 + 36.034\ X_3$$

and helicopter logging:

$$Y = 255.16 + 0.5511\ X_4 + 47.94\ X_2$$

where:

Y = high bid stumpage value/MBF (1978$)
X_1 = weighted average lumber price, log scale (1978$)
X_2 = the summation of the natural logarithm of each dbh class times the proportion of the net sale volume in each class (analogous to the logarithm of the median dbh).
X_3 = percent of area that is tractor logged
X_4 = weighted average lumber price, lumber tally (1978$)

Directions on how the timber values were entered into the FORPLAN model can be found in the Forest Planning files.

Stumpage values were affected by incorporating two parameters to identify market response to variations in timber production. The first of these, use of a horizontal demand curve, assumes that the Forest's current production level is within the elastic portion of the demand function. The effect of this assumption is that unit prices for stumpage will be constant for all timber output levels predicted by FORPLAN, and that all additional output will be consumed (1970-1920 letter "Use of Demand Functions for Timber," 3/18/82).

The second parameter affecting market response to timber production involved the use of real price trends affecting lumber price and lumber production costs, consistent with the prediction of Adams and Haynes (see FSM 1970.4, R-1 ID No. 5). The use of independent price trends was necessary in order to portray the net real increase in stumpage values throughout the planning horizon. This is because the stumpage values used in the FORPLAN model are the residual of these projected lumber prices and production costs, and result from the application of both trends.

Costs and price trends in FORPLAN are expressed in terms of proportionate annual shifts per decade for the first 6 decades. The accumulated trend through the sixth decade is used for the seventh decade and beyond. Because resource inputs and outputs are assumed to occur in the fifth year of each decade, the annual shifts are used to calculate the price and cost multipliers for years 5, 15, 25, 35, etc. Table B-21 summarizes the predicted price and cost trends used in the analysis:

Table B-21
Lumber Price and Production-Cost Indices of Adams and Haynes
(Decades and Indices)

Decade	Lumber Price Index	Production Cost Index
1	114.5	111.8
2	142.5	136.5
3	165.3	150.9
4	186.3	154.7
5	207.3	158.1
6+	218.8	159.5

Priced timber benefits or estimated stumpage value for each alternative and benchmark were derived from the FORPLAN optimal solution Economic Report No. 6 titled "All Gross Revenues" and No. 7 titled "All Costs," and reported as average annual benefits per planning decade. Specifically, timber benefits were calculated as the residual value between lumber price (L.S.) and logging production costs such that:

Stumpage Value = Total Revenues - Per Thousand Logging Costs
(Economic Report 6) (Economic Report 7)

Where:

Total Revenues = Total Lumber Price (L.S.)

Per Thousand Logging Costs = Purchaser-incurred Logging Production Costs.

Actual net stumpage prices ranged from $74/thousand cubic feet on poor sites (Productivity Class 5/6) to $911/thousand cubic feet on the best sites (Productivity Class 3). This range does not reflect real price increases.

A second category of purchaser-incurred costs, "Per Acre Logging Costs," was not subtracted from total timber revenues in this analysis. This is because this cost category was used to summarize the purchaser-incurred cost of local and minor collector road construction already discussed (see "Costs" - timber purchaser road credits). These costs are assumed to be implicitly incurred by the Federal Government in the form of foregone timber revenues. The effect of these costs on net revenues will be discussed under "Present Net Value."

(b) Nontimber Benefits

These benefits constitute the remaining resource outputs used in land assignment scheduling procedures in FORPLAN. They include dispersed recreation, wilderness, wildlife (elk), and range. As stated, all three of these benefits constitute nonmarket values reflecting the user's marginal willingness-to-pay or theoretical site rent.

Value coefficients for dispersed recreation, wilderness, wildlife (elk), and range forage were entered into the FORPLAN model by appending rows and columns

to the LP matrix. This enabled the model to use the corresponding resource values to aid in determining land assignments and scheduling through the maximization of PNV.

This methodology also enabled the use of real price trends and demand ceilings to be used in determining total resource values. Price trends were used to define the real value increase in a particular resource over time. Demand ceilings defined the maximum resource output that could be valued, corresponding to estimates of present and anticipated future demand. Use of the demand ceilings was necessary because potential opportunities for these resources, as estimated in FORPLAN, exceeded demand in most cases. Both the real price increase and demand ceilings were predicted for 5 decades, and remained constant for the rest of the planning horizon. Table B-22 summarizes the real price increase and demand ceilings used in the FORPLAN model.

Table B-22
Real Price and Demand Projections Used in Appended Rows and Columns. (Specified Units)

		Planned	Projected			
Output	Units	1988	1998	2008	2018	2028+
Dispersed Rec.	$/RVD	4.45	4.67	5.30	5.92	6.68
	MRVD/Yr.	668.3	798.8	913.9	1048.1	1188.6
Wilderness	$/RVD	8.00	8.00	9.12	9.84	11.20
	MRVD/Yr.	148.6	170.0	196.6	228.3	264.6
Wildlife (Elk)	$/RVD/Elk	93.60	98.28	111.38	124.49	140.40
	Elk per Yr.	----------	----------	No Limit	----------	----------
Range	per AUM	8.20	8.60	8.98	9.15	9.30
	MAUM per Yr.	41.6	43.8	46.2	48.7	51.3

As stated, resource values were applied only to the amount of output expected to be consumed. For example, in the third decade, 46.2 thousand animal unit months (MAUM) of range output is projected to be valued at $8.98 per AUM. Any additional output was not valued. Because all winter range elk will be valued, no constraints were imposed.

Dispersed recreation values were developed at the national level for the 1980 Resource Planning Act Assessment and represent estimates of society's willingness-to-pay for a recreation day over and above the actual costs of participation. Values for dispersed recreation represent the weighted average mix of recreation types reported for Fiscal Year 1979 Recreation Information Management (RIM). The base value is $4.45 per Recreation Visitor Day (RVD). Anticipated demand for dispersed recreation on the Forest was calculated from an adaptation of the 1975 Pacific Northwest River Basin Commission (PNRBC) estimates of recreation use in Washington, Oregon, and Idaho. The demand estimates account for increases in use of 2.26 percent per year between 1981-1990, and 1.35 percent per year between 1991-2020. Dispersed recreation use values were obtained from each FORPLAN run in the "Other Columns" Report.

Wildlife (elk) values were developed in accordance with the 1980 RPA Assessment and were used to measure the recreational experience associated with the wildlife indicator species, elk. Valuation is based on the total incremental use (RVD) provided for by each elk. The base value is $93.60 per elk. No demand ceilings were imposed on outputs because it was assumed all output (elk) would have a corresponding recreation benefit. Wildlife values (elk) were obtained from each FORPLAN run in the "Other Columns" report.

Recreational values associated with wildlife on the Forest are a product of two functions: expected recreational demand and site-carrying capacity. Because recreational demand is independent of carrying capacity (demand could shift to other activities), the resulting valuation process must be responsive to shifts in resource outputs for wildlife, but still account for total recreational demand. Because of this relationship, the value for wildlife will be broken into two components:

1. That portion of the wildlife recreation value responsive to total recreation demand on the Forest. Since big-game hunting accounts for 8 percent of total recreation use (1980 RIM), the weighted average general recreation value will be adjusted by a factor of 8 percent of demand times the general recreation value ($3.00).

2. The remaining value, $21.00 less $3.00, or $18.00, represents the incremental value of wildlife above and beyond the general recreational value. This will be applied to each RVD attributable to wildlife recreation from FORPLAN. The relationship is:

Value/Wildlife RVD
x
#RVDs/Elk
x
#Elk/Acre
(Carrying Capacity)

Range values were developed by Economic and Statistics Research Services, USDA, to estimate the value of an allotted animal unit month (AUM) to a permittee. The base value is $7.89 per AUM. Real value increases were determined at the national level for the 1980 RPA Assessment. Demand ceilings represent an anticipated increase in demand for grazing of 29 percent by 2030. Grazing output values were obtained from each FORPLAN run in the "Other Columns" report.

(2) Other Priced Benefits

Resource outputs not affecting land assignments or prescription assignments include developed recreation, anadromous fishery (commercial and recreation), land use, recreation fees, power, minerals, and range receipts. These values are included in the present net value calculation in order to determine the total priced benefits (36 CFR 219.1).

Developed recreation, and commercial and recreational anadromous fishery resource outputs represent nonmarket benefits reflecting the user's marginal willingness-to-pay or theoretical site rent. The total benefits were derived by matching the resource outputs per decade with the corresponding per unit

value to obtain the total benefit per decade. All calculations are external to the FORPLAN analysis.

These benefits are also subject to real price increase and consumptive ceilings, as discussed in the corresponding background papers on the Analysis of the Management Situation. The information for all decades is included in Table B-23.

Table B-23
Real Price and Demand Projections
(Specified Units)

		Planned	Projected			
Output	Units	1988	1998	2008	2018	2028+
Developed	$ per RVD	3.00	3.15	3.57	3.99	4.50
Rec. MRVD	per year	138.1	162.2	188.2	218.3	253.8
Anadromous	$ per RVD	58.50	61.43	69.62	77.81	87.75
Fish	MRVD per Decade	----------	----------	No Limit	----------	----------
	#Lbs.	1.61	1.69	1.92	2.14	2.42
	Lbs per yr.	----------	----------	No Limit	----------	----------

Developed recreation values, including real value increases, were developed at the national level for the 1980 RPA assessment. The base value of $3 per recreation visitor day represents the general value for developed recreation. Anticipated demand for developed recreation was calculated from adaptations of the 1975 Pacific Northwest River Basin Commission estimates of recreation use in Washington, Oregon, and Idaho. Demand estimates account for increases in use of 2.21 percent between 1980-1990, and 1.5 percent between 1991-2030.

The value of the anadromous fishery is derived from the recreational and commercial value which can be attributed to annual smolt production on the Forest. This represents total on-site and off-site values associated with a specified level of fish reared on the Forest. Since there are only minimal sport catches of smolts on the Forest, the bulk of the value represents the commercial and sport catch of adult fish in the ocean and during their return migration (i.e., off-site values). This approach seems valid when considering that all downstream benefits are dependent upon the Forest providing suitable habitat for reproduction of fish; if the habitat is not available, then the fishery would not exist. Real value increases were determined at the national level for the 1980 RPA Assessment for both sport and commercial values.

Resource benefits for developed recreation fees and range permit fees were calculated from the average Fiscal Year 1979 and 1980 levels of receipts to the Forest. The values were adjusted over time to account for anticipated increases in demand for these resources. The demand function for developed recreation and range forage use previously discussed were used to make these adjustments. The values per decade are included in Table B-24.

Table B-24
Anticipated Fee Collections - Developed Recreation and Range Receipts
(Annual Average - Million Dollars)

Output	Value (Million Dollars) - Average Annual				
	Planned	Projected			
	1988	1998	2008	2018	2028+
Developed Rec.	0.016	0.016	0.017	0.018	0.020
Range	0.058	0.061	0.064	0.068	0.071

Since demand was assumed constant for both of these resources, values were also constant for all benchmarks and alternatives.

Resource output benefits for the remaining categories (land use, power, minerals) denoted as "other" benefits, constitute a minor contribution to total benefits. An average of Fiscal Year 1979 and 1980 receipts shows that these resources account for only $0.011 million. For planning purposes, it was determined that the contribution of "other" benefits would be held constant for each alternative and benchmark.

3. Present Net Value (PNV) Calculations

As stated, PNV was calculated to determine the relative cost-efficiency of each alternative and benchmark. PNV is the difference between the discounted values of all outputs to which monetary values or established market prices are assigned, and the total discounted costs of managing the planning area (36 CFR 219.3). PNV was calculated over the entire 150-year planning horizon for each alternative and benchmark.

In order to determine PNV, the present value (PV) of discounted costs (PVC) and discounted benefits (PVB) were calculated individually for each of the following resource components:

Costs	Benefits
Timber	Timber
Roads (including purchaser road credits)	
Range	Range
Recreation and Wildlife	Recreation and Wildlife
Other	Other

Benefits by resource component category were determined by stratifying the market and nonmarket benefits, discussed in Section 2b (Priced Benefits used in PNV), in the following classifications: (1) Timber - timber revenues, (2) Range - range forage and range receipts; (3) Recreation per Wildlife - developed and dispersed recreation values, wildlife recreation values, anadromous fish recreation and commercial values, and developed recreation receipts; (4) Other - land use, power, and mineral receipts.

The PV of each resource component was derived by multiplying the average annual decade values by a factor of 10 to determine the total decade value of each resource component. These total decade values were then discounted from the mid-point of each decade, and summed to determine total PV by resource component. The sum of all discounted resource component costs (PVC) was then subtracted from the sum of all discounted resource component benefits (PVB) to determine PNV at both the 4-percent and 7 1/8-percent discount rates. The benefit per cost (B per C) ratio for each alternative and benchmark was also calculated by determining the ratio of PNV per PVC (4 percent only).

In addition to the above categories, the PV of priced resource benefits was also categorized by market vs. nonmarket and Federal receipts vs. other benefit classifications to show their relative proportion of PVB. Benefits were classified in these categories in the following manner:

Market Benefits	vs.	Nonmarket Benefits
Timber returns		Dispersed recreation values
Range forage		Wildlife recreation values
Range receipts		Anadromous fish values (recreation)
Developed recreation values		
Developed recreation receipts		
Anadromous fish values (commercial)		
Other benefits (land use, power, mineral receipts)		

Federal Government Receipt Benefits	vs.	Other Benefits
Timber returns		Dispersed recreation values
Range receipts		Developed recreation values
Developed recreation receipts		Wildlife recreation values
Other benefits (land use, power, mineral values)		Anadromous fish values (commercial and recreation)
		Range forage

4. Economic Tradeoffs

In order to determine the relative cost-efficiency of the various alternatives and benchmarks, economic tradeoffs were derived to show the difference in PNV between FORPLAN runs. These tradeoffs are defined as the difference in PNV between the Max PNV (06D) benchmark, or alternatives with the highest PNV, and alternatives developed in response to the issues, constraints, and opportunities. The economic tradeoffs measure the change in PNV value for priced resource outputs, and can be used in the analysis of Net Public Benefits. For further discussion, see Chapter II, Section 17.

C. Net Subjective Values (Nonpriced Outputs)

Determination of PNV enables comparisons to be made between alternatives with regard to priced resource outputs. However, other factors also influence the decisionmaking process. In many instances, the subjectively-determined importance of nonpriced values that are consequences of management decisions can outweigh the advantages of producing higher levels of priced outputs.

These amenity values are addressed in the regulations of NFMA, which charge the Forest Service with maximizing the net public benefits (NPB) of the Forest. Net public benefits are the overall long-term value to the Nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not (36 CFR 219.3). Net public benefits include both priced and nonpriced resource outputs, less all costs, produced under each alternative. As stated, priced resource outputs include those values contributing to PNV. The major nonpriced outputs include:

- Community Stability
- Protection for Threatened and Endangered Species Habitat
- Cultural Resources
- Providing Dispersed Recreation Opportunity
- Contributing Opportunities for Traditional Lifestyles
- Protection of Big-Game (Elk) Habitat
- Providing for Visual Quality in Sensitive Areas
- Attaining Anadromous fishery Goals
- Management of Habitat for Old-Growth-Dependent Species
- Wilderness

Nonpriced outputs do not have available market transaction evidence and no reasonable basis exists for making market value estimates comparable to priced output values. They are therefore valued subjectively and are not considered in PNV calculations (see chart in front of this section). Nonpriced outputs that occur in excess of the amounts provided by minimum management requirements are, however, included in the NPB determination of each alternative. Potential costs or reductions of nonpriced benefits below minimum management levels are also considered.

Many nonpriced outputs are produced by applying constraints in each alternative. These constraints usually result in a cost increase and/or a reduction in the production of priced outputs (e.g. timber). Either of these occurrences can reduce the PNV of the priced NPB component. Any dollar costs directly associated with the production of nonpriced outputs are included in PNV.

In comparing the nonpriced outputs of various alternatives, it is important to identify and report which nonpriced outputs have significant impacts on the PNV components of direct costs and priced benefits. Subjective judgment is involved in assessing the desirability of nonpriced output production which often results in a PNV tradeoff (loss). If a nonpriced output-caused PNV tradeoff is judged acceptable, the nonpriced output is assumed to be worth as much or more than the PNV foregone. The Nez Perce nonpriced output categories are described below. While the dollar values of each cannot be determined, each can be described by quantitative indicators such as acres. The actual contribution (value) to NPB is still subjectively determined from the information presented.

1. Nonpriced Output Parameters Used in Net Subjective Value (NSV)

a. Community Stability

Maintenance of a viable economic base to ensure the continued existence of historical trades and professions within dependent communities is a nonpriced benefit of National Forest management. The contribution of Forest resource outputs to potential employment was not included in PNV.

The economy of the regional area (Idaho, Lewis, Nez Perce, and Clearwater Counties) has historically been natural resource-oriented, with a high percentage of employment dependent on Forest resource outputs. Currently, the Forest contributes 2,065 jobs to the regional economy; this is 10 percent of the total employment base. Alternatives were evaluated by comparing average annual changes in employment resulting from increases or decreases in these outputs with base year (1980) employment in the regional area. Changes in employment and income for three sectors of the economy: timber, outfitters and guides, and other recreation were evaluated to show differences in emphasis among alternatives. The effect of these changes was evaluated with respect to economic stability in terms of "rapid change." As defined, rapid change would occur in the regional area if increases or decreases in Forest resource outputs create a 10 percent or greater change in potential employment, income, and job distribution within a 10-year period. (See Appendix B, Section V, for further discussion.)

b. Threatened and Endangered (T&E) Species Habitat

One threatened species, the grizzly bear, and three endangered species, the gray wolf, the peregrine falcon, and the bald eagle, are found on the Forest. Habitat for these species is maintained or enhanced in all alternatives, but the value of this habitat is not included in PNV.

Although provision is made for T&E habitat protection in all alternatives, those alternatives which propose the highest levels of timber harvest and road construction also require the most coordination to reduce conflicts between these activities and maintenance of habitat for threatened and endangered species. These differences in the degree of coordination required were used to compare alternatives.

Most of the peregrine falcon and bald eagle habitat is located in classified river corridors or on lands not suitable for timber production, and little coordination is required. However, the amount of development in the 503,162 acres of the Forest presently roadless may have a direct relationship to gray wolf and grizzly bear habitat, and intense coordination may be required.

Different alternatives specify different degrees of development in roadless areas, and this relationship was analyzed in relation to threatened and endangered species habitat.

c. Cultural Resources

Protection of known historic and prehistoric cultural sites and the evaluation and protection of undiscovered sites are treated the same under all alternatives. The value of these sites is not included in PNV. Those alternatives which have the most land-disturbing activities will lead to the earliest and most complete clearing and analysis of cultural resource sites in the nonclassified portion of the Forest, in that cultural resource surveys are conducted both prior to and during land-disturbing activities. Cultural inventory in classified areas is performed in response to specific requests and is not affected by any alternatives.

d. Semiprimitive Recreation Opportunity

The value of dispersed recreation opportunities has been accounted for in the determination of PNV for each alternative. However, quality variations significantly above or below average were not considered in PNV calculations: PNV values were based on average quality assumptions.

Total potential dispersed recreation opportunity exceeds projected demand in all alternatives. This is due to an increase in roaded recreation opportunity resulting from the Forest becoming more accessible (roaded) over time. However, under each alternative, semiprimitive recreation opportunities will decrease as fewer areas remain unroaded. The quality of this recreational experience outside of classified wilderness will decline and potential for overuse of the remaining roadless areas will increase. The change in semiprimitive recreation opportunities for each alternative could affect wilderness use and cause a decrease in the opportunity to experience solitude (Hendee, Stankey, and Lucas, 1978).

Areas assigned to roadless nonwilderness prescriptions in each alternative were used to evaluate the quality of semiprimitive recreation opportunities. These were compared to existing inventories that show the Forest currently provides semiprimitive recreation opportunities on 869,200 acres. These inventories are not the same as the current roadless area inventory.

e. Opportunities for Traditional Lifestyles

Contributions to traditional forms of employment with slow but steady growth, promotion of local use of Forest recreation opportunities, and permanence of existing lifestyles in local communities are viewed as important components of Nez Perce Forest planning by local citizens (Bacigalupi, 1980). The Forest's contribution in maintaining these values is addressed in the social impact analysis, but is not included in PNV.

All alternatives were determined to maintain traditional lifestyles. This is because the Forest's contribution to the regional economy under any alternative would not create large shifts in the sectors of employment offered in local communities, although all alternatives would increase the potential employment levels within these sectors over time.

f. Big-Game (Elk) Habitat

The value of big-game (elk) habitat, as it is related to the number of recreation visitor days provided, has been accounted for in PNV. However, the effect of timber harvest on big-game habitat has not been addressed in this value.

The "Guidelines for Evaluating and Managing Summer Elk Habitat in North Idaho" will be used to assess habitat effectiveness and attainment of elk habitat objectives in all alternatives; however, habitat effectiveness will vary by alternative. Managing for optimum elk habitat and managing for timber create potential conflicts between these resources. Those alternatives which harvest more area have the greatest potential for conflict. This is apparent in evaluating a road closure program to provide habitat security and incorporating the other coordinating recommendations. As more area becomes available for timber harvest, the probability of conflict increases. While conflict can also occur in unroaded areas, the chances are greatly reduced.

To evaluate the alternatives, the proportion of currently unroaded big-game summer habitat assigned for timber harvest was analyzed.

g. Visual Quality, Especially in Areas Inventoried For Retention or Partial Retention Visual Quality Objectives (VQOs)

The value of visual quality in sensitive areas is not included in PNV. However, decreases in PNV occur where timber harvest is spatially constrained by time period and cutting practice to achieve an assigned VQO of retention or partial retention. These changes are addressed as opportunity costs of managing for a given alternative. The current visual quality inventory identifies approximately 362,600 acres as retention or partial retention. The alternatives differ in the emphasis placed on achieving these VQOs.

h. Anadromous Fishery

The value of anadromous fishery habitat potential, as it relates to recreational and commercial opportunities, has been included in PNV; however, the maintenance of habitat to provide a harvestable surplus of fish was not considered in this value.

Anadromous fish are found in all river systems on the Forest. Each alternative provides habitat to support minimum harvestable populations of these fish, and this objective is exceeded in most alternatives.

At present, the anadromous fishery Forestwide is at 86 percent of biological potential. The maximum allowable reduction in this biological potential which would still furnish habitat to support minimum harvestable fish populations is 15 percent; or 71 percent of biological potential.

Alternatives were evaluated for the degree to which they exceed this requirement.

i. Habitat for Old-Growth-Dependent Species

Maintenance of adequate habitat for old-growth-dependent species was treated equally in all alternatives as a minimum management requirement. Each alternative was modeled to ensure that at least 5 percent of each prescription watershed would remain in old growth, and that old-growth habitat would be maintained on 10 percent of the landbase Forestwide. The value of old-growth habitat is not included in PNV; however, decreases in PNV occur where timber harvest is spatially constrained by time period to achieve old-growth habitat requirements.

While the minimum management requirement for old growth provides for adequate protection of dependent species, conflicts resulting from management activities on adjacent lands may result in more intense levels of resource management coordination to maintain suitable old-growth habitat. Alternatives which furnish more than 10 percent old-growth habitat Forestwide will tend to reduce these conflicts. Alternatives were evaluated on this basis.

j. Wilderness

The priced value of recreation in wilderness has been accounted for in the determination of PNV for each alternative; however, PNV does not recognize the nonpriced value of wilderness as a resource in itself. Wilderness is important in preserving natural integrity, apparent naturalness, outstanding opportunities for solitude, and primitive recreation opportunities.

The Forest presently contains 926,188 acres of this resource in four Congressionally-designated wildernesses. In addition, 503,162 acres remain roadless. The alternatives explored a full range of wilderness recommendations for these roadless lands.

Alternatives were evaluated on the basis of additional wilderness acreage proposed.

2. Indicators of Responsiveness for the Alternatives

Appendix A fully discusses each of the issues, concerns, and opportunities (ICOs). The indicators of responsiveness for the Alternatives for each ICO are as follows:

- The level of timber harvest while responding to other demands.
  Indicators:
  - volume of timber harvested in the first decade
  - long-term sustained yield
  - suitable acres managed for timber harvest

- Compatibility of timber harvest, road development, water quality, and anadromous fish.
  Indicators:
  - population of anadromous and resident fish
  - percent of habitat effectiveness

- Areas to be managed as roadless or wilderness while meeting other demands.
  Indicators:
    acres of wilderness
    acres of roadless areas

- Quality of habitat for wildlife.
  Indicators:
    population of elk
    level of management objectives
    acres of winter range burned annually

- Acres to be managed for nonmotorized recreation use.
  Indicators:
    acres managed for semiprimitive nonmotorized recreation use

- The emphasis of recreation management for each alternative.
  Indicators:
    measure of the primary recreation objective

- Road accessibility and quality of roads.
  Indicators:
    miles of road built per decade

- Management for special recreation areas.
  Indicators:
    level of management by area

- Range Management.
  Indicators:
    Animal Unit Months (AUMs) produced

- Compatibility of timber harvest, road development, and big-game habitat needs.
  Indicators:
    miles of road built per decade
    big-game habitat effectiveness

- Minerals Management.
  Indicators:
    acres withdrawn from mineral entry

- Fire Management.
  Indicators:
    Acres managed for initial attack--will be managed the same for all alternatives

- Acres managed for scenic quality.
  Indicators:
    acres of retention and partial retention

- Community Stability.
  Indicators:
    employment and income levels

V. SOCIAL AND ECONOMIC IMPACT ANALYSIS

A. Overview

Social and economic impact analysis estimates the relationships National Forest activities have with people. Short-term impacts are of primary concern with consideration given to longer term situations (over 10 years) occurring within the impact area of the Forest.

Issues and concerns (Chapter I and Appendix A of the EIS) include areas for which social and economic information can provide useful insights. For instance, many resource outputs (recreation, timber, range, and minerals) cause economic effects on people in the impact area.

Forest-related economic impacts on employment, income, and State and local government revenues are directly related to the social well-being of people in the impact area (i.e., economic considerations are a subset of all Forest impacts that influence people's lives). Population, lifestyles, attitudes, beliefs, values, and social organization are also related to Forest Service activities.

After evaluating all public comments on the Proposed Forest Plan and Draft Environmental Impact Statement (EIS), it was decided to do additional analysis of impacts on major industrial sectors within the regional impact area that would be significantly affected by the various management alternatives.

Prior to the development of alternatives, information was gathered on the existing social and economic situation of the impact area. Additional economic impact analysis was done for significant industrial sectors within the impact area.

B. Impact Analysis Area

An "area of primary impact" was defined for the Nez Perce National Forest as the multi-county area receiving at least three-fourths of the resource flows from the Forest (Ceperley, 1979). Resource flows are defined as the movement of forest goods and services to consumers. The selected area was assumed to contain most of the economic and social impacts related to the Forest's activities.

The selected impact area includes the Idaho counties of Clearwater, Idaho, Nez Perce, and Lewis. This four-county impact area is based on economic influences that exist and is assumed to capture most of the area within which social and economic effects would occur. Table B-25 shows the percent of resource flows to the primary impact area. Table B-26 describes the resources considered in this analysis.

Table B-25
Resource Flows to Counties as a Percent of Total Nez Perce National Forest Output (FY 1979)
(Percentage of Specified Units)

Resource	Units	Total	Idaho Co.	Lewis Co.	Clear-water Co.	Nez Perce Co.	Latah Co.	Other Idaho State	Unknown & Out of State
Land Area	MAcres	2206.6	100	0	0	0	0	0	0
Comm.Tbr.	MMBF	1854.7	88	12	0	0	0	0	0
Firewood	Permits	770.0	87	6	*	4	*	(-----3----)	
Gen.Disp. Rec.	MRVD	547.0	(----------66----------)				18	7	9
Wilderness Use	MRVD	120.0	(---------6--------)			6	5	17	65
Minerals	Notices of Intent	103.0	42	0	3	15	2	4	34
Human Resources	Enrollees	97.0	56	1	1	4	0	38	0
Ranching	MAUM	40.5	81	1	0	0	0	8	10

*Less than 0.5%

Table B-26
Market Area Indicators
(Indicator and Source)

Indicators	Sources
Land Area	Land areas of the National Forest System as of September 30, 1978. USFS.
Commercial Timber	Report of Uncut Volume Remaining Under Contract (Annual). 1963-1979.
Firewood	Addresses of free use permittees, October 1, 1978 to July 1, 1979.
General Dispersed Recreation Use	Estimates by District staff, includes vehicle license survey for 1978 and 1979.
	RVD estimates for outfitter/guide permittees by District staff for 1984-1985 season.
	Origin of Recreators in Idaho. Regional Recreation Data Program. PNW River Basins Commission.
	Vehicle license plate identification of campground registration tickets. Castle Creek and South Fork Campgrounds, June 1 to September 15, 1978.
Wilderness	Survey of the sources of wilderness users, 1978.
Minerals	Residence of holders of mineral claims.
Human Resources	Residence of enrollees in the Nez Perce Human Resource Programs.
Ranching	Residences of holders of grazing permits on July 20, 1979.

C. Economic Impact Model

1. Overview

An input-output model (IMPLAN) is used to estimate the employment and income impacts of Forest outputs and activities. Direct, indirect, induced, and total impacts are calculated. Economic input-output (I-O) analysis is a procedure for describing the structural independencies of a Regional economy (impact area) and serves as a short-term predictive model for evaluating the impacts of shifts in National Forest System (NFS) outputs and activities. I-O analysis is based upon the interdependence of the production and consumption sectors in the impact area. Industries must purchase inputs from other industries, as well as primary (i.e., natural resource) sources, for use in the production of outputs which are sold either to other industries or to final consumers. Thus, a set

of I-O accounts can be thought of as a "picture" of an impact area's economic structure.

Flows of industrial inputs can be traced via the I-O accounts to show linkages between the industries composing the economy. The accounts are also transformed into a set of simultaneous equations that permit the prediction of economic effects (employment, income, etc.) resulting from changes in Forest outputs and activities.

I-O analysis is based on assumptions that limit the accuracy of projections made very far into the future; therefore, the numbers presented should be considered relative indicators of the future, rather than absolute projections.

2. Data Base - IMPLAN

This I-O model has a data base consisting of two parts: a national level technology matrix; and a county-by-county file of estimated activity levels for total gross output, six components of final demand, three components of final payments, and employment for 466 industrial/business sectors.

The national technology matrix is based on a 1972 Commerce Department I-O model that was converted to an "industry by industry" basis and updated to 1977 using the RAS procedure (Clopper, Almon, et al., 1983) . The county level information is based on a 1977 data set constructed by Engineering Economics Associates of Berkeley, California.

3. National Data Base Reduction to Impact Area

Utilizing the national technology matrix and the control totals for the local, multi-county impact area, a data reduction method is employed to develop a Regional input-output table. The method used exploits the property of "openness" displayed by Regional economies compared with the National economy (Richardson 1972). Smaller Regional economies exhibit much greater tendencies, more "open," to import and export than is observed at the national level. Based on the assumption that trade balances are the principal difference between national and Regional purchase patterns (i.e, industry production functions are identical, but Regional imports and exports make local inter-industry transactions different), the supply-demand pool technique (Schaffer and Chu, 1969) for data reduction was adopted.

4. Final Demand Expenditures

The I-O model translates Forest Service outputs and activities into employment and income impacts. An intermediate step in this process is the translation of NFS outputs (timber, range, recreation, etc.) into final demand dollars. Final demand expenditures are different from the "values" used in the cost-efficiency analysis. Final demand expenditures represent the dollars spent by the final consumers of the finished products derived from Forest Service outputs. For instance, timber is processed into lumber which has a sale value at the mill. The sale value represents the amount of new money that will be directly generated for the local impact area -- assuming that most is sold outside the impact area, causing the local impact. The cost-efficiency analysis examines only the market value of the raw material that leaves the Forest -- stumpage.

This modeling step is accomplished by applying a final demand expenditure per unit of output to total outputs and linking the resulting dollar amount to the sectors in which the direct expenditure takes place. This process determines the "change" expected to take place in the existing economy. (Expenditure information is contained in the Planning Records.)

D. Base Year Alternative and Benchmark-Related Employment and Income Information

Forest outputs for 1980 were determined and run through the I-O model to provide a base situation from which employment and income changes could be measured. Table B-27 contains 1980 output levels and lists the employment and income amounts associated with Forest outputs and unit coefficients. Table B-28 lists the Forest-related employment and income associated with all alternatives and benchmarks. A third table, B-29, shows a breakdown of employment and income for three sectors of the economy: timber, outfitters and guides, and other recreational businesses. The purpose of this table is to show the impact of related Forest resource outputs on these sectors in the regional economy. Estimates for jobs and income are based on the IMPLAN model employment and income coefficients and the difference in outputs between the 1980 base level and the output level valued in the FORPLAN model. The difference in the timber output used in this analysis falls within the "rapid change" constraints used to ensure community stability. Dispersed recreation outputs are based on the difference from the 1980 base level and the projected use level from the Pacific Northwest River Basin Commission (PNRBC) study. The dispersed recreation outputs do not vary between alternatives because all alternatives meet the first and fifth decade PNRBC projected use levels. Dispersed recreation outputs allocated to the outfitter/guide sector were based on information provided by District recreation specialists. The differences in output levels were converted by using the unit coefficients in Table B-27.

Table B-27
Nez Perce National Forest Outputs and Unit Coefficients - 1980
(Specified Units)

Output	1980 Output Production		Jobs/Unit[2]	Income/Unit (Millions 1978 $)
Sawtimber	104.8	MMBF	11.2	0.269
Picnicking	17.3	MRVD	0.5	0.007
Camping	191.9	"	0.1	0.002
Downhill Skiing	0	"	0.0	0.000
Waterbased Rec.	102.7	"	0.4	0.005
Disp.Nonmotorized Rec.	107.1	"	0.9	0.011
Disp.Motorized Rec.	133.0	"	0.9	0.011
Big-Game Hunting	93.4	"	1.3	0.018
Small-Game Hunting	26.6	"	0.5	0.007
Nonhunting Wildlife	1.4	"	0.8	0.008
Fishing	45.3	"	0.4	0.005
Cattle	36.0	MAUM	0.7	0.017
Sheep	4.5	"	2.2	0.054
Coal	0	MTON	0.0	0.000
Oil & Gas	0	MOEB[1]	0.0	0.000
Locatable Minerals	0	MTON	0.0	0.000
Common Minerals	0	MTON	0.0	0.000
NFS Inv. Oper. Admin.	4.5	$MILLIO	54.9	0.808
NFS Salaries	5.5	$MILLIO	30.8	0.544
Total Regional Economy	--		20,669	472.204
Total Forest Service-Related Base	--		2,065	9.997

1/ Oil equivalent barrels

2/Includes direct, indirect, and induced jobs

Table B-28
Forest-Related Employment and Income for Alternatives and Benchmarks
(Number of Jobs and Millions of 1978 Dollars)

Benchmarks and Alternatives	Jobs Planned Decade 1	Jobs Projected Decade 5	Income Planned Decade 1	Income Projected Decade 5
02A	823	3907	17.6	87.8
03A	6577	2995	150.6	65.9
04B	1856	2179	41.8	47.0
05A	828	2827	17.8	62.0
05C	799	2126	17.3	45.8
06D (Max. PNV)	1298	2143	28.9	46.1
08E	1834	2151	41.2	46.5
09C	1825	2110	41.2	45.3
10C	1870	2149	42.2	46.3
11C	828	3980	17.8	89.2
12B	828	3974	17.8	89.2
13A	1408	2340	31.3	50.6
15A	828	4012	17.8	89.8
16A	820	4012	17.7	89.8
17A	1420	2331	31.5	50.5
18A	1469	2143	31.9	46.1
19A (Min.Level)	- 1450	- 1059	- 32.8	- 27.6
20A	1101	1423	24.6	29.5
22Y	828	3972	17.8	89.0
23Y	901	3921	19.5	88.0
24D	454	3420	9.6	76.1
A(CD)	- 186	840	-5.0	15.8
C	- 280	1558	-7.5	32.4
D	799	2115	17.4	45.5
E	432	1964	8.8	41.8
F	323	1726	5.3	36.3
G(PA)	159	1739	2.7	36.7
G1	195	2438	3.6	53.0
H	- 46	1003	-2.4	19.5
H1	- 85	1485	-2.1	30.8
I	336	1280	6.9	26.1
J	527	1650	11.2	34.6
K	90	1595	1.0	33.2
L	90	1595	1.0	33.2

Table B-29
Changes in Employment and Income by Key Economic Sector - Decades 1 and 5
(Number of Jobs and Millions of 1978 Dollars)

		Jobs		Income	
		Planned	Projected	Planned	Projected
Alternative	Sector	Decade 1	Decade 5	Decade 1	Decade 5
A (CD)					
	Timber	-234	450	-5.700	10.800
	Out. & Guides	4	30	.224	1.833
	Other Recreat.	51	410	.700	5.316
C					
	Timber	-356	1077	-8.200	25.800
	Out. & Guides	4	30	.224	1.833
	Other Recreat.	51	410	.700	5.316
D					
	Timber	584	1604	13.800	38.500
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
E					
	Timber	248	1477	5.800	34.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
F					
	Timber	125	1234	3.800	29.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
G (PA)					
	Timber	38	1255	.955	30.155
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
G1					
	Timber	74	1901	1.775	45.649
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
H					
	Timber	-122	540	-3.200	12.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
H1					
	Timber	-176	1032	-3.200	24.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
I					
	Timber	204	797	4.900	18.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316
J					
	Timber	360	1122	8.600	26.900
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316

Table B-29 (Continued)
Changes in Employment and Income by Key Economic Sector - Decades 1 and 5
(Number of Jobs and Millions of 1978 Dollars)

		Jobs		Income	
		Planned	Projected	Planned	Projected
Alternative	Sector	Decade 1	Decade 5	Decade 1	Decade 5
K & L					
	Timber	-32	1111	-1.000	26.800
	Out. & Guides	4	30	.224	1.833
	Other Rec.	51	410	.700	5.316

The information from Table B-29 indicates the dominant influence of the timber sector on the stability/instability of the regional economy. If the anticipated demand projections for dispersed recreation should increase at a greater rate than those used in the PNRBC study, then the role of recreation and outfitter/guide operations would be greater in the local economy. The importance of the tourism/recreation industry, of which outfitter/guide operations is an element, should continue to grow regardless of the management alternative selected for this Forest. What will occur is a shift in the types of activities offered and the quality of recreational opportunities. Market- oriented alternatives, such as D and E, would provide more opportunities for developed or roaded natural recreation activities. Amenity-oriented alternatives, such as C and H, would emphasize activities such as backcountry hunting, fishing, and general dispersed recreation.

E. Returns to the U.S. Treasury and Local State Governments

Predicted returns to the U.S. Treasury and local governments for each alternative and benchmark were calculated in the analysis to show the effects on revenue programs administered by the Nez Perce National Forest. These returns illustrate the impact of management on both Federal Government receipts collected as a result of revenue-producing programs on the Forest, and the resultant change in revenues passed on to local government. Comparisons were made between the average annual returns per period for each alternative and benchmark, and the base year (1980).

Returns to the U.S. Treasury were calculated by deriving the revenue of income-producing programs on the Forest which correspond to FSM 6531.12b "Annual Collections Statement," or the National Forest Fund. Total Treasury returns were broken down into three categories: timber, grazing, and other (includes recreation, land use, power, and mineral fees). Timber returns were calculated for each FORPLAN run from the net value of timber revenues (Economics Report 6). Grazing returns were also calculated from the FORPLAN analysis and were equal to the average unit permit fee in 1980 ($1.39/AUM in 1978 dollars) times the average annual AUM output per period for each alternative and benchmark. Other returns were calculated as the sum of fees collected for recreation, land use, power, and minerals. Recreation fees were calculated by adjusting current collections ($.016 million) by the percentage increase in demand for developed recreation through the first decade (see developed recreation values). Returns for land use, power, and minerals were assumed to be constant at the current level (1980)

over the entire planning period. Table B-30 summarizes the base year returns to the U.S. Treasury.

Table B-30
Base Year Estimates - Returns to the U.S. Treasury 1980
(Millions of 1978 dollars)

Resource	Returns
Timber	$ 6.525
Range	$ 0.056
Other a. Recreation b. Land use, power, minerals	$ 0.027
Total	$ 6.608

Returns to local governments are Treasury funds paid to the State of Idaho and eventually passed to local government (Idaho County) resulting from revenue-producing programs on the Forest. The basis of this fund, Returns to the U.S. Treasury, is discussed above. Also included in the base value are collections for Knudsen-Vandenburg (KV) and purchaser road credits. Calculation of returns to local governments are defined as:

$$\text{Returns to Local Government} = .25 \left(\begin{array}{l}\text{Returns to U.S. Treasury} \\ \text{Plus KV collections and} \\ \text{purchaser road credits}\end{array}\right)$$

KV collections, which are funds contributed by timber purchasers, were accounted for as implicit values of the timber revenues reported in Economic Report 6. This was done to fully account for the cost of site preparation in the timber cost category. Purchaser road credits (see Costs section) were added to the U.S. Treasury returns to determine the basis for the 25 percent fund. (See Chapter II for alternative displays of these values).

F. Work Force

Shifts in Forest Service work force (measured as Full Time Equivalents - FTE) were calculated to show the change in government employment resulting from increases or decreases in land management programs for each alternative and benchmark. Adjustments were made to the base year level (315.55 FTE) according to the following assumptions:

- For all alternatives and benchmarks, the Forest will maintain a stable base work force of 142 FTE for all programs except timber and roads.
- Employment in the timber program will vary by 53.1 FTE for every $1.0 million of appropriated funds.
- Employment in the roads (engineering support) program will vary by 6.8 FTE for every $1.0 million of appropriated funds.

G. Social Measures

Social impact analysis is the estimation of how Forest Service policies and actions affect the quality of life or social well-being. The analysis is accomplished by projecting future social conditions in an area influenced by Forest Service actions if current management is unchanged, then comparing this projection with conditions likely to occur as a result of implementing management alternatives.

Social measures include two aspects of social impact analysis: social variables and social zones of influence. Social zones of influence identify who is affected by Forest Service activities, and social variables define how people are affected and the relationship between people and the natural environment. The following describes the social measures and how they are used.

1. Social Zones of Influence

The following is a description of the groups of people or communities within the impact analysis area.

a. Local Zone

The local zone of influence (Idaho County) is closely aligned to the Nez Perce National Forest because of geographic location, historic reasons for settlement, economic dependency, and traditional use patterns. Although precise dates as to when Native Americans first occupied the lands that comprise Idaho County are not available, it is thought that Native Americans have lived in north-central Idaho for some 7,000 to 10,000 years. More recently, studies have shown that Idaho County falls within the territory of the Sahaptin-speaking Nez Perce Indians. The Nez Perce used many different environments and resources in Idaho County, spending winters along primary rivers such as the Salmon, Snake, and Clearwater, and then moving to higher elevations in the spring and summer. The Nez Perce way of life continued uninterrupted for many years until the coming of Euro-Americans in search of gold.

Mining began in Idaho County in the early 1860s, and played an important role in the historic settlement of the area, creating communities such as Elk City, Newsome, Florence, and Dixie, and supporting the growth of others such as Mount Idaho. Because these communities needed many goods and services, mining was also the stimulus for the development of a transportation system within the County.

Later development of agriculture and cattle ranching occurred in the early 1900s, as a result of the migration of farmers and ranchers to the Camas Prairie. With the exception of timber, these historical industries have remained stable since that time. The local area is still predominantly rural and primarily dependent upon three major industries: cattle ranching, agriculture, and timber products. Analysis has shown that within the County, agriculture and timber products comprise 11 and 17 percent (521 and 798 jobs), respectively, of total employment. Recent trends, however, suggest that there is a growing opportunity for the development of the tourism and recreation industry in the area. Statewide, this is the third largest industry with a gross revenue exceeding $1 billion annually (1985). A particular segment of this industry, Outfitter and Guide operations, has seen increased growth as a result of renewed interest in leisure travel nationwide. At present this industry services 4 percent of all

dispersed recreation activity on the Forest, and should continue to grow as the demand for recreation increases.

The stable demand for products produced by these industries has had a direct impact on the slow but steady growth pattern in the dependent communities within the County. This is exhibited by the minimal changes in population that occurred during the last two census periods. The population of Idaho County decreased from 13,542 in 1960 to 12,891 in 1970, a 4.8 percent decrease, but grew to 14,769 in 1980, a 14.6 percent increase (U.S. Department of Census Statistics "Characteristics of Population," 1981). These changes represent only minor increases when compared to the growth in population Statewide between 1970 and 1980, 32.4 percent.

Because the local economy relies on Nez Perce Forest outputs, and because traditional leisure activities such as firewood cutting, hunting, and fishing are so important to local lifestyles, a close relationship exists between Forest management activities and residents of the local area. An estimated 25 percent of the Forest's recreation use originates within the local influence zone. More than 80 percent of Idaho County's 5,464,960 acres are in Federal ownership, much of which is National Forest (the Nez Perce National Forest encompasses 2,218,040 acres of the County).

Because each community within the local zone is unique in its social makeup, it is further delineated into subareas as follows:

(1) Lower Salmon River

This subarea extends from White Bird south to Riggins and the Little Salmon River area. Timber products and cattle ranching have been primary industries along with some mining activity. Riggins is the business center. A sawmill in Riggins burned in 1982 and the decision was made not to rebuild. Until that time, the timber products industry had been a major employer; now however, boating and recreation have come to play an increasingly significant role in the area economy. This subarea has been stable in terms of employment and social characteristics, and has been described by residents as being close-knit. There has been an influx of new residents in recent years, which has altered the social makeup of this subarea to some degree. The social characteristics here could be significantly altered in the next few years if the sawmill is not rebuilt or if radical change in Forest outputs occurs.

(2) Camas Prairie

This subarea extends from White Bird Hill and Mt. Idaho on the southern tip of the Camas Prairie northward across what is primarily agricultural country. Grangeville, the County seat, is the largest community within Idaho County and it serves as the business center for both the subarea and the County as a whole. Agriculture is a primary industry, as are timber products. The agricultural industry adds a measure of stability to this area not inherent in the others. Grangeville has one sawmill and it, together with woods workers, comprises the single greatest source of employment. This subarea more than any other has organized public interest groups which take an active part in helping shape Forest management priorities. Among the more prominent groups are off-road vehicle clubs, wildlife interest groups, local government agencies, and the Chamber of Commerce. Like the Lower Salmon River subarea, it has been described

as close-knit, and its residents have shown a willingness to work together to achieve mutual objectives. This subarea has also exhibited stability over the years in terms of employment and social characteristics, either of which could be altered if Forest outputs were to be drastically changed.

(3) Clearwater River Area

This subarea extends from the Kooskia-Stites-Harpster area to Kamiah and upriver to Syringa. A sawmill is located in Kooskia and a number of residents are employed in the timber industry. Along the Middle Fork of the Clearwater, there are a number of small business establishments that cater to tourism, recreation, and others traveling between Idaho and Montana via U.S.
Highway 12. Like the other subareas, it can be categorized as having a high level of stability in terms of employment, and its social characteristics have remained constant. Given its location, this subarea is dependent on outputs from both the Nez Perce and Clearwater National Forests.

(4) Elk City Area

This subarea includes the Township of Elk City and other homesteads and patented mining claims within the Red River and Elk City Ranger Districts. Unlike the other subareas, it is located within rather than adjacent to the Forest, and is completely surrounded by Federal and State lands. Elk City is the business center and has a sawmill which provides the primary source of employment for the subarea. A number of miners live in this subarea and there are many outfitter-guide operations in the adjacent backcountry. Unlike the other subareas, however, residents have not characterized it as close-knit, but they do place a high value on the individual lifestyles such an environment permits. The turnover rate among its residents is high compared to other subareas. Any drastic change in Forest outputs would affect the lifestyles to which these people have become accustomed.

b. Regional Zone

The regional zone constitutes the major market area within which the direct, indirect, and induced impacts of Forest management activities and outputs apply. It encompasses the four-county area of Clearwater, Idaho, Lewis, and Nez Perce Counties, and includes the region's primary service center at Lewiston. The economy in the regional area reflects the impact of Lewiston in the market area. The major sectors, by employment, are forest products (5,971 jobs or 29 percent), wholesale/retail trade (4,281 jobs or 21 percent), miscellaneous services (4,187 jobs or 20 percent), and agriculture (1,344 jobs or 7 percent). Contributions of Forest resource outputs to the regional economy, based on employment, are reflected in Table B-27.

Population in the regional area has remained stable over the last two census periods (1970 and 1980). With the exception of Nez Perce County (Lewiston area), no real growth trends are apparent. This can be accounted for by the stable demand for both agricultural and forest products; both are mainstays in the Regional economy.

Other than manufacturing of market products, the primary importance of the Forest in the regional area is for recreation. There is a large group that uses the Forest for recreational pursuits (an estimated 50 percent of the use is by people

from the four-county area). There is also a trend toward more use of the Forest for leisure time activities. Fishing and hunting draw most Forest visitors from this zone. The Nez Perce Tribe has treaty rights of hunting and fishing on the Forest, and many members reside within the regional zone. These trends are partially responsible for the growth in the tourism/ recreation industry in this area. Statewide this is the third largest industry with gross revenue exceeding $1 billion annually (1985). It is anticipated that tourism will play a more significant role in the regional economy over time. Two communities, Riggins and Kamiah, have already experienced timber mill closures and are attempting to capture a significant portion of the tourism trade in this area. It is assumed that tourism and recreation will continue to grow along with the increase in statewide activity. Because of the diverse nature of this industry, it is difficult at this time to quantify specific impacts of management activities on the employment and income distribution in the Regional area. However, it is assumed that the growth of the industry in the Regional area will continue regardless of the management alternative selected on the Forest. What will occur, is a shift in the types of activities offered. Market-oriented alternatives would provide more opportunities for developed recreation activities while amenity-oriented alternatives would emphasize activities such as backpacking, hunting, etc.

Individuals in the regional area (Clearwater, Idaho, Lewis, and Nez Perce Counties) who use the Forest also have shown a strong attachment to and interest in how it is managed. A number of public interest groups, as well as individuals, have taken an active part in helping shape Forest management priorities. This is often expressed in the form of appreciation for amenity or aesthetic values. Except for aesthetics, however, even dramatic changes in Nez Perce Forest outputs are perceived as having only limited effect on the regional economy as a whole and almost no effect on the personal lifestyles of most of its residents.

c. National Zone

The national zone of influence is not significantly affected in terms of response to changes in Forest outputs for a given level of management. For instance, a change in timber output would not significantly vary supply or demand on a national scale. However, changes in policy affecting amenity values such as scenic quality, water quality, wildlife and fisheries management, and similar values will continue to draw attention from special interest groups at the state and national levels. This is evidenced in the past, by these interest groups' involvement in wilderness issues.

d. Nez Perce Tribe

Any discussion of the social characteristics of the Forest would be remiss without including the Nez Perce Tribe and their relationship to the Forest. Among the Forest users, the Forest Service has unique responsibilities to the Tribe. These responsibilities include the requirement of coordination with the land and resource protection efforts of the Tribe as well as assuring the Tribe's freedom to believe, express, and exercise its traditional religious beliefs within the Nez Perce National Forest as provided by the American Indian Religious Freedom Act. Furthermore, the Nez Perce Forest shares a common interest with the Tribe in securing a fisheries habitat on the Forest which is adequate to maintain a viable anadromous fishery population. The Tribe also expressed primary

concerns for protection of sites of cultural and religious importance, and the enhancement and perpetuation of big-game herds. In terms of big-game herds and anadromous fisheries, alternatives which maintain or enhance these resources would least change traditional lifestyles. Protection of cultural and religious sites is less affected by changes in output because protection needs are identified on a project-by-project basis through consultation with the Tribe or where the Forest already knows a site of significance exists. Because few Tribal members are employed directly by the Forest Service or in occupations dependent upon Forest outputs, any dramatic change in current output levels is not likely to affect them in terms of economic stability (employment).

2. Social-Economic Variables

To measure or quantify the social effects of the alternatives, a common quantifier was used to evaluate changes in the social-economic variables. Input-output modeling of the regional area economy showed that variations in employment, gross output, and personal income resulting from changes in Forest resource outputs by alternatives could have a significant impact on these social variables. As a result, the change in employment and personal income by alternative in the regional area was used to quantify these changes. It was assumed that modeling of the regional economy could be used not only to predict changes in the social variables for that area, but also for the local impact zone as well. Specifically, comparisons were made of the change in forest industry, general recreation, outfitter and guide, and total employment and income to the base level (1980) outputs for each alternative.

Although there are other factors that could affect the social variables, current data suggests that National Forest outputs can make a substantial difference in the social makeup of the impact areas identified. It should also be understood that many variables outside the realm of alternative outputs exert considerable influence on the social impact areas in question. These would include the recent economic recession, or the inclusion of new industries in the market area.

To quantify the impact of social factors in each zone of influence with regard to the varying outputs of the different alternatives, it was necessary to define five variables to conduct the quantification or measurement (Bacigalupi, 1980). These are defined below:

a. Economic Stability

The ability to maintain a viable economic base in order to insure the existence of historical trades and professions within the impact zone characterize this variable. This situation enables the affected community to "maintain or enhance a way of living which may be financially dependent upon particular resource-related work" (Bowen, et al., 1978).
This variable is applicable most directly to the local zone and secondarily to the regional zone, as previously described.

The ideal level, as perceived by local residents, is to maintain or minimally increase present employment and/or income levels. Drastic reductions or increases would be viewed as detrimental, since they would alter existing business patterns.

Because of the local dependence on timber production, the most critical factor that could affect this variable would be a drastic change in timber outputs from the Forest. This would directly alter forest industry income and employment, and the indirect effects would be felt in the other sectors of the local and regional economies. In order to measure the effects of the alternatives with respect to economic stability, it was determined that timber outputs should not invoke "rapid change." This was defined as an approximate 10-percent or greater deviation from base employment, income, or job distribution within a 10-year period. Because the base economy is not static, it was assumed a decrease of 20 million board feet (MMBF) from the historical (1980) annual harvest, or an increase of 20 MMBF above current milling capacity (135 MMBF) would be required to create approximately 10 percent change in base employment. This leaves a range of 77 MMBF to 155 MMBF within which harvest could vary without invoking "rapid change," during the first decade. For subsequent decades, it was assumed that as long as harvest levels did not fluctuate more than plus or minus 30 percent, rapid change would not occur.

In addition to the impacts of timber production, an evaluation of the impacts of each alternative on the tourism/recreation industry was also analyzed. The diverse nature of this industry, ranging from developed recreation resorts to backcountry outfitter operations, made quantification of management activities on employment and income difficult. The impacts that were estimated for each alternative were based on the Pacific Northwest River Basin Commission (PNRBC) demand projections for dispersed recreational activities for the local area. The importance of this industry should continue to grow regardless of the management alternative selected on the Forest. What will occur, is a shift in the types of activities offered. Market-oriented alternatives would provide more opportunities for developed recreation activities, such as resorts. Amenity-oriented alternatives would emphasize activities such as backcountry hunting, fishing, and general recreation trips; the type of activities most closely associated with the local outfitter and guide industry. Timber harvests and related road building can reduce traditional outfitter/guide operations on previously unroaded areas. From information provided by District recreation specialists, it is estimated that there would be a 50-percent reduction in an outfitter/guide's operation if roads were built into his/her assigned area. Based on this information, market-oriented alternatives, such as D and E, would have the potential for the greatest impact on outfitter/ guide's operations while amenity-oriented alternatives, such as C, H, and H1, would have the least impact. Below is a summary of potential impacts on outfitters and guides by Ranger Districts:

Salmon River RD

Alternatives D and E would have the greatest impact on one out of eight outfitters operating within this District. Alternatives G and G1 would reduce this same outfitter by 22 percent from current operations.

Clearwater RD

All alternatives would reduce the operations of the one outfitter by 50 percent.

Red River RD

Alternatives A, D, and E have the greatest negative impact by reducing 50 percent of the operations of all outfitters administered within this District. Alternatives C, H, and I would reduce by 50 percent operations on two out of five outfitters. Alternatives F, G, G1, J, K, and L would reduce operations by 50 percent on three out of the five outfitters.

Moose Creek RD

There would be no significant impact by the alternatives on outfitters and guide operations within this wilderness District. There is the potential for greater outfitter activity due to a shift in operations from other Districts significantly impacted by alternatives.

Selway RD

Alternatives A, D, and E would have the greatest impact on one outfitter by reducing operations 40 to 50 percent. Two other outfitter operations would be reduced by 5 to 10 percent. The remaining alternatives would impact only one out of the four outfitters and this would be a reduction of 5 percent on his/her operation.

Elk City RD

Alternatives D, E, and K would have the greatest impact on the one outfitter operating within this District. Outfitter activity would be reduced by 73 percent under these alternatives. Alternatives A and F have an impact of approximately 50 percent and Alternatives C, H, H1, and I have no significant impact.

b. Social Stability

The perception is that "future events can be counted on to permit living a desired life direction" (Ibid, 1978). Social stability can be characterized as an environment which maintains existing social and cultural ties in their present state in order to minimize conflicts with user groups. This variable is applicable only to the local area.

During interviews with local residents, the local area was perceived to be both stable and capable of providing a high level of continuity among the citizenry. While stability was a very important concern, slow but steady growth (with respect to population and employment) was also viewed as advantageous. It was assumed that growth was not aligned with any particular industry, but rather moving towards a more stable economy. Any alternative which would create a sudden increase or decrease in population would be viewed as undesirable.

c. Community Cohesion

"The quality of adherence to a particular community cause; a zealous collective support of community; community pride and loyalty; people working together for mutual benefit; a sense of belonging that is associated with mutual community interests and goals; the regard and respect people hold for their community and each other" (Ibid, 1978). This variable speaks directly to the degree to which

individuals and groups support or denounce broadbased social issues. It is important only at the local level.

In general, the local area can be categorized as being in agreement on land resource issues, although a certain degree of polarization exists over environmental vs. market-output questions. This could be an important issue if management activities are perceived as being weighted too heavily one way or the other.

There is a high level of community pride, and a strong sense of association within the local area. An alternative which promotes or maintains this cohesiveness would be acceptable.

d. Lifestyle

This variable pertains to preserving the traditional way of living commonly associated with Idaho County and the local subareas within it. It is important to note that most of the local people view their traditional level as being centered around individuality, freedom, permanency, and a strong identification with the area. Although moderate change in this lifestyle is not viewed as detrimental, most individuals would prefer to see little or no change.

e. Aesthetics

"Feelings of attachment" characterize this variable with regard to the perception of local individuals and their attitudes. Many people consider amenity values (preservation of wilderness, clean air, clean water) as the most important factors, while others maintain that use of the Forest for timber harvest, grazing, firewood cutting, hunting, etc. are more important issues. In addition, this variable can be measured on the regional and national levels since many of these same values are important to the surrounding communities and nation as well.

Each alternative can be analyzed as to what the emphasis of the management is perceived to be, and what values are best satisfied within each.

VI. ANALYSIS PRIOR TO DEVELOPMENT OF ALTERNATIVES

A. Introduction

This analysis process included compiling data (issues concerns, demand projections, the current situation assessment, etc.), and using the FORPLAN model to process and/or develop information on Forest output production capability, economics, and resource interrelationships.

During the Analysis of the Management Situation (AMS), resource supply potentials were determined by establishing minimum and maximum production levels called benchmarks. A point of reference was also defined from which the costs and effects of applying regulation and policy constraints were measured. Production capabilities were determined for single resources as well as for sets of multiple resource outputs produced in the most cost-efficient way. This analysis established the benchmark levels required by National planning

direction. Those benchmarks served as references from which the costs and effects of various objectives and constraints used in developing alternatives were evaluated.

The benchmark analysis was performed prior to the formulation of alternatives and used the FORPLAN model. The purpose of the benchmark analysis was fourfold:

- Estimate the schedule of management activities, resource outputs, effects, discounted benefits and costs, present net value, and acreages of prescription assignments appropriate to achieving the purposes of the benchmarks;

- Define the resource production levels associated with maximizing single resource outputs;

- Analyze the implications of legal and policy constraints; and

- Comply with the analysis of minimum management requirements of 36 CFR 219.27.

In order to fulfill these requirements, the Forest developed three types of benchmarks. These are:

- Maximize Present Net Value Benchmarks - Maximizes present net value for the Forest and displays the associated resource outputs.

- Resource Benchmarks - Defines the maximum potentials for timber production, elk, and wilderness.

- Minimum Level Benchmarks - Defines the minimum outputs associated with custodial management of the Forest and the unavoidable costs and benefits of public ownership.

Several variations of the Present Net Value and Resource Benchmarks were run to determine the opportunity cost and resource tradeoffs of meeting specific constraints, objectives, regulations, and policies. In addition to these requirements, all benchmarks were designed to be approximately implementable, were not constrained by budget, and generally used a maximization of PNV as the objective function to obtain a fixed analytical solution.

As a result of public comments, additional analysis and several changes have been made since the Draft EIS. The additional analysis is summarized below:

- Alternative G (Preferred Alternative) was modified to maintain a stable harvest level over the planning horizon.

- Alternative G was modified by limiting timber harvesting to those timber prescription/analysis area combinations which showed a positive present net value.

- Alternative G was modified by adding additional suitable acres from East Meadow Creek, West Meadow Creek, and Rackliff-Gedney roadless areas.

- Alternative G was modified to compare and evaluate the effect of using 60 acres available for harvest per mile of new road construction in the first decade rather than 40 acres per mile.

- Sensitivity analysis was performed to estimate the impact that different timber price assumptions would have on land assignments and the economics of timber management using the FORPLAN model. Also, updated recreation/ wildlife values were used to estimate any impacts on land assignments and economic efficiency. This analysis was done on the Max Present Net Value Benchmark, Alternative D, and Alternative G. For additional information on this analysis, see Appendix D.

Summary of changes to alternatives since the Draft EIS:

The boundaries of the Mallard and Gospel-Hump roadless areas were changed to the original RARE II boundaries. This change was in response to the public concern that this Forest adjusted the RARE II boundaries because of timber sale and road construction activities which were expected to take place, but have not at this time.

Constraints common to all alternatives remain unchanged. Additional constraints were applied to Alternative G (Preferred Alternative) to meet specific resource and economic objectives. These constraints have been designed to meet the following objectives:

- Increase fish/water quality objectives in 64 drainages;

- Increase prescribed burning on deer/elk winter range from 2,700 acres to 5,000 acres per year in the Plan period (1988-1997);

- No scheduled road construction or timber harvesting activities in the West Meadow Creek roadless area for the Plan period (1988-1997), except for the portion which is west of the hydrologic divide between Meadow Creek and the Red River and American River drainages;

- Managing approximately 13,300 acres in the Silver Creek-Pilot Knob roadless area without additional roads and with no scheduled timber harvest;

- Make timber management prescriptions available for approximately 11,000 acres of tentatively suitable land in the Rackliff-Gedney roadless area;

- Include all riparian acres in the suitable timber base, but review harvesting activities on any riparian areas during implementation of the Forest Plan.

B. Development of Management Requirements

In order to perform the stepwise analysis in the benchmarks, various sets of management requirements were modeled in FORPLAN in order to ensure that the purposes of the benchmark analysis could be achieved. These management requirements were divided into three categories: minimum management

requirements (MMRs); timber policy requirements; and maximum resource output constraints. The management requirements were incorporated into FORPLAN in two ways. First, many of the standards and guidelines for prescriptions were developed to include specific management requirements. These requirements are included in FORPLAN as cost and yield table variations reflecting management under these assumptions. Second, various management requirements were incorporated into FORPLAN by imposing constraints on the linear program. These constraints were used to ensure that outputs, effects, and forest conditions will be produced in the proportions required to achieve the particular purposes of a benchmark.

In linear programming analysis, constraints override the objective function. Thus, if a predetermined level of outputs or minimum physical condition is entered as a constraint, it is always achieved (or no feasible solution is found). Output levels and other desired effects entered as constraints, then, are implicitly assumed to contribute more to public benefits than the sum of their cost of production plus the foregone contribution of public benefits of any outputs they replace in the solution. In the design of the benchmarks, care was taken to ensure that the effects of various constraints or sets of constraints on PNV could be quantified, and that these constraints constituted the most cost-efficient method for attaining the desired results. Following is a discussion of the management requirements used in the Nez Perce FORPLAN model.

The minimum management requirements in 36 CFR 219.27 were identified and incorporated into the planning process. Several of the minimum management requirements are a part of the design for management prescriptions assigned in the FORPLAN model to benchmarks and alternatives. In addition, a set of modeling constraints were developed for FORPLAN to approximate the effects of MMRs which could not be tied to management prescriptions. Other minimum management requirements were considered outside the model. Following is a discussion of how each minimum management requirement was incorporated.

1. Minimum Management Requirements

a. Conservation of Soil and Water Resources

The basic soil, water quality, and water yield resources were protected by the application of specific management standards, guidelines, and practices integrated within management prescriptions, and accessibility and acres of harvest constraints in the FORPLAN model. This methodology provides a baseline necessary to protect the physical integrity of the land and water systems. Soil resources were protected by employing standards, guidelines, and practices within the management prescriptions which called for land-disturbing activities (i.e., timber harvesting and road construction). These measures were incorporated into the model to protect the basic productivity of the soil. Water quality resources were protected by a combination of standards, guidelines, and practices within the management prescriptions, and accessibility and acres of harvest constraints in the FORPLAN model. These measures were taken to limit stream sedimentation to acceptable levels. Water yields were protected by utilizing accessibility constraints in the FORPLAN model to protect Forestwide stream channel stability. Specifically, accessibility constraints limited harvest on all analysis areas over 400 acres to 10 percent per decade for the first four decades. The acres of final

harvest constraints limited harvest acres to levels which would not jeopardize minimum viable fisheries populations on each watershed available for timber harvest on the Forest.

b. Minimize Hazards from Flood, Wind, Wildfire, Erosion, or Other Natural Physical Forces

The Forestwide management standards and guidelines incorporated in management prescriptions include the necessary mitigation and protection from the above hazards.

c. Reduce Hazard From Pest Organisms

Activities to prevent conditions favorable to pest organisms are included in management prescriptions.

d. Protection of Riparian Zones

Riparian areas are protected by specific management standards, guidelines, and practices within the management prescriptions and scheduled output constraints limiting harvest in riparian areas per decade. All identified riparian areas are managed to protect riparian ecosystem resources and timber harvesting is limited to 10 percent of the riparian zone in any 10-year period.

e. Diversity

Animal and vegetative diversity is currently very high and is well distributed on the Forest. Vegetative diversity is maintained through a combination of managing for old-growth habitats, timber harvest, and fire management. A minimum of 10 percent of the forested area on the Forest is maintained at any one time as old growth with no less than 5 percent of the forested acres maintained as old growth within each prescription watershed or combination of watersheds totalling 5,000 to 10,000 acres. Animal diversity is further discussed under item "f."

f. Adequate Fish and Wildlife Habitat to Maintain Viable Populations

Fish - The fishery habitat to maintain minimum viable populations was met by the application of the accessibility constraints to the FORPLAN model.

Wildlife - One or more selected indicator species are used to represent wildlife species that have similar biological requirements. Eleven species were selected as indicator species. Species selected are either impacted by management direction or are the emphasis in management direction. Endangered, threatened, and/or sensitive species were included. Maintenance of minimum viable populations of wildlife was a part of the design for management prescriptions. As a result, all alternatives and benchmarks maintain at least those minimums.

Specific constraints for elk key summer range were modeled by capability area boundary or groups of capability areas. Open road density is the variable used to evaluate the effect of various management directions.

Three wildlife indicator species, goshawk, pine marten, and pileated woodpecker, have optimum habitat in old-growth ecosystems. Old growth is discussed in item "e."

g. Consistency with Multiple Use Laws

The Secretary of Agriculture under various laws is directed to administer national forests for multiple uses such as outdoor recreation, range, timber, watershed, wildlife, fish, and minerals. The Secretary is also directed to develop and administer the renewable surface resources.

Forest planning and environmental analyses require that processes formerly used to make individual resource decisions must be combined into integrated management decisions.

The riparian zone diversity, and fish and wildlife minimum management requirements (MMR) address how multiple use and sustained yield is achieved. The reforestation MMR provides for maintenance of a sustained yield of timber without impairment to the productivity of the land.

h. Protecting Threatened and Endangered Species Habitat

The gray wolf, peregrine falcon, grizzly bear, and bald eagle are threatened and endangered species for which habitat has been identified on the Forest. The Regional Guide directs the Forest to evaluate the capacity of supplying habitat for these species. Adequate prey base of big game (elk and deer) is discussed above. Availability of habitat was determined for each alternative and benchmark by evaluating prescriptions that provide a reduction in the likelihood of human-wolf encounters. The evaluation method is documented in the planning records.

i. Providing for Utility and Transportation Rights-of-Way and Corridors

Land-disturbing activities such as timber harvest, land clearing, road construction, pipeline trenches, and holes for power poles occur when providing rights-of-way. An analysis outside FORPLAN and prescriptions defined the kinds of land which should be excluded or avoided in permitting or constructing linear corridor facilities. Avoidance areas are areas where establishment and use of corridors conflicts with land use or management objectives such as cultural or historic sites, wildernesses, Research Natural Areas, and scenic areas. Recently established and expanded Wildernesses (Selway-Bitterroot and Frank Church-River of No Return) preclude any consideration of a major east-west corridor on the Forest.

j. Road Construction Standards

Access roads are necessary for efficient timber harvest, but road construction affects the soil, water, visual, wildlife, fisheries, and riparian resources. Safe road conditions for public use are necessary. The variables considered to establish road standards are road density per square mile and road design requirements.

Minimum road design considered type of road, clearing width, width of road, and grades. Roads are categorized into two types -- collector and local.

Clearing width was established at the top of the road cut and the toe of the road fill. No major difference in costs occurs between collector and local roads for clearing. Steeper slopes require larger clearing width and increased costs.

The width of local roads influences costs. The standard established was 12-foot width for rock-surfaced roads and 14-foot width for unsurfaced roads. Narrower road widths are not considered because of logging equipment requirements and safety. The costs for this standard vary, depending on the landtype (slope).

The grades of the road vary by road type. Collector roads were established at a maximum 6-percent sustained grade with some pitches to 10 percent. This percentage was based on traffic volume, road maintenance costs, construction costs, and the effects on soil and water. Local road grades were established at a maximum 8-percent sustained normal grade with pitches to 15 percent. Steep pitches are considered exceptions. A grade up to 15 percent is used rather than the 8 percent in those situations where less impact on soil, water, and visual resources is possible.

Mitigating measures will be applied to newly constructed roads and road maintenance to help maintain water quality and reduce damage to fisheries by limiting the amount of sediment that enters the streams. Some measures are applied to all roads while others are for specific sections such as within riparian zones or within sediment-contributing areas adjacent to active channels. The sediment mitigation guidelines for roads are on file in the Forest planning records. These guidelines are included in management prescriptions.

k. Revegetating Temporary Roads

Short temporary roads are sometimes needed to efficiently transport logs; however, they can affect soil and water resources. The road density for the Forest's transportation system and log skid distances were designed to preclude the use of temporary roads in most cases. The minimum requirement is to reestablish forage or grass cover by seeding. Revegetation is included in the logging practices for prescriptions that harvest timber.

l. Maintaining Air Quality

This requirement was handled outside of FORPLAN. The Regional Guide directs the Forest to work through cooperative agreements with the States to manage smoke emissions. Scheduling the time and number of prescribed burns is done outside the FORPLAN model and in cooperation with States of Montana and Idaho.

m. Reforestation

In order to have reasonable assurance of regeneration in 5 years, seedlings are planted on most harvested areas. Planting occurs because of the long periods between cone crops, insect (spruce budworm) and disease (dwarf mistletoe) effects on seed sources and seedlings, grass competition or prevention of

natural generation, and the need to close harvest openings within 20 years to meet the hydrologic recovery rate established in the soil and water MMR. Planting variables considered were: single species, species mix, stocking rates, and site preparation. The minimum requirement for species is a mix that minimizes plantation losses and the need to replant. Stocking rates are 200 to 600 trees per acre. The rate varies because the drier habitat types can't support full stocking. Site preparation is required in most cases because native planted species cannot grow efficiently if existing vegetation competes for soil nutrients, water, and sunshine. Reforestation is included in the prescriptions with timber harvest as a management practice.

n. Forty-Acre Clearcut Limit

Clearcutting is one silvicultural system used on the Forest for even-aged timber harvest. The Regional Guide establishes that the openings created by even-aged silviculture normally will be 40 acres or less. Costs and practices used are based on clearcuts of 40 acres or less and are included in the management prescriptions. As discussed in the soil and water MMR, the FORPLAN model harvested an entire analysis area in 1 decade. An access constraint which limited the amount of harvest in an analysis area was applied to assure that cutting could be limited to 40 acres.

Constraints used in modeling the benchmarks are summarized in Table B-31, and are discussed in this section.

Table B-31
Benchmark Constraint Summary
(Benchmarks and Constraints)

Run ID 11711C & 11721C	Run ID 11712B	Run ID 11713A	Run ID 11706D
Ending Inv.	Ending Inv.	Ending Inv.	Ending Inv.
Rotations based on utilization standards	Rotations based on 95% culmination of mean annual increment (CMAI)	Rotations based on utilization standards	Rotations based on 95% CMAI
Upper and lower bounds 25% per decade	Upper and lower bounds 25% per decade	Non-declining yield	Non-declining yield
1st decade volume ceiling 333 million cubic feet (MMCF)	1st decade volume ceiling 333 MMCF		
Full MMR constraint set	Full MMR constraint set	Full MMR constraint set	Full MMR constraint set
Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades

Table B-31 (Continued)
Benchmark Constraint Summary
(Benchmarks and Constraints)

Run ID 11715A	Run ID 11716A	Run ID 11702A	Run ID 11703A
Ending Inv.	Ending Inv.	Ending Inv.	Ending Inv
Rotations based on utilization standards	Rotations based on 95% CMAI	Rotations based on utilization standards	Rotations based on utilization standards
Upper and lower bounds 25% per decade	Upper and lower bounds 25% per decade	Upper and lower bounds 25% per decade	Upper and lower bounds 25% per decade
1st decade volume ceiling 333 MMCF	1st decade volume ceiling 333 MMCF	1st decade volume ceiling of 333 MMCF	
Full MMR constraint set	Full MMR constraint set		
Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades

Run ID 11717A	Run ID 11718A	Run ID 11705A	Run ID 11705C
Ending Inv	Ending Inv	Ending Inv	Ending Inv
Rotations based on utilization standards	Rotations based on 95% CMAI	Rotations based on 95% CMAI	Rotations based on 95% CMAI
Non-declining yield	Non-declining yield	Non-declining yield 1/	Non-declining yield 1/
		1st decade volume ceiling of 333 MMCF	1st decade volume ceiling of 333 MMCF
Full MMR constraint set	Full MMR constraint set	Full MMR constraint set	Full MMR constraint set
Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades

See footnotes at end of table.

Table B-31 (Continued)
Benchmark Constraint Summary
(Benchmarks and Constraints)

Run ID 11704B	Run ID 11708E	Run ID 11709C	Run ID 11710C
Ending Inv	Ending Inv	Ending Inv	Ending Inv
Rotations based on 95% CMAI	Rotations based on 95% CMAI	Rotations based on 95% CMAI	Rotations based on 95% CMAI
Non-declining yields	Non-declining yield	Non-declining yield	Non-declining yield
	Analysis area constraints of 10% per decade (fisheries/water quality)	Old growth MMR constraint	Riparian area MMR constraint
Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades	Max PNV assigned for 15 decades

Run ID 11722Y	Run ID 11723Y	Run ID 11720A
Ending Inv	Ending Inv	Ending Inv
Rotations based on utilization standards	Rotations based on utilization standards	Rotations based on 95% CMAI
Upper and lower bounds 25% per decade	Upper and lower bounds 25% per decade	Non-declining yield
1st decade volume ceiling 333 MMCF	1st decade volume ceiling 333MMCF	
Full MMR constraint set	Full MMR constraint set	Full set of MMR constraints
Max PNV assigned for 15 decades 2/	Max PNV assigned for 15 decades 3/	Max PNV assigned for 15 decades

See footnotes at end of table.

Table B-31 (Continued)
Benchmark Constraint Summary
(Benchmarks and Constraints)

Run ID 11799A	Run ID 11724D
Ending Inv	Ending Inv
Rotations based on 95% CMAI	Rotations based on utilization stds.
Non-declining yield	Upper and lower bounds 25% per decade
Full set of MMR constraints	
Max PNV assigned for 15 decades	

1/ Increase between decades limited to 25% up to LTSY level.

2/ The objective function for the inital run was Max Grazing for 5 decades. The resulting grazing outputs were locked in for the first 5 decades and rerun as 11722Y.

3/ The objective function for the inital run was Max Elk for 5 decades. The resulting elk outputs were locked in for the first 5 decades and rerun as 11723Y.

2. Timber Policy Requirements

a. Nondeclining Yield (NDY)

Nondeclining yield (NDY) is a constraint on timber outputs which limits the per-period harvests to levels greater than or equal to the preceding period level. This constraint was used to ensure a constant even flow of timber harvest levels throughout the planning period.

b. Sequential Upper and Lower Bounds; Harvest Floors and Ceilings

In lieu of the NDY constraint on timber outputs, sequential upper and lower bounds and floors and ceilings were used to constrain the harvest flows to reasonable levels in specific benchmark runs. Floors and ceilings were used to establish a parameter on first decade timber harvests which would not invoke substantial change in local consumptive patterns. Floors are a lower limit which may be a necessary limit on harvests to offer a level of reasonableness in a benchmark. Normally this limit is imposed in a benchmark on the first decade only, allowing the objective functions and other constraints to control the

solution beyond the first decade. Ceilings are an upper limit, only to be imposed for the same reasons as the floor.

Floors and ceilings for the Nez Perce National Forest were calculated with respect to timber outputs which would not create a "rapid change" in the local economy. Rapid change was defined as a 10-percent or greater deviation from base employment, income, or job distribution in the first planning period. In relation to output levels, it was determined that rapid change would occur if harvest levels changed an average of greater than 20 MMBF from the base year harvest level. Since the annual regulated harvest for the base year was 97 MMBF, the floor and ceiling limits for the first decade were calculated as 77-155 MMBF (the upper limit was calculated as +20 MMBF above the local milling capacity of 135 MMBF). Sequential upper and lower bounds were used in conjunction with the floors and ceilings to limit timber harvest levels after the first decade. Sequential upper and lower bounds were defined as the change in timber harvest levels for succeeding periods which did not invoke rapid change in the local economy. Expressed as a percentage, it was determined that timber harvest levels would be constrained to +/-25 percent of the previous period harvest. The justification for this level was an estimate of the change in harvest levels which would create a 10-percent or greater deviation in employment, income, or job distribution, and current local industry estimates of the incremental change in timber harvest levels required to efficiently operate new milling facilities.

c. Rotation Based on 95 Percent CMAI

Timber rotation lengths based on 95 percent of the culmination of mean annual increment (CMAI) for existing and regenerated stands is required by 36 CFR 219.16(2)(iii). The Forest Service is directed to analyze timber rotation lengths based on the time required for stands to reach the culmination of net growth. CMAI assures that all stands scheduled for harvest have reached this level. CMAI was used to constrain the FORPLAN model with regard to when timber harvests could actually occur.

d. Rotation based on Utilization Standards

In order to evaluate the effects of timber rotation lengths constrained by CMAI, rotation lengths based on Regionally proposed utilization standards were used to determine what, if any, change in timber harvest levels or PNV could be attributed to the more constraining CMAI levels.

3. Maximum Resource Output Objectives

Maximum resource output constraints were used to determine the physical or biological potential of achieving specific resource outputs for the Forest, and the resulting impact on other resources or programs. The outputs chosen for this analysis were timber, range, wildlife, and wilderness. The resource outputs were maximized by first assigning FORPLAN an objective function to maximize the particular output, locking in the resulting optimal land assignment, and rerunning FORPLAN with the objective function of maximizing PNV.

C. Displayed Benchmarks

Following are descriptions of the benchmarks developed and considered in the Nez Perce National Forest planning process.

1. Model Calibration - 01D

The purpose of this benchmark was to verify that the FORPLAN model was reasonable in terms of resource outputs and cost information, and to ensure that all data coding for scheduled outputs, costs, etc. was correctly done. The constraints used in this benchmark were:

- Timber rotations based on 95 percent of CMAI.
- Nondeclining yield (NDY) for timber harvest at or below long-term sustained yield capacity (LTSYC).

Because this benchmark was only used to validate the FORPLAN model, it was not carried through in the analysis of benchmarks to determine opportunity costs or resource outputs.

2. Max PNV (Assigned) - Variation 1 - 02A

The purpose of this benchmark was to form a basis for measuring the opportunity costs of timber harvest floors and ceilings and sequential upper and lower bounds in the first decade. The constraints used in this benchmark were:

- Harvest floors and ceilings for the first decade, and sequential upper and lower bounds for all decades thereafter.
- Timber rotations based on current utilization standards.

The long-term sustained yield capacity (LTSYC) in benchmark 02A was 49 MMCF per year, or 238 MMBF, with a first decade harvest level of 156 MMBF per year and 1,056,340 acres identified as suitable for timber management. PNV for this benchmark is $1,487 million. Because of a lack of minimum viable fishery constraints, the anadromous fishery is projected to be reduced to remnant populations by the third decade. Elk winter range capacity is projected to vary from a low of 14,500 elk in decade 2 to 15,700 elk in decade 3.

3. Max PNV (Assigned) - Variation 2 - 03A

The purpose of this benchmark is to determine the opportunity costs of timber floors and ceilings when compared with benchmark 02A, in the absence of MMRs. It is the same as benchmark 02A with the exception of no constraint on timber harvests in the first decade. The constraints used in this benchmark are:

- Sequential upper and lower bounds
- Rotations based on utility standards

The LTSYC in benchmark 03A was 49 MMCF per year, or 238 MMBF, with a first decade harvest level of 609 MMBF per year, and 1,056,874 acres identified as suitable for timber management. This run had the most rapid conversion of existing stands

to regenerated and achieved 90 percent of the potential LTSYC growth rate by the sixth decade. PNV for this benchmark is $1,860 million, the highest of all benchmarks. First period costs are increased $35 million over 02A, due to the high level of road construction. The anadromous fishery is projected to be reduced to remnant populations by the third decade because of the lack of a minimum viable fishery constraint. Elk winter range capacity is projected to vary from a low of 14,900 elk in decade 1 to 28,600 elk in decade 5.

4. Max PNV (Assigned) - Variation 3 - 04B

The purpose of this benchmark is to provide a base run against which the minimum management requirements can be analyzed. When compared with run 02A, it defines the opportunity cost of the nondeclining yield/long-term sustained yield capacity (NDY/LTSYC) link in conjunction with timber rotation based on 95 percent of the culmination of mean annual increment (CMAI).

The significant constraints applied to this benchmark are:

- NDY/LTSYC link.
- Rotations restricted to 95 percent of CMAI.

The LTSYC in benchmark 04B was 51 MMCF per year, or 246 MMBF, with an annual harvest in the first decade of 246 MMBF and 1,057,686 acres identified as suitable for timber management. PNV for this benchmark is $1,260 million. Because of a lack of minimum viable fishery constraints, the anadromous fishery is projected to be reduced to remnant populations by the third decade. Elk winter range capacity is projected to vary from a low of 14,400 elk in decade 2 to 16,000 elk in decade 3.

5. Max PNV (Assigned Values) - Variation 5 (Max PNV Benchmark) - 06D

This run provides the reference point for the comparison of the alternative runs to determine opportunity costs of the various goals and objectives. This run is also used to determine the opportunity costs of the full set of MMRs when employed with harvest constraints of NDY/LTSYC link and rotations restricted to 95 percent CMAI. Specific constraints applied to achieve MMRs are:

- Accessibility constraints of 10 percent per decade for the first 4 decades on all sawtimber analysis areas.

in all runs

- Upper limit of 108,796 acres of regeneration harvests in decade 1 and 102,622 acres in decade 2 applied as scheduled output constraints by Ranger District.

- Prescriptions for existing and replacement old-growth stands locked in to 95,070 acres.

- A proportional scheduled output constraint restricting harvest in riparian areas to 10 percent of the total riparian area acres in any decade.

By comparing this run to 04B, the opportunity costs for the full set of MMRs can be determined. The LTSYC level in benchmark 06D was 51 MMCF per year, or 243 MMBF, with an annual harvest level of 196 MMBF in the first decade and 1,056,136

acres identified as suitable for timber management. PNV for this benchmark is $1,119 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 18,900 elk in decade 5.

6. Max PNV (Assigned) MMR Analysis - 08E

The purpose of this run was to determine the opportunity cost of the analysis area accessibility constraint applied in run 06D as part of the minimum management requirements (MMR) set. This single constraint achieves, partially or in full, the following MMRs:

- Size of opening restrictions
- Maximum water yields
- Water quality-fishery viability

This run is essentially the same as run 04B with NDY/LTSYC link and rotations restricted to 95 percent of CMAI being the primary harvest constraints. The only exception is the analysis area accessibility constraints that are set at 10 percent per decade for the first four decades and are applied to all sawtimber analysis areas greater than 400 acres. The LTSYC level in benchmark 08E was 51 MMCF per year, or 244 MMBF, with an annual harvest level of 244 MMBF in the first decade, and 1,057,686 acres identified as suitable for timber management. Present net value for this benchmark is $1,148 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 19,000 elk in decade 5.

7. Max PNV (Assigned) MMR Analysis - 10C

The purpose of this run is to determine the opportunity cost of the harvest constraint applied to riparian areas which partially achieves the MMR for riparian areas. The constraint limits the acres of riparian area harvest in any one decade to 10 percent of the inventoried riparian area Forestwide. This constraint, in conjunction with specific standards and guidelines, was used to fulfill the riparian area MMR.

This run is identical to run 04B with the exception of the riparian area constraint. By comparing the two, the opportunity cost of the constraint can be determined. NDY/LTSYC link and rotations restricted to 95 percent CMAI are the significant harvest constraints. The LTSYC level in benchmark 10C was 51 MMCF per year, or 246 MMBF, with an annual harvest level of 246 MMBF in the first decade, and 1,057,686 acres identified as suitable for timber management. PNV for this benchmark is $1,251 million. Because of a lack of minimum viable fishery constraints, the anadromous fishery is projected to be reduced to remnant populations by the third decade. Elk winter range capacity is projected to vary from a low of 14,400 elk in decade 2 to 16,000 elk in decade 3.

8. Max PNV (Assigned) MMR Analysis - 09C

The purpose of this run was to determine the opportunity costs of old-growth prescriptions to meet the MMR of maintaining viable populations of old-growth-dependent species. Prescriptions for existing old growth, with early timber entry dates delayed to the 10th decade, are assigned to 42,329 acres. Prescriptions for replacement old-growth stands with entry dates delayed to the 16th decade are assigned to 52,741 acres. The other significant constraints are NDY/LTSYC link and rotations restricted to 95 percent CMAI, the same as in 04B. Comparing this run to 04B will determine the impacts and opportunity costs of maintaining minimum viable populations of old-growth-dependent species. The LTSYC level in benchmark 09C was 51 MMCF per year, or 243 MMBF, with an annual harvest level of 243 MMBF in the first decade, and 1,056,136 acres identified as suitable for timber management. PNV for this benchmark is $1,230 million. Because of a lack of minimum viable fishery constraints, the anadromous fishery is projected to be reduced to remnant populations by the third decade. Elk winter range capacity is projected to vary from a low of 14,400 elk in decade 2 to 16,000 elk in decade 3.

9. Max PNV (Assigned Values) Variation 6 - 05C

This run is virtually the same as 06D: NDY/LTSYC link, full set of MMR constraints, and rotations restricted to 95 percent CMAI. In addition to these, this run has the additional constraint of a first decade ceiling of 155 MMBF with a sequential upper bound of 25 percent per decade.

Comparing this run to 06D will provide the opportunity cost of the harvest ceiling and 25 percent incremental increase constraint when applied with the NDY/LTSYC link harvest constraint and the full set of MMRs. The LTSYC in benchmark 05C was 50 MMCF per year, or 243 MMBF, with an annual harvest level in the first decade of 157 MMBF and 1,056,136 acres identified as suitable for timber management. PNV for this benchmark is $1,108 million. This benchmark shows only a 1 percent reduction in PNV due to the timber harvest floors and ceilings and sequential upper and lower bounds for the first five decades. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 18,100 elk in decade 5.

10. Max PNV (Assigned Values) Variation 7 - 05A

The purpose of this run was to determine the opportunity cost of linking the nondeclining flow over a 150-year planning horizon to the LTSYC level. This run is essentially the same as 05C with one exception. The nondeclining flow constraint is not linked to the LTSYC level. The result is a departure run, although the LTSYC is not linked with any other specific run, and the harvest level never comes down to the LTSYC level during the projected planning horizon.

By comparing this run to 05C, the opportunity costs of the LTSYC link can be determined. Even though this run is not a true departure analysis of 05C since the LTSYC levels are different, it does provide an opportunity to evaluate the potential impacts of a harvest schedule that departs from the nondeclining flow policy. The LTSYC in benchmark 05A was 48 MMCF per year, or 236 MMBF, with an annual first decade harvest level of 157 MMBF and 1,056,136 acres identified as

suitable for timber management. PNV for this benchmark is $1,174 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 14,900 elk in decade 1 to 17,100 elk in decade 3.

11. Max PNV (Assigned) Variation 8 - 12B

The purpose of this run is to analyze the opportunity costs of NDY/LTSYC link harvest constraint. Constraints common to this run and 06D are: rotations restricted to 95 percent CMAI and full set of MMR constraints. In this run, harvest constraints are sequential upper and lower bounds on the timber harvest and a ceiling on timber harvest in the first decade.

When this run is compared to 06D, it is possible to see the impacts of the NDY/LTSYC link constraint within the entire set of constraints that are common to both runs.

When this run is compared to 11C, the opportunity costs of rotations restricted to 95 percent CMAI are defined. When this run is compared to 16A, the opportunity cost of the Max PNV - market value objective function can be determined.

Also, comparing this run to 05A displays the opportunity cost nondeclining yield (NDY) without the long-term sustained yield capacity (LTSYC) link. Both runs are departures, but the presence of the NDY constraint in 05A results in a significantly different harvest schedule. The LTSYC level in benchmark 12B was 48 MMCF per year, or 234 MMBF, with an annual harvest level of 157 MMBF in the first decade and 1,055,324 acres identified as suitable for timber management. Present net value for this benchmark is $1,334 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,100 elk in decade 1 to 19,800 elk in decade 5.

12. Max PNV (Assigned) Variation 9 - 13A

The purpose of this run is to evaluate the opportunity costs of restricting the minimum rotation ages of timber stands to 95 percent CMAI in the stand. This run has several constraints that are also used in run 06D. They are NDY/LTSYC link constraints and the full set of MMR constraints. The difference between the two runs are the rotation ages for timber. In this run they are based on the minimum proposed utilization standards instead of 95 percent of CMAI as in 06D.

A comparison of this run with run 06D will show the opportunity costs of restrictions on rotation lengths. A comparison of this run and 11C will show the opportunity cost of the NDY/LTSYC link. A comparison of this run with 17A will show the opportunity cost of a Max PNV/market value objective function. The LTSYC level in benchmark 13A was 53 MMCF per year, or 256 MMBF, with an annual harvest level of 204 MMBF in the first decade and 1,054,262 acres identified as suitable for timber management. PNV for this benchmark is $1,149 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 18,800 elk in decade 5.

13. Max PNV (Assigned) Variation 10 - 11C

The purpose of this run is to evaluate the opportunity costs of the NDY/LTSYC link constraint when used with the following set of constraints: rotations based on minimum proposed utilization standards and the full set of MMR constraints. By comparing this run to 13A, the opportunity cost of the NDY/LTSYC link can be determined. In addition, the following comparisons can also be made: a) 11C to 12B shows the opportunity cost of rotations based on 95 percent CMAI; b) 11C to 06D shows the opportunity cost of a combination of rotations based on 95 percent CMAI and the NDY/LTSYC link; c) 11C to 02A shows a comparison of the opportunity costs of MMRs in the absence of rotations based on 95 percent CMAI and the NDY/LTSYC link; and d) 11C to 15A shows the opportunity cost of a Max PNV/market value objective function. The LTSYC level in benchmark 11C was 49 MMCF per year, or 230 MMBF, with an annual harvest level of 157 MMBF in the first decade and 1,055,324 acres identified as suitable for timber management. PNV for this benchmark is $1,348 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 19,500 elk in decade 5.

14. Max PNV (Market Values) Variation 11 - 16A

The purpose of this run is to evaluate the variation in outputs that result from maximizing PNV for market values only, given the same timber harvest constraints found in 12B: rotations restricted to 95 percent CMAI, sequential upper and lower bounds, harvest floors and ceilings, and MMRs. A comparison of this run with 18A will show the opportunity cost of the NDY/LTSYC link. By comparing 16A to 15A, the opportunity cost of a rotation based on 95 percent CMAI is defined. A comparison of 16A and 12B will show the opportunity cost of a Max PNV/market value objective function. The LTSYC level in benchmark 16A was 48 MMCF per year, or 236 MMBF, with an annual harvest level of 157 MMBF in the first decade and 1,055,324 acres identified as suitable for timber management. PNV for this benchmark is $1,320 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 12,400 elk in decade 1 to 16,700 elk in decade 5.

15. Max PNV (Market Values) Variation 12 - 17A

The purpose of this run is to evaluate the variation in outputs that results from maximizing only the PNV of those outputs which have an established market value (timber and range) in FORPLAN. The harvest constraints, rotation lengths, and MMRs are identical to run 13A. A comparison of this run to 13A will display changes resulting from valuing market outputs only in the FORPLAN model. In addition, the following comparisons can also be made: a) 17A to 18A defines the opportunity costs of rotations based on 95 percent CMAI; b) 17A to 15A shows the opportunity cost of the NDY/LTSYC link. The LTSYC level in benchmark 17A was 53 MMCF per year, or 256 MMBF, with an annual harvest level of 204 MMBF in the first decade and 1,053,136 acres were identified as suitable for timber management. PNV for this benchmark is $1,127 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 12,400 elk in decade 1 to 16,100 elk in decade 5.

16. Max PNV (Market Values) Variation 13 - 15A

This run is identical to run 17A, except that the harvest constraints are 25 percent sequential upper and lower bounds by decade with a first decade ceiling of 155 MMBF.

One purpose of this run is to evaluate the opportunity cost of the nondeclining yield/long-term sustained yield capacity (NDY/LTSYC) link when using an objective function to maximize only market outputs. This can be done by comparing this run to run 17A.

A second purpose is to analyze the impacts on outputs resulting from valuing only market outputs given a constant set of harvest constraints and minimum management requirements (MMR). A comparison of this run to 11C will display these results.

Third, a comparison of 15A to 16A will show the opportunity cost of rotations based on 95 percent culmination of mean annual increment (CMAI).

Fourth, a comparison of 15A to 18A will show the opportunity cost of the NDY/LTSYC link and rotations based on 95 percent CMAI. The LTSYC level in benchmark 15A was 49 MMCF per year, or 236 MMBF, with an annual harvest level of 159 MMBF in the first decade and 1,055,324 acres identified as suitable for timber management. Present net value (PNV) for this benchmark is $1,340 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 12,400 elk in decade 1 to 16,600 elk in decade 5.

17. Max PNV (Market Values) Variation 14 - 18A

This run has the same constraints as run 06D. The only change is that only the market outputs (timber and range) included in FORPLAN are maximized by the objective function. This run serves four purposes:

One purpose is to display the opportunity cost of restricting rotations to 95 percent CMAI when compared to run 17A. A second purpose is to show the differences that result when the outputs valued in the objective function are limited to timber and range. This comparison can be made by using run 06D. Third, the run shows the opportunity cost of the NDY/LTSYC link when compared with 16A; and fourth, it shows the opportunity cost of the combination of the NDY/LTSYC link and rotations based on 95 percent CMAI when compared to 15A. The LTSYC level in benchmark 18A was 51 MMCF per year, or 243 MMBF, with an annual harvest level of 196 MMBF in the first decade and 1,056,136 acres identified as suitable for timber management. PNV for this benchmark is $1,114 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 12,400 elk in decade 1 to 16,000 elk in decades 3 and 5.

18. Max PNV (Assigned Values) - 99C

The purpose of this run is to evaluate and analyze the changes that result when timber yields are derived using current utilization standards. The constraints

used in this run are identical to run 05C: timber harvest in decade 1 is limited to 155 MMBF, NDY/LTSYC link, full set of MMR constraints, and rotations based on 95 percent CMAI.

Comparing this run to 05C will show the changes that result when timber yields are derived from timber yield tables based on current utilization standards versus proposed utilization standards. The LTSYC level in benchmark 99C was 50 MMCF per year, or 242 MMBF, with an annual harvest level of 160 MMBF in the first decade and 1,056,136 acres identified as suitable for timber management. PNV for this benchmark is $1,093 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 18,100 elk in decade 5.

19. Max Timber Benchmark - 21C

This benchmark is designed to measure the maximum capability of the Forest to produce timber on the tentatively suitable lands within the following constraints: sequential upper and lower bounds of 25 percent on timber harvest between decades, first decade ceiling of 155 MMBF, full set of MMR constraints, and rotations based on minimum proposed utilization standards. The objective function was to maximize timber for the first five decades in the initial run. The harvest levels in the first five decades were identical to those in Max PNV benchmark 11C which also had identical constraints. Based on this observation, it was concluded that rerunning Max timber, with the timber harvest level locked in for decades 1 through 5 and an objective function of Max PNV, would produce the same results as run 11C. Max PNV benchmark 11C therefore was analyzed as the Max timber benchmark with an objective function of Max PNV.

Comparisons of this run to the maximum resource output runs will show the differences that result when different resource outputs are maximized. The LTSYC level in benchmark 21C was 49 MMCF per year, or 230 MMBF, with an annual harvest level of 157 MMBF in the first decade and 1,055,324 acres identified as suitable for timber management. PNV for this benchmark is $1,348 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 15,000 elk in decade 1 to 19,500 elk in decade 5.

20. Max Range Benchmark - 22Y

The purpose of this benchmark is to establish the maximum level of forage production for domestic grazing on areas outside of classified areas. The following constraints are applied to this benchmark: sequential upper and lower bounds of 25 percent on timber harvest between decades, first decade ceiling of 155 MMBF, full set of MMR constraints and rotations based on minimum, and proposed utilization standards. The LTSYC level in benchmark 22Y was 49 MMCF per year, or 238 MMBF, with an annual harvest level of 157 MMBF in the first decade and 1,055,130 acres identified as suitable for timber management. PNV for this benchmark is $1,239 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 12,400 elk in decade 1 to 17,200 elk in decade 5.

Two iterations of this benchmark were run. The first had an objective function to maximize domestic range outputs for the first five decades. The resulting levels were then locked in as constraints and a run was made with an objective function to maximize PNV (assigned values).

Comparing this run to run 11C will show the differences that result when range outputs are maximized versus maximizing PNV.

Also, comparisons of this run with 11C and 23Y (Max elk) will show changes resulting from objective functions maximizing timber and elk.

21. Max Elk Benchmark - 23Y

The purpose of this benchmark is to establish the maximum potential for elk based on the condition and availability of winter range. This analysis assumes that winter range is the limiting factor on elk production. Constraints applied to this benchmark were: sequential upper and lower bounds of 25 percent on timber harvest between decades, first decade ceiling of 155 MMBF per year, full set of minimum management requirement constraints, and rotations based on minimum proposed utilization standards. The objective function of the initial run was to maximize elk for the first 5 decades. The resulting elk values were then locked in as constraints and another run made to maximize present net value (assigned values).

Comparing this run to 11C will show the changes due to maximizing elk versus maximizing PNV (assigned values).

Also, comparisons of this run with runs 11C and 22Y (Max range) will show the differences that result when objective functions are Max timber or Max range. The LTSYC level in benchmark 23Y was 46 MMCF per year, or 227 MMBF, with an annual harvest level of 163 MMBF in the first decade and 1,003,057 acres identified as suitable for timber management. PNV for this benchmark is $1,310 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 21,200 elk in decade 1 to 34,800 elk in decade 3.

22. Max Wilderness Benchmark - 24D

This benchmark is designed to measure the effects on resource outputs if all current inventoried roadless areas on the Forest were classified as wilderness. The constraints for this run are the same as run 05C, with the exception of excluding the 503,162 acres of current roadless areas from controllable use.

Comparison of this run with 05C shows the opportunity cost of managing roadless areas for wilderness. The LTSYC level in benchmark 24D was 30 MMCF per year, or 147 MMBF, with an annual harvest level of 132 MMBF in the first decade and 665,772 acres identified as suitable for timber management. PNV for this benchmark is $1,074 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 11,800 elk in decade 1 to 15,500 elk in decade 5.

23. Current Management - 20A

This benchmark was designed to show the levels of outputs that would be produced on the Forest if current direction, as stated in existing management plans and policies, was followed. Under this benchmark, current direction concerning the management of all resources was evaluated and used to produce a set of constraints aimed at reflecting that direction. Specifically, timber was constrained to rotations based on 95 percent of CMAI and NDY/LTSYC link. Permanent browse burning was applied to 500 acres annually, and all MMRs are applied. This run is not constrained by budget and does show changes in resource outputs over time. When compared with run 05C, it shows the opportunity cost of operating at current management. The LTSYC level in benchmark 20A was 39 MMCF per year, or 190 MMBF, with an annual harvest level of 187 MMBF in the first decade and 826,052 acres were identified as suitable for timber management. PNV for this benchmark is $980 million. Anadromous fisheries are maintained at the minimum viable level, which is projected to reduce outputs to 72 percent of potential in the third decade. Elk winter range capacity is projected to vary from a low of 18,700 elk in decade 1 to 23,700 elk in decade 3.

24. Minimum Level - 19A

This run specifies the minimum level of management which would be needed to maintain the Forest in Federal ownership, and the management needed for uncontrollable outputs and uses. It is also used as a reference point in alternative comparisons along with 06D (Max PNV). Only the minimum level prescription was applied to analysis areas, and costs reflect only the fixed cost of Federal ownership. Uncontrollable outputs such as recreation, wildlife, and anadromous fish are valued in this run. When compared to run 05C, this run shows the opportunity costs of operating at minimum level. Benchmark 19A reduces the timber harvest to 0 MMBF in the first decade. The PNV for this benchmark is $325 million, the lowest value in the analysis. Fishery habitat would recover to a level of approximately 90 percent of potential, supporting the largest populations of anadromous fish of any benchmark or alternative. Elk winter range capacity is projected to vary from a low of 14,400 elk in decade 1 to 16,000 elk in decade 3.

D. Benchmark Analysis - Summary of Opportunity Costs Associated With Modeling Constraints

The monetary tradeoffs of the management opportunities explored during the analysis of the management situation (AMS) can be determined by comparing the benchmarks described in Section C. Monetary tradeoffs are limited to priced benefits. In this section, the tradeoffs of timber harvest floors and ceilings, minimum management requirements, timber policy constraints, market vs. assigned values, additional timber modeling constraints, providing maximum resource outputs, current direction, and the minimum level are discussed. Note that the "opportunity cost" reference points vary in the benchmark discussion. Alternative comparisons will use benchmark 06D as a common reference point.

1. Opportunity Cost of Timber Harvest Floors and Ceilings

An initial comparison of benchmarks was performed to portray the opportunity cost of limiting timber harvest to reasonable levels, given an unconstrained set of

management constraints modeled in FORPLAN. The results of this analysis showed that while first decade timber harvests are reduced from 609 MMBF to 156 MMBF, the LTSYC increased by 2 MMBF when a large increase in timber harvests is deferred to later decades. However, PNV is decreased 20 percent ($373 million) because the contribution to discounted timber benefits is also deferred. These benchmarks represent absolute timber resource potentials since no other resources were protected as minimum management requirements.

- Runs compared: 03A (PNV $1,859,580,000)
  02A (PNV $1,487,075,000)

  Opportunity cost: $372,505,000 (20 percent reduction)

PNV is reduced by 20 percent due to a constraint on first decade harvest equal to or less than current mill capacity (155 MMBF).

2. Opportunity Cost of Minimum Management Requirements (MMRs)

The tradeoffs associated with MMRs were analyzed by comparing the opportunity costs of benchmarks 02A, 04B, 06D, 08E, 09C, 20C, and 11C. First, each MMR was analyzed separately in FORPLAN in order to determine its opportunity cost, then they were applied as a set to determine the net effect. In addition, the opportunity costs of MMRs was analyzed using the timber policy constraints of timber harvest floors and ceilings, sequential upper and lower bounds, and rotations based on utilization standards. The analysis showed that when applied separately, MMRs for riparian areas and old growth had only minor changes in PNV of less than 1 percent and 2 percent respectively ($8 million, $29 million), and no significant change in the LTSYC or first decade harvest (243-246 MMBF). The major response of applying these MMRs was to limit the harvest in both riparian areas and inventoried old-growth stands, which was made up for by harvest on other tentatively suitable lands. Application of the fishery/water quality MMR constraints did show a significant reduction in PNV of $112 million, or 9 percent, and is attributable to timber harvesting on the most cost-efficient lands during the earlier planning periods. This is in response to the constraint which limits timber harvest in analysis areas over 400 acres to 10 percent per decade for the first 4 decades. When all MMRs were analyzed, PNV was reduced 11 percent ($140 million) and LTSYC by only 3 MMBF (246-243 MMBF). This reduction in PNV represents the opportunity cost of managing the Forest for optimum market outputs, especially timber, while still providing for minimum management requirements. When the timber policy requirements were relaxed in benchmark 11C, the opportunity cost of MMRs was $140 million, but represented only a 9-percent reduction from the base level (benchmark 02A). This is in response to a gradual increase in timber harvests throughout the planning horizon, above the LTSYC level.

a. Fishery/Water Quality Objectives

- Runs compared: 04B (PNV $1,259,512,,000)
  08E (PNV $1,147,544,000)

  Opportunity cost: $111,968,000 (9 percent reduction)

PNV is reduced 9 percent by the accessibility constrairts which address the size of openings, water yield, water quality, and fishery objectives for minimum

viable population MMRs. Constraints on timber harvest acres in the first two decades for the fishery MMRs were not analyzed here because they were not constraining on the FORPLAN model and had no opportunity cost.

b. Riparian Area Objectives

- Runs compared: 04B (PNV $1,259,512,000)
  10C (PNV $1,251,119,000)

  Opportunity cost: $8,393,000 (<1 percent reduction)

PNV is reduced less than 1 percent for the harvest constraint on inventoried riparian areas in FORPLAN. This constraint has the least impact on PNV of any of the constraints used to model MMRs. However, riparian areas are further protected by standards and guidelines built into the management prescriptions applied to all riparian areas.

c. Old-Growth Objectives

- Runs compared: 04B (PNV $1,259,512,000)
  09C (PNV $1,230,110,000)

  Opportunity cost: $29,402,000 (2 percent reduction)

PNV is reduced 2 percent by the inclusion of restricted timber harvest entry dates to model old-growth habitat MMRs. Old-growth habitat is further protected by standards and guidelines built into the management prescriptions applied to all existing and replacement old-growth areas.

d. All MMRs

- Runs compared: 04B (PNV $1,259,512,000)
  06D (PNV $1,119,678,000)

  Opportunity cost: $139,834,000 (11 percent reduction)

PNV is reduced 11 percent by the combination of constraints from runs 08E, 10C, and 09C used to model MMRs under the NDY/LTSYC link and rotations based on 95 percent CMAI timber policy guidelines.

- Runs compared: 02A (PNV $1,487,075,000)
  11C (PNV $1,347,525,000)

  Opportunity cost: $139,550,000 (9 percent reduction)

PNV is reduced 9 percent by the combination of constraints from runs 08E, 10C, and 09C used to model MMRs under the timber harvest floors and ceilings, sequential upper and lower bounds, and rotations based on utilization standards and timber policy guidelines.

3. Opportunity Cost of Timber Policy Constraints

The impacts of timber policy constraints were analyzed to determine their impact on PNV. Two constraints, nondeclining yield/long-term sustained yield capacity

(NDY/LTSYC) link and rotations based on 95 percent of culmination of mean annual increment (CMAI), were applied to the FORPLAN model separately to determine their opportunity cost and then as a set to determine the net effect. The results of this analysis show that when analyzed together, the NDY/LTSYC link and CMAI constraints have a significant impact on present net value (PNV) ($228 million - 17 percent) when applied in conjunction with minimum management requirements (MMR) and a Max PNV assigned value objective function. Besides the opportunity cost for land withdrawals in the Max wilderness benchmark (24D), this represents the most significant decrease in PNV of any constraint analyzed. Reductions in timber harvest to levels at or below the LTSYC level account for the decrease in PNV, although the LTSYC level is increased (230-243 MMBF) under this scenario. The major factor in this decrease is the NDY/LTSYC link which, by itself, reduces PNV by 16 percent ($214 million). The reduction due to CMAI is minimal ($29 million) at 3 percent. Analysis also shows that when other constraints are released (i.e., rotations based on utilization standards, sequential upper and lower bounds), the effects are even less (see following descriptions).

In conjunction with this analysis, the opportunity costs of further timber policy constraints were analyzed to determine the effects on PNV. A reduction of 1 percent ($12 million) was attributable to limiting timber harvest in the first two decades to levels which would not disrupt local economic impacts. This reduced first decade timber harvest from 196 MMBF to 157 MMBF, and second decade timber harvest from 243 MMBF to 198 MMBF. NDY without the LTSYC link reduced PNV by 12 percent ($160 million), due to a substantial increase projected in timber harvests in the fourth through eighth decades. When NDY is not linked to the LTSYC level, PNV is reduced 6 percent, or $66 million. An analysis of rotations based on utilization standards vs. 95 percent CMAI shows only minimal changes in PNV ($15 million - 1 percent).

a. NDY/LTSYC Link

- Runs Compared: 12B (PNV $1,333,675,000)
  06D (PNV $1,119,678,000)

  Opportunity cost: $213,997,000 (16 percent reduction)

Present net value is reduced 16 percent by applying the NDY/LTSYC link in conjunction with timber rotations based on 95 percent CMAI, MMR constraints, and a Max PNV/assigned value objective function.

- Runs Compared: 16A (PNV $1,320,298,000)
  18A (PNV $1,113,776,000)

  Opportunity cost: $206,522,000 (16 percent reduction)

Present net value is reduced 16 percent by applying the NDY/LTSYC link in conjunction with timber rotations based on 95 percent CMAI, MMR constraints, and a Max PNV/market value objective function.

- Runs Compared: 11C (PNV $1,347,525,000)
  13A (PNV $1,148,964,000)

  Opportunity cost: $198,561,000 (15 percent reduction)

PNV is reduced 15 percent by applying the NDY/LTSYC link in conjunction with timber rotations based on utilization standards, MMR constraints, and a Max PNV/ assigned value objective function.

- Runs Compared: 15A (PNV $1,339,579,000)
  17A (PNV $1,127,039,000)

  Opportunity cost: $212,540,000 (16 percent reduction)

PNV is reduced 16 percent by applying the NDY/LTSYC link in conjunction with timber rotations based on utilization standards, MMR constraints, and a Max PNV/ market value objective function.

b. Rotations Based on 95 Percent CMAI

- Runs Compared: 13A (PNV $1,148,964,000)
  06D (PNV $1,119,678,000)

  Opportunity cost: $29,286,000 (3 percent reduction)

PNV is reduced 3 percent by applying the 95 percent CMAI constraint in conjunction with NDY/LTSYC link, MMR constraints, and a Max PNV/assigned value objective function. Benchmark 06D provides the basis for comparison of alternative runs to determine the opportunity costs of the various goals and objectives.

- Runs Compared: 11C (PNV $1,347,525,000)
  12B (PNV $1,333,675,000)

  Opportunity cost: $13,850,000 (1 percent reduction)

PNV is reduced 1 percent by applying the 95 percent CMAI constraint in conjunction with timber harvest floors and ceilings, sequential upper and lower bounds, MMR constraints, and a Max PNV/assigned value objective function.

- Runs Compared: 15A (PNV $1,339,579,000)
  16A (PNV $1,320,298,000)

  Opportunity Cost: $19,281,000 (1 percent reduction)

PNV is reduced 1 percent by applying the 95 percent CMAI constraint in conjunction with timber harvest floors and ceilings, sequential upper and lower bounds, MMR constraints, and a Max PNV/market value objective function.

- Runs Compared: 17A (PNV $1,127,039,000)
  18A (PNV $1,113,776,000)

  Opportunity Cost: $13,263,000 (1 percent reduction)

PNV is reduced 1 percent by applying the 95 percent CMAI constraint in conjunction with NDY/LTSYC link, MMR constraints, and a Max PNV/market value objective function.

c. Combinations of NDY/LTSYC Link and 95 Percent CMAI

- Runs Compared: 02A (PNV $1,487,075,000)
  04B (PNV $1,259,512,000)

  Opportunity Cost: $227,563,000 (15 percent reduction)

PNV is reduced 15 percent by applying the 95 percent CMAI and NDY/LTSYC link constraints in the absence of MMRs.

- Runs Compared: 11C (PNV $1,347,525,000)
  06D (PNV $1,119,678,000)

  Opportunity Cost: $227,847,000 (17 percent reduction)

PNV is reduced 17 percent by applying the 95 percent CMAI and NDY/LTSYC link constraints in conjunction with MMR constraints and a Max PNV/assigned value objective function. Benchmark 06D provides the basis for comparison of alternative runs to determine the opportunity costs of the various goals and objectives.

- Runs Compared: 15A (PNV $1,339,579,000)
  18A (PNV $1,113,776,000)

  Opportunity Cost: $225,803,000 (17 percent reduction)

PNV is reduced 17 percent by applying the 95 percent CMAI and NDY/LTSYC link constraints in conjunction with MMR constraints and a Max PNV/market value objective function.

d. Timber floors and ceilings, sequential upper and lower bounds

- Runs Compared: 06D (PNV $1,119,678,000)
  05C (PNV $1,108,033,000

  Opportunity Cost: $11,645,000 (1 percent reduction)

PNV is reduced 1 percent by constraining timber harvest with a first decade ceiling of 155 MMBF and sequential upper and lower bounds of 25 percent for the first five decades, assuming common constraints of rotations based on 95 percent CMAI, MMR constraints, and NDY/LTSYC link. The reason this constraint is considered is to show the opportunity cost of timber harvest constraints to insure run 05C is technically implementable with respect to timber utilization by the local industry. Benchmark 06D provides the basis foı omparison of

alternative runs to determine the opportunity costs of the various goals and objectives.

e. LTSYC Link

- Runs Compared: 05A (PNV $1,174,135,000)
  05C (PNV $1,108,133,000)

  Opportunity Cost: $66,102,000 (6 percent reduction)

PNV is reduced 6 percent when the NDY of timber harvest is not linked to the LTSYC level, given common constraints of rotations based on 95 percent CMAI, and MMR constraints.

f. NDY

- Runs Compared: 12B (PNV $1,333,675,000)
  05A (PNV $1,174,135,000)

  Opportunity Cost: $159,540,000 (12 percent reduction)

PNV is reduced 12 percent when a timber harvest constraint of NDY is applied independently of the LTSYC link. These runs are compared with common constraints of MMR constraints and rotations based on 95 percent CMAI.

g. Utilization Standards

- Runs Compared: 05C (PNV $1,108,133,000)
  99C (PNV $1,092,668,000)

  Opportunity Cost: $15,465,000 (1 percent reduction)

PNV is reduced only 1 percent when current utilization standards for merchantable timber are substituted for proposed regional standards, given common constraints of rotations based on 95 percent CMAI, MMR constraints, NDY/ LTSYC link, and timber ceilings for the first five decades.

4. Opportunity Cost of Valuing Market Values Only

The sensitivity of land assignments and output schedules to assigned values of nonmarket resources is determined by comparing Benchmarks 06D, 11C, 13A, 15A, 16A, 17A, and 18A. The only difference between the benchmarks are the values of dispersed recreation, wildlife, and anadromous sport fishing.

In general, land assignment and output schedules are not sensitive to these values.

- Runs Compared: 11C (PNV $1,347,525,000)
  15A (PNV $1,339,579,000)

  Opportunity Cost: $7,946,000 (less than 1 percent reduction)

PNV is reduced less than 1 percent when only market values are valued in the objective function, in conjunction with timber harvest floors and ceilings,

sequential upper and lower bounds, MMR constraints, and rotations based on utilization standards.

- Runs Compared: 13A (PNV $1,148,964,000)
  17A (PNV $1,127,039,000)

  Opportunity Cost: $21,925,000 (2 percent reduction)

PNV is reduced 2 percent when only market values are valued in the objective function, in conjunction with NDY/LTSYC link, MMR constraints, and rotations based on utilization standards.

- Runs Compared: 12B (PNV $1,333,675,000)
  16A (PNV $1,320,298,000)

  Opportunity Cost: $13,377,000 (1 percent increase)

PNV is increased 1 percent when only market values are valued in the objective function, in conjunction with timber harvest floors and ceilings, sequential upper and lower bounds, MMR constraints, and rotations based on 95 percent CMAI.

- Runs Compared: 06D (PNV $1,119,678,000)
  18A (PNV $1,113,776,000)

  Opportunity Cost: $5,902,000 (less than 1 percent reduction)

PNV is reduced less than 1 percent when only market values are valued in the objective function, in conjunction with the NDY/LTSYC link, MMR constraints, and rotations based on 95 percent CMAI. Benchmark 06D provides the basis for comparison of alternative runs to determine the opportunity costs of the various goals and objectives.

5. Opportunity Costs of Maximum Resource Output, Minimum Level, and Current Direction Benchmarks

An analysis of maximum resource outputs was conducted to define the opportunity costs of these resources, and to determine maximum resource potentials. These runs were compared using common constraints of: rotation based on utilization standards, sequential upper and lower bounds, and minimum management requirements (MMR). The Max timber benchmark showed that by maximizing timber harvest through a departure from the long-term sustained yield capacity (LTSYC), both timber and present net value (PNV) could be maximized on the Forest. The reason for this relationship is the fact that timber constitutes the single most valuable resource in terms of priced benefits. In this run, net timber benefits account for 81 percent of total PNV, and harvest levels vary from 157 to 534 MMBF. In addition, both elk and livestock forage are maintained at high levels.

The minimum level benchmark defines the costs and benefits which can be attributed to operating the Forest in the absence of producing controllable outputs such as timber, range, etc. Management under this benchmark reduces PNV by 76 percent ($1,028 million), and essentially terminates all market outputs (except commercial anadromous fishery). The discounted cost of this run, $51 million, represents the cost of maintaining the Forest in public ownership.

Anadromous fishery habitat is maximized in this benchmark because of the termination of land-disturbing activities.

Both the Max range and Max wildlife benchmarks have only minor effects on PNV ($109 million and $38 million), due to the compatibility of managing for high timber harvest levels and production of suitable forage on transitory range. While timber harvest levels in both of these runs are not appreciably different from the Max timber benchmark, both livestock forage and wildlife forage are increased substantially from other benchmark runs and current levels. The Max range benchmark produces available forage for 82 thousand animal unit months (MAUM) per year in the first decade, projected up to 87 MAUM per year by the third decade. This represents a 102- to 114-percent increase in outputs over the current situation. The opportunity cost of this run is $109 million (8 percent reduction) primarily because of a substantial reduction in wildlife benefits. The Max wildlife benchmark produces from 21,000 to 35,000 elk on winter range (including wilderness). This represents a 75- to 292-percent increase above current levels. The opportunity cost of this run is $38 million, or 3 percent, and represents a decrease in range benefits.

The opportunity cost of maximizing wilderness on the Forest was analyzed to determine the impacts of this management scenario. Under this benchmark, all 503,162 acres of current roadless areas were assigned to wilderness management, which effectively reduces the suitable timber acres by 37 percent (665,772 acres). The results of this run show that PNV is reduced $274 million (20 percent), more than any other factor analyzed in the benchmarks. Timber harvest levels are reduced significantly. The LTSYC drops from 230 MMBF to 135 MMBF, and first decade timber harvest decreases from 157 MMBF to 132 MMBF. These levels are projected to increase in later decades, however, as the harvest levels depart from the LTSYC. Both livestock and wildlife forage are maintained at reasonable levels, although some reduction is evident because of the decrease in cutover lands. Recreation benefits are increased to their highest level in this run ($363 million), because of the shift to wilderness recreation.

The current direction benchmark illustrates the tradeoffs which occur by continuing management under current land use plans and direction, and in the absence of budget constraints. The PNV of this run is reduced significantly by 27 percent ($368 million), primarily because current direction calls for timber management on only 826,052 acres, which reduces the LTSYC level from 230 to 190 MMBF. Both wildlife and livestock forage are maintained at moderate levels.

a. Max Timber

- Runs Compared: 11C - This run is both the max timber and max PNV benchmark (PNV $1,347,525,000)

Opportunity Cost: 0

b. Minimum Level

- Runs Compared: 11C (PNV $1,347,525,000)
  19A (PNV $324,638,000)

  Opportunity Cost: $1,022,887,000 (76 percent reduction)

PNV is reduced 76 percent when all controllable outputs on the Forest are terminated.

c. Max Range

- Runs Compared: 11C (PNV $1,347,525,000)
  22Y (PNV $1,238,736,000)

  Opportunity Cost: $108,789,000 (8 percent reduction)

NV is reduced 8 percent when range resources (AUMs) are maximized in the objective function.

d. Max Wildlife

- Runs Compared: 11C (PNV $1,347,525,000)
  23Y (PNV $1,309,583,000)

  Opportunity Cost: $37,942,000 (3 percent reduction)

.V is reduced 3 percent when wildlife resources (elk) are maximized in the ›jective function.

e. Max Wilderness

- Runs Compared: 11C (PNV $1,347,525,000)
  24D (PNV $1,073,473,000

  Opportunity Cost: $274,052,000 (20 percent reduction)

PNV is reduced 20 percent when all existing roadless areas are assigned to wilderness use.

f. Current Management

- Runs Compared: 11C (PNV $1,347,525,000)
  20A (PNV $979,601,000)

  Opportunity Cost: $367,924,000 (27 percent reduction)

PNV is reduced 27 percent when lands are assigned to uses described in present management plans and direction.

Figure B-1 summarizes the comparison of benchmarks with respect to the opportunity costs of timber policy and management constraints.

Figure B-1
Summary of Major Modeling Constraints and Opportunity Costs Explored in the Benchmarks

1. Timber Harvest Floors and Ceilings

03A (PNV = $1860 million)

↓ Timber Harvest Floors and Ceilings in First Decade - $373 million

02A (PNV = $1487 million)

2. Minimum Management Requirements

04B (PNV = $1260 million)

- Fisheries/ Water Quality Objectives - $112 million → 08E (PNV = $1148 million)
- Riparian Area Objectives - $8 million → 10C (PNV = $1251 million)
- Old-Growth Objectives - $29 million → 09C (PNV = $1230 million)
- All MMR's - $140 million → 06D (PNV = $1119 million)

3. Timber Policy Constraints

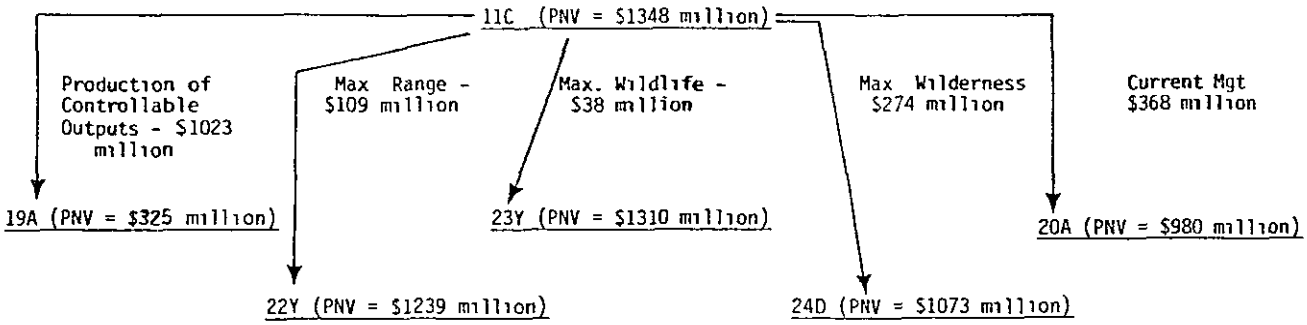
See narrative description.

4. Market vs. Assigned Values

See narrative description.

Figure B-1 (Continued)
Summary of Major Modeling Constraints and Opportunity Costs Explored in the Benchmarks

5. Maximum Resource Outputs



E. Resource Relationships

1. Timber Harvest/Roadless and Wilderness Management

Timber harvest levels and roadless/wilderness management are inversely related. The mix of resources which maximizes PNV (06D) is no additional roadless/wilderness and 100 percent of the potential timber harvest (243 MMBF). As the roadless/wilderness acreage is increased above the minimum, the efficient level of harvest over 150 years decreases. When roadless/wilderness acreage is maximized (503,162 acres), the efficient level of timber output is 147 MMBF, or 60 percent of the potential.

2. Timber Harvest/Livestock Forage

Creating livestock forage with timber harvest could increase livestock grazing potential from 40 MAUM to 87 MAUM. The mix of timber harvest and livestock forage which maximizes PNV for assigned values is 100 percent of the timber potential (243 MMBF) and 57 percent of livestock potential (50 MAUM). Anticipated livestock use is expected to increase to 51.3 MAUM by 2030.

3. Timber Harvest/Elk Forage

Creating elk forage with timber harvest could increase elk habitat potential from 12,000 elk to 35,000 elk. The mix of timber harvest and elk forage which maximizes PNV for assigned values is 100 percent of the timber harvest potential (243 MMBF) and 54 percent of the elk potential (19,000 elk). Maximizing elk forage reduces the amount of efficient timber harvest to 93 percent of the potential (227 MMBF).

4. Timber Harvest/Anadromous Fishery Habitat

Timber harvest levels directly affect anadromous fishery habitat by the adverse impact of roadbuilding on stream habitat. Timber harvest was limited in all benchmarks to habitat to support minimum viable populations of anadromous fish. The mix of timber harvest and anadromous fish habitat which maximizes PNV is 100 percent of the timber harvest potential (243 MMBF) and 72 percent of anadromous fish habitat potential. Maximum anadromous fish potential is attained at the minimum level (90 percent), where timber harvest is discontinued.

5. Livestock Forage/Elk Forage

Both livestock forage and elk winter range forage are increased with timber harvest. However, both forage outputs cannot be maximized at the same time because of competition between livestock and elk for forage. The mix which maximizes PNV values is 54 percent of the elk forage potential and 57 percent of the livestock forage potential. Maximizing livestock forage reduces efficient elk forage to 34 percent of the potential. Maximizing elk forage reduces efficient livestock forage to 0 percent of the potential.

6. Livestock Forage/Roadless and Wilderness Management

Producing high levels of roadless areas and livestock forage is not possible because roadless management precludes creating transitory forage with timber harvest. The mix which maximizes PNV for assigned values is no additional roadless management and 57 percent of livestock forage (50 MAUM).

7. Elk Forage/Roadless Area and Wilderness Management

Elk forage production is decreased when roadless management is maximized because of the decrease in acres of timber harvest which create forage. The mix of resources which maximizes PNV for assigned values is 54 percent of the elk forage potential (19,000 elk) and no additional wilderness.

F. Production Potential

The benchmarks provide information about production and economic potential of the Forest. This section discusses the potential and efficient mix of resource outputs to meet the potential.

1. Economic Potential of Max PNV with Assigned Values (Benchmark 06D)

The maximum present net value (PNV) of the Forest is defined in the Max PNV benchmark (06D) with the following constraints: nondeclining yield and a link to the long-term sustained yield level (NDY/LTSYC), rotations based on 95 percent of the culmination of mean annual increment (95% CMAI), and minimum management requirements (MMRs). The PNV of this benchmark is $1,119 million. Other benchmarks analyzed had higher PNVs, but did not meet the timber policy and legal requirements to be considered in this analysis. Timber management is cost efficient on 99 percent of the tentatively suitable lands, or 1,056,136 acres. Timber harvests are approximately 234 MMBF per year. Eighty percent of the tentatively suitable lands are assigned to a timber emphasis, 8 percent are assigned to a wildlife emphasis, 9 percent are assigned to old-growth emphasis, and 3 percent are assigned to a riparian emphasis. A moderate level of elk and livestock forage is produced. Eventually, all tentatively suitable acres outside wilderness will be roaded.

2. Fixed Costs of Public Land Ownership (Benchmark 19A)

The cost of maintaining the Forest in public ownership, protecting existing facilities, and providing for uncontrollable outputs is $2.0 million. The major activities include:

- Facilities maintenance is reduced to levels which protect the incidental user.

- Fire suppression would be limited to preventing safety hazards and protecting adjacent landowners.

- Timber harvest, road construction, and livestock grazing activities are limited to completing current contracts.

The present value of the costs is $51 million and the distribution is:

General Administration	56 percent
Fire	18 percent
Maintenance	13 percent
Other	13 percent
Minerals	
Recreation trails	
Range, timber, road contracts	

Outputs which are incidental to management include timber and livestock grazing under contracts, recreation use, and elk forage. Recreation use would be restricted as trails, roads, and facilities are closed. Elk winter range forage potential would eventually stabilize at 15,000 elk as transitory range was not created. Anadromous fishery habitat would recover to levels reflecting 90 percent of the biological potential. The present value of these outputs is $376 million, of which virtually all is attributed to recreation and wildlife.

3. Timber Potential (Benchmark 21C)

The Forest has the ability to produce more timber than it is currently producing, but a substantial portion of the natural fishery resource would be foregone. The impact on fishery will be substantial due to necessary road construction and other sediment-producing activities. Significant losses in recreation user-days of elk hunting and significant losses in semiprimitive nonmotorized recreational opportunity would result. The imminent threat of mountain pine beetle could mean a shift toward harvesting of lodgepole pine stands in the short term. The Max timber benchmark, 11C, was modeled to address the capability of harvesting maximum yields of timber. This benchmark had constraints for: a first decade timber harvest ceiling of 155 MMBF, sequential upper and lower bounds of 25 percent of timber harvest in latter decades, rotations based on utilization standards, and MMRs. The first decade timber harvest is 157 MMBF and the LTSYC is 230 MMBF. Timber management is cost-efficient on 1,055,324 acres, or 99 percent of the tentatively suitable lands. Eighty percent of the tentatively suitable lands are assigned to a timber emphasis, 9 percent to a wildlife emphasis, 9 percent to old growth, and 2 percent to a riparian emphasis. A moderate level of elk and livestock forage is produced. The PNV is $1,348 million.

4. Anadromous Fishery (Benchmark 19A)

Annually, the Forest has the biological potential to produce 821,000 anadromous smolts (summer steelhead and spring chinook) and 423,000 catchable trout. The Forest currently has the potential to produce 705,000 anadromous smolts and 364,000 catchable trout.

Several factors influence the difference between what the Forest can produce and what it is producing. In the past, survival of smolts migrating to the sea has been very poor due to dams on the Snake and Columbia Rivers. Adults experience mortalities at dams and must also survive commercial and sport fishing in the ocean and on the Columbia River. Mortalities of wild anadromous stocks have resulted in steelhead runs at approximately 60 percent of potential and chinook runs at about 30 percent of potential in both the Salmon and Clearwater drainages.

The South and Middle Forks of the Clearwater River are presently providing only 55 percent of their total potential fish habitat, primarily due to instream sediment impacts still remaining from such past activities as placer mining and road construction. Other Forest streams are providing fish habitat varying from 77 percent to 99 percent of capacity.

Timber harvesting/road construction activities have the most significant detrimental effect on fishery habitat through accelerated sedimentation in stream channels. The effects on fishery can be minimized, however, by limiting the amount of sedimentation to levels which are tolerable to the fishery. This idea was modeled in FORPLAN through the use of analysis area accessibility constraints and acres of final timber harvest constraints aimed at providing for minimum viable levels of anadromous fishery habitat (see section VI, minimum management requirement "f"). The Max PNV benchmark is modeled using this MMR. The maximum potential for fishery habitat occurs in the Min Level Benchmark (19A) due to reduced sediment yields. Fishery outputs are projected to recover to the biological potential by the third decade. The PNV is $325 million, of which most of the benefits are for recreation and wildlife. This benchmark eliminates all controllable outputs, including timber harvesting.

5. Elk Winter Range Forage Potential (Benchmark 23Y)

The potential to provide needed forage exceeds the targets set for elk populations by Regionally-disaggregated targets. However, if other impacts on elk populations were projected as indicated by present policies such as hunting seasons, hunting regulations, and open road densities, then elk populations would never reach the desired levels.

The Forest will need to intensify road management for wildlife habitat protection and see that timber on winter-game ranges is rotated as frequently as possible.

The Max Elk Benchmark was modeled to show the capability of producing elk habitat on the Forest. This benchmark had constraints for managing for maximum elk habitat production, no livestock forage, a first decade timber harvest ceiling of 155 MMBF, sequential upper and lower bounds of 25 percent of timber harvest in latter decades, rotations based on utilization standards, and MMRs. This benchmark produces the highest levels of elk habitat, capable of supporting 21,000 elk on winter range in the first period, and 30,000 by the fifth period. The first decade timber harvest is 163 MMBF in the first decade, and the LTSYC is 227 MMBF. Timber management is cost-efficient on 1,003,057 acres, or 94 percent of the tentatively suitable lands. Wildlife is emphasized on 9 percent of the tentatively suitable lands, in response to the objective of maximizing elk forage. Eighty percent of the tentatively suitable lands are assigned to a timber emphasis, 9 percent are assigned to old growth, and 2 percent are assigned to a riparian emphasis. The PNV is $1,310 million.

6. Wilderness Potential (Benchmark 24D)

The roadless resource of the Nez Perce National Forest consists of 503,162 acres in 16 separate areas. All of the Forest's roadless areas are presently, by definition, eligible candidates for inclusion into the National Wilderness Preservation System. They range in size from 8,006 to 201,715 acres. Six adjoin existing wildernesses; these are the most likely candidates for wilderness classification. The others are smaller and more isolated. Most of these are near development activity of one kind or another; some are completely surrounded by roads. Two of these smaller areas contain established Research Natural Areas, and another contains a proposed Research Natural Area. Four of the roadless areas contain or are immediately adjacent to rivers in the National Wild and Scenic Rivers System. The cost to administer these areas as wilderness is accounted for in this analysis. The Max Wilderness Benchmark (24D) assigns all 503,162 acres to proposed wilderness. Along with existing Wilderness, Wild and Scenic Rivers, and Research Natural Areas, the total classified area would be 1,400,231 acres, or 63 percent of the total Forest lands. This benchmark is modeled with constraints for all roadless areas proposed for wilderness first decade timber harvest ceiling of 155 MMBF, sequential upper and lower bounds of 25 percent of timber harvest in latter decades, NDY/LTSYC, and MMRs. Timber in the first decade is only 132 MMBF, because of the substantial decrease in tentatively suitable lands. The LTSYC is 147 MMBF, and 665,772 acres were cost efficient for timber management, 98 percent of the tentatively suitable lands. Eighty-two percent of the tentatively suitable lands were assigned to a timber emphasis, 9 percent to a wildlife emphasis, 9 percent to old growth, and 2 percent to a riparian emphasis. This benchmark produces moderate levels of livestock and range forage. The PNV is $1,073 million.

7. Range Forage Potential (Benchmark 22Y)

Range forage potential is maximized by providing transitory range on cutover timberlands. This transitory range far exceeds the level that is reasonably demanded by users of forage attainments on the Forest. Under this benchmark, forage outputs range from 82,300 AUM per year in the first decade to 85,700 AUM per year in the fifth decade. This represents a 103- to 112-percent increase over current use (40,500 AUM). Because demand is not expected to increase substantially in the foreseeable future, and elk compete for this forage, all benchmarks and alternatives were modeled to attain levels of livestock forage production only indicative of demand. The Max Range Benchmark (22Y) had constraints for managing for maximum livestock forage production, a first decade timber harvest ceiling of 155 MMBF, sequential upper and lower bounds of 25 percent of timber harvest in latter decades, rotations based on utilization standards, and MMRs. First decade timber harvest is 157 MMBF with a LTSYC of 238 MMBF. Timber management is cost efficient on 1,055,130 acres, or 99 percent of the tentatively suitable lands. Eighty percent of the tentatively suitable lands are assigned a timber emphasis, which helps yield the high forage outputs. Nine percent are assigned a wildlife emphasis, 9 percent to old growth, and 2 percent to riparian. This benchmark yields low levels of elk forage, because of the objective to maximize livestock forage. The PNV is $1,239 million.

8. Dispersed Recreation Potential (Benchmark 02A)

Although not addressed specifically in this analysis, dispersed recreation opportunities are expected to shift in emphasis among benchmarks. The type of recreation opportunities will shift from semiprimitive to roaded natural in proportion to the roading of present roadless areas. In the same proportion, outfitter operations will decrease and users preferring primitive experiences will be limited to wilderness use. There will be a decreased need for trail maintenance in present roadless areas and an increased need for trail maintenance in classified areas. This pattern will be most obvious in alternatives which show an emphasis in timber development. Benchmark 02A provides the highest level of dispersed recreation. In this benchmark, 2,261,800 recreation visitor days of dispersed recreation are provided for annually by the fifteenth decade.

9. Resource and Economic Potential Under Current Management (Benchmark 20A)

Continuing current management on the Forest with no budget constraint provides for a moderate level of roadless, wilderness, livestock forage, and elk winter range forage. Timber harvest starts at 187 MMBF/year for the first decade, then increases to 190 MMBF/year for the remaining 14 decades. All 826,052 acres of the tentatively suitable timberland is defined as suitable for timber management. Of the 826,052 acres in the suitable timber base, 79 percent is assigned to the timber emphasis, 7 percent is assigned to the wildlife emphasis, 11 percent is assigned to the old-growth emphasis, and 3 percent is assigned to the riparian emphasis. The PNV is $980 million, reflecting the $139 million opportunity cost of operating at the current level.

Tables B-32, B-33, and B-34 summarize the outputs and effects of the benchmark analysis.

Table B-32

Land Assignments by Management Emphasis for Benchmarks

Table B-32
Land Assignments by Management Emphasis for Benchmarks
(Acres)

	Management Emphasis						
Benchmark	Timber	Research Natural Areas	Winter Range	Old-Growth	Recreation Areas (Middle-Fork)	Grazing	Riparian
021	921,916	9,725	108,297	0	8,802	44,624	31,518
03A	935,172	9,725	97,575	0	8,802	44,624	31,518
05A	927,693	9,725	11,468	94,160	8,802	44,425	30,804
05C	856,780	9,725	81,471	95,070	8,802	44,425	30,804
06D(Max.PNV)	860,579	9,725	77,672	95,070	8,802	44,921	30,804
08E	945,391	9,725	86,168	0	8,802	44,624	31,518
09C	868,425	9,725	69,826	95,070	8,802	44,425	30,804
10C	953,315	9,725	78,244	0	8,802	44,624	31,518
11C	844,741	9,725	93,608	94,160	8,802	44,425	30,804
12B	839,642	9,725	98,707	94,160	8,802	44,425	30,804
13A	856,528	9,725	81,723	95,070	8,802	44,425	30,804
15A	860,485	9,725	77,864	94,160	8,802	71,194	30,804
16A	856,545	9,725	81,804	94,160	8,802	71,194	30,804
17A	862,688	9,725	75,563	95,070	8,802	71,194	30,804
18A	863,118	9,725	75,133	95,070	8,802	71,194	30,804
19A(Min.Level)	0	0	0	0	0	0	31,656
20A	653,502	9,725	62,896	94,368	8,802	44,485	29,973
22Y	846,332	9,725	91,823	94,160	8,802	71,194	30,804
23Y	809,685	9,725	165,697	94,160	8,802	0	30,551
24D	546,445	9,725	41,393	59,685	8,802	26,349	24,633

Management Emphasis				
Wilder-ness	Wild & Scenic Rivers	Min. Level	Fishery and Recrea-tion	Visuals
865,826	13,459	96,800	0	0
865,826	13,459	96,266	0	0
865,826	13,459	94,605	0	0
865,826	13,459	94,605	0	0
865,826	13,459	94,109	0	0
865,826	13,459	95,454	0	0
865,826	13,459	94,605	0	0
865,826	13,459	95,454	0	0
865,826	13,459	95,417	0	0
865,826	13,459	95,417	0	0
865,826	13,459	94,605	0	0
865,826	13,459	68,648	0	0
865,826	13,459	68,648	0	0
865,826	13,459	67,836	0	0
865,826	13,459	67,836	0	0
0	0	2,069,311	0	0
865,826	13,459	202,750	100,810	14,371
865,826	13,459	68,459	0	0
865,826	13,459	103,062	0	0
1,315,079	13,459	55,397	0	0

Table B-33
Present Value Benefits and Costs for Resource Groups by Benchmarks
(Millions of 1978 Dollars)

Benchmark	Present Net Value	Present Value Benefits			
		Timber	Range	Recreation/ Wildlife	Other
02A	1487	1610	12	345	0
03A	1860	2403	12	293	0
04B	1260	1369	12	343	0
05A	1174	1293	12	345	0
05C	1108	1170	12	346	0
06D(Max.PNV)	1119	1223	12	348	0
08E	1148	1266	12	347	0
09C	1230	1348	12	343	0
10C	1251	1366	12	343	0
11C	1348	1481	12	347	0
12B	1334	1450	12	348	0
13A	1149	1275	12	348	0
15A	1340	1482	12	339	0
16A	1320	1451	12	340	0
17A	1127	1276	12	340	0
18A	1114	1223	12	340	0
19A(Min.Level)	325	0	0	376	0
20A	980	1001	12	358	0
22Y	1239	1475	12	244	0
23Y	1310	1419	12	367	0
24D	1074	1091	12	358	0

1/ The direct comparison of individual resource benefits and costs is misleading because not all costs are allocated to each resource, ie. the "other" cost category contains inseparable joint costs associated with several resources.

Present Value Costs				
Timber	Roads	Range	Recreation/ Wildlife	Other
124	243	4	12	96
275	460	4	13	96
118	232	5	12	96
114	249	5	12	96
104	204	5	12	96
116	233	5	12	96
122	242	5	12	96
118	242	5	12	96
119	238	5	12	96
127	253	5	12	96
124	239	5	12	96
122	250	5	12	96
127	253	5	12	96
123	255	5	12	96
122	265	5	12	96
116	232	5	12	96
0	4	0	1	45
94	184	5	13	96
127	252	5	12	96
122	252	0	18	96
105	167	5	15	96

Table B-34
Total Resource Production by Benchmarks -- Planned In Decade 1, Projected In Later Decades
(Outputs Other Than Nonperiodic are Average Annual Outputs)

Output/Activity	Unit of Measure	02A	03A	04B	05A	05C	06D	08E	09C
Wilderness Mgmt.	Thousand Acres	900.4	900.4	900.4	900.4	900.4	900.4	900.4	900.4
Elk Winter Range - Wilderness	Thousand Elk								
-DECADE 1		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
-DECADE 5		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
-DECADE 10		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
-DECADE 15		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Elk Winter Range - Nonwilderness	Thousand Elk								
-DECADE 1		6.7	6.6	6.6	6.6	6.7	6.7	6.7	6.6
-DECADE 5		4.0	17.7	5.1	5.9	7.2	8.1	8.2	5.1
-DECADE 10		15.3	4.4	11.8	5.8	13.3	11.2	7.9	15.8
-DECADE 15		3.1	3.0	4.7	3.3	4.8	4.7	4.3	4.3
Livestock Grazing Use	Thousand Animal Unit Months								
-DECADE 1		41.6	41.6	41.2	39.9	39.3	40.0	39.5	41.0
-DECADE 5		59.2	42.8	56.8	48.8	47.1	46.6	47.0	55.5
-DECADE 10		29.1	17.3	27.7	36.6	31.7	31.0	31.2	31.9
-DECADE 15		16.6	16.6	24.2	18.8	25.3	24.2	21.0	25.2
Timber - Suitable Acres	Acres	1056340	1056874	1057686	1056136	1056136	1056136	1057686	1056136
Long-Term Sustained Yield	Million Board Feet	238	236	246	236	243	243	250	243
Programed Sales Offered	Million Board Feet								
-DECADE 1		156	609	246	157	198	196	244	243
-DECADE 5		398	318	246	299	243	243	244	243
-DECADE 10		264	234	246	299	243	243	244	243
-DECADE 15		220	176	246	299	243	243	244	243
Anadromous	Thousand Smolts								
-DEDADE 1		705	291	705	705	705	705	705	705
-DECADE 5		492	0	492	492	492	492	492	492
-DECADE 10		492	0	492	492	492	492	492	492
-DECADE 15		492	0	492	492	492	492	492	492
Road Construction/ Reconstruction	Miles								
-DECADE 1		94	305	145	94	94	118	143	143
-DECADE 5		90	16	38	61	50	50	38	49
-DECADE 10		13	12	12	15	12	12	13	12
-DECADE 15		10	9	12	15	12	12	12	12
Present Value									
-Benefits (4%)	Thousand $	1971285.0	2711264.0	1727652.0	1654565.0	1532911.0	1582119.0	1629685.0	1707649.0
-Costs (4%)	Thousand $	480010.0	848173.0	463939.0	476230.0	420678.0	462442.0	477911.0	473339.0
Present Net Value -- Market/Nonmarket (4%)	Thousand $	1491275.0	1863090.0	1263712.0	1178335.0	1112233.0	1119678.0	1151774.0	1234310.0

Table B-34 (Continued)
Total Resource Production by Benchmarks -- Planned In Decade 1, Projected In Later Decades
(Outputs Other Than Nonperiodic are Average Annual Outputs)

Output/Activity	Unit of Measure	10C	11C	12B	13A	15A	16A	17A	18A
Wilderness Mgmt.	Thousand Acres	900.4	900.4	900.4	900.4	900.4	900.4	900.4	900.4
Elk Winter Range - Wilderness	Thousand Elk								
-DECADE 1		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
-DECADE 5		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
-DECADE 10		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
-DECADE 15		10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Elk Winter Range - Nonwilderness	Thousand Elk								
-DECADE 1		6.6	6.7	6.8	6.7	4.1	4.1	4.1	4.1
-DECADE 5		4.1	8.6	9.0	8.0	5.8	5.9	5.3	5.2
-DECADE 10		11.5	10.2	10.1	11.8	6.3	6.0	8.5	6.6
-DECADE 15		4.3	3.1	3.1	4.8	.5	.5	1.8	1.8
Livestock Grazing Use	Thousand Animal Unit Months								
-DECADE 1		41.0	40.0	40.0	40.0	44.0	44.0	45.0	45.0
-DECADE 5		56.0	51.0	50.0	47.0	54.0	53.0	51.0	51.0
-DECADE 10		28.0	26.0	29.0	30.0	31.0	33.0	35.0	37.0
-DECADE 15		26.0	19.0	19.0	23.0	24.0	24.0	28.0	29.0
Timber - Suitable Acres	Acres	1057686	1055324	1055324	1054262	1055324	1055324	1053136	1056136
Long-Term Sustained Yield	Million Board Feet	246	230	234	256	236	236	256	243
Programed Sales Offered	Million Board Feet								
-DECADE 1		246	157	157	204	159	157	204	196
-DECADE 5		246	401	502	256	402	402	256	243
-DECADE 10		246	226	199	256	227	202	256	243
-DECADE 15		246	280	254	256	290	249	256	243
Anadromous	Thousand Smolts								
-DEDADE 1		705	705	705	705	705	705	705	705
-DECADE 5		492	492	492	492	492	492	492	492
-DECADE 10		492	492	492	492	492	492	492	492
-DECADE 15		492	492	492	492	492	492	492	492
Road Construction/ Reconstruction	Miles								
-DECADE 1		145	94	94	122	94	94	122	118
-DECADE 5		38	60	40	53	80	80	40	50
-DECADE 10		12	11	10	13	11	10	13	12
-DECADE 15		12	14	13	13	15	12	13	12
Present Value									
-Benefits (4%)	Thousand $	1725537.0	1844825.0	1814653.0	1638840.0	1837080.0	1806988.0	1631798.0	1579407.0
-Costs (4%)	Thousand $	470218.0	493100.0	470389.0	485676.0	493300.0	482490.0	500560.0	461448.0
Present Net Value -- Market/Nonmarket (4%)	Thousand $	1255319.0	1351725.0	1337875.0	1153164.0	1343779.0	1324498.0	1131239.0	1117976.0

Table B-34 (Continued)
Total Resource Production by Benchmarks -- Planned in Decade 1, Projected in Later Decades
(Outputs Other Than Nonperiodic are Average Annual Outputs)

Output/Activity	Unit of Measure	19A	20A	22Y	23Y	24D
Wilderness Mgmt.	Thousand Acres	900.4	900.4	900.4	900.4	1371.4
Elk Winter Range - Wilderness	Thousand Elk					
-DECADE 1		8.3	8.3	8.3	8.3	11.4
-DECADE 5		10.8	10.8	10.8	10.8	13.4
-DECADE 10		10.8	10.8	10.8	10.8	13.4
-DECADE 15		10.8	10.8	10.8	10.8	13.4
Elk Winter Range - Nonwilderness	Thousand Elk					
-DECADE 1		6.1	10.4	4.1	12.9	3.5
-DECADE 5		5.1	9.0	6.3	20.3	4.7
-DECADE 10		5.0	10.3	7.2	12.3	2.9
-DECADE 15		5.0	7.0	.5	10.1	.7
Livestock Grazing Use	Thousand Animal Unit Months					
-DECADE 1		.0	46.2	82.3	.0	45.3
-DECADE 5		.0	52.3	85.7	.0	53.3
-DECADE 10		.0	19.5	63.0	.0	32.6
-DECADE 15		.0	33.5	61.6	.0	31.3
Timber - Suitable Acres	Acres	0	826052	1055130	1003057	665772
Long-Term Sustained Yield	Million Board Feet	0	190	238	227	135
Programed Sales Offered	Million Board Feet					
-DECADE 1		0	187	157	163	132
-DECADE 5		0	187	400	398	356
-DECADE 10		0	187	226	212	154
-DECADE 15		0	187	276	307	153
Anadromous	Thousand Smolts					
-DEDADE 1		705	705	705	705	705
-DECADE 5		739	492	492	492	492
-DECADE 10		739	492	492	492	492
-DECADE 15		739	492	492	492	492
Road Construction/ Reconstruction	Miles					
-DECADE 1		0	110	94	98	66
-DECADE 5		0	19	60	40	36
-DECADE 10		0	10	11	11	7
-DECADE 15		0	9	14	15	7
Present Value						
-Benefits (4%)	Thousand $	375784.0	1375437.0	1735401.0	1802212.0	1465686.0
-Costs (4%)	Thousand $	51146.0	391636.0	492465.0	488429.0	388013.0
Present Net Value -- Market/Nonmarket (4%)	Thousand $	324638.0	983801.0	1242936.0	1313783.0	1077673.0

VII. FORMULATION OF ALTERNATIVES

A. Introduction

A Forest planning alternative is a mix of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. To be viable (NFMA - 36 CFR 219.12f), the alternative must:

- Exist between maximum and minimum resource potential of the Forest;
- Facilitate analysis of opportunity costs and of resource use and environmental tradeoffs among alternatives;
- Facilitate evaluation of present net value, benefits, and costs of achieving various outputs as well as values that are not assigned monetary values;
- Show a different way to address and respond to major public issues, management concerns, and resource opportunities (ICOs);
- Represent the most cost-efficient combination of management prescriptions that can meet the objectives of the alternative;
- State the condition and uses that will result from implementation;
- State what goods and services will be produced including timing and flow of outputs and the costs and benefits generated;
- State the resource management standards and guidelines used; and
- State the purpose of the management direction used.

Formulating alternatives was planning action number five in the Forest planning process following the analysis of the management situation (AMS). During the analysis of the management situation a determination was made of the ability of the Forest to supply goods and services. Maximum and minimum output levels were established. These levels form the range within which the alternatives were developed. Two specific alternatives are required. One alternative must be developed which responds to and incorporates the Resource Planning Act (RPA) program tentative resource objective. Another alternative was developed to reflect the current and expected level of goods and services produced should current management be continued (the "no-action" alternative). The process for formulating alternatives can best be explained in a series of steps.

Step 1. Major public issues and concerns were identified through public involvement. (This process is further explained in Appendix A). These issues and concerns were reviewed by an interdisciplinary team and consolidated into a set of planning questions to be answered.

Step 2. A comprehensive multiresource data base was formed based on the identified issues and concerns and stored in a computer retrieval system.

Step 3. Land analysis areas with similar physical and biological attributes were identified and mapped. The capability, suitability, and management opportunities of specific areas of the Forest were considered in this step.
Step 4. A set of management prescriptions was prepared to represent a variety of possible ways and intensities to manage the Forest.

Step 5. The 480 analysis areas identified in Step 4 were assigned management prescriptions. Some analysis areas were assigned only one prescription while others were assigned a variety of prescriptions that could be applied. Single prescription assignments limit the model's allocation choices.

Step 6. Resource outputs and the associated costs and dollar values that would result when a prescription was implemented were calculated and entered into the computer model FORPLAN.

Step 7. Demand was estimated for the resources involved in the planning questions.

Step 8. Supply potentials were determined using the FORPLAN computer model. Various assumptions, constraints, and objectives were used to establish benchmarks for supply potentials of each resource. Benchmarks were established for the minimum, maximum, and constraint resource levels and maximum present net value. Existing resource supply and projected demand were compared to supply potentials of each benchmark. Opportunities to resolve issues and concerns were identified for each resource by comparing existing and projected demand to potential production levels. These potentials, when compared to the Current Direction, indicate opportunities and/or need for change. This step concluded the analysis of the management situation - benchmark analysis.

Step 9. Alternative objectives were established to provide a broad range of options for future management of the Forest. Selected benchmarks were used to define upper and lower limits for the production of each resource. These upper and lower limits outlined the decision space boundaries for the resources involved. The interdisciplinary team considered expected use, supply, potential (upper and lower limits), and evaluated public input to establish the range of alternatives within the decision spaces. Descriptions were written to define the resource management intent for each alternative.

Step 10. The FORPLAN model was again used to estimate the outputs and costs for each alternative by reflecting the objective of the alternative through a given set of constraints.

Step 11. The results of the FORPLAN analysis for each alternative were evaluated to assure conformance with laws, policies, and guidelines. Refinements were made to insure that each alternative could be achieved.

Further information on the FORPLAN model is presented in Section IV of this Appendix.

The interdisciplinary team incorporated cost-efficiency into the planning process. First, a comparative analysis was performed (see planning records) to identify the most cost-efficient prescriptions. For the timber resource, an additional analysis was done to identify the most cost-efficient level of management intensity on each timber prescription. Second, the

interdisciplinary team developed different alternatives and identified the necessary constraints to address specific objectives, issues, and concerns. Third, prescriptions meeting the cost-efficiency test were combined with the necessary constraints and incorporated into FORPLAN to form different alternatives. Each alternative produces a different combination of priced and nonpriced outputs. The technical feasibility of each alternative is analyzed with FORPLAN. All constraints must be satisfied or an infeasibility will result. The methodology used to account for both categories in alternative formulation and evaluation is discussed in Section IV of this Appendix.

As a result of public comments, additional analysis and several changes have been made since the Draft EIS. The additional analysis is summarized below:

- Alternative G (Preferred Alternative) was modified to maintain a stable harvest level over the planning horizon.

- Alternative G was modified by limiting timber harvesting to those timber prescription/analysis area combinations which showed a positive present net value.

- Alternative G was modified by adding additional suitable acres from East Meadow Creek, West Meadow Creek, and Rackliff-Gedney roadless areas.

- Alternative G was modified to compare and evaluate the effect of using 60 acres available for harvest per mile of new road construction in the first decade rather than 40 acres per mile.

- Sensitivity analysis was performed to estimate the impact that different timber price assumptions would have on land assignments and the economics of timber management using the FORPLAN model. Also, updated recreation/wildlife values were used to estimate any impacts on land assignments and economic efficiency. This analysis was done on the Max PNV benchmark, Alternative D, and Alternative G. For additional information on this analysis, see Appendix D.

Summary of changes to alternatives since the Draft EIS:

The boundaries of the Mallard (1847) and Gospel-Hump (1921) roadless areas were adjusted to the original RARE II boundaries. This change was in response to the public concern that this Forest adjusted the RARE II boundaries because of timber sale and road construction activities which were expected to take place, but have not at this time.

Constraints common to all alternatives remain unchanged. Additional constraints were applied to Alternative G (Preferred Alternative) to meet specific resource and economic objectives. These constraints have been designed to meet the following objectives:

- Increase fish/water quality objectives in 64 drainages;

- Increase prescribed burning on deer/elk winter range from 2,700 acres to 5,000 acres per year during the Plan period (1988-1997);

- No scheduled road construction or timber harvesting activities in the West Meadow Creek roadless area during the Plan period (1988-1997), except for the portion which is west of the hydrologic divide between Meadow Creek and the Red River and American River drainages;

- Manage approximately 13,300 acres of the Silver Creek-Pilot Knob roadless area without additional roads and with no scheduled timber harvest.

- Make timber management prescriptions available for approximately 11,000 acres of tentatively suitable land in the Rackliff-Gedney roadless area;

- Include all riparian areas in the suitable timber base, but review harvesting activities on these area during implementation of the Forest Plan.

B. Common Constraints

The constraints used in the maximum present net value (06D) benchmark formed the basis for constraints applied to all alternatives except current management (Alternative A). The effects of some constraints applied early in this analysis process were effectively replaced by constraints developed and applied later (see Section VI). Common benchmark constraints were developed, examined, and tested to see how well they addressed their stated purpose. They also represent the most cost-efficient approach to meeting the intended purpose. These constraints were previously analyzed in Section VI, "Analysis Prior to Development of Alternatives." The benchmark constraints common to all alternatives were as follows:

- Constraint: All alternatives except departures require nondeclining yield (NDY) for timber harvests.
  Purpose: Provides a sustained yield of timber harvests.
  Rationale: Assumes a constant supply or upward trend in timber supply.
  Tradeoff: Significant reduction in PNV and base timber harvest schedule (see Section VI).

- Constraint: Insure an appropriate level of timber inventory at the end of the planning horizon (long-term sustained yield link - LTSYC).
  Purpose: To assume that harvestable timber will be available in the decades immediately following the end of the planning horizon.
  Rationale: Assure a future sustained yield of timber harvest.
  Tradeoff: Significant reduction in PNV and timber harvest schedule, but not as substantial as NDY (see Section VI).

- Constraint: Timber rotations are based on 95 percent of the culmination of mean annual increment (CMAI) for existing and regenerated stands.

	Purpose:	Assure that timber is harvested at or beyond its maximum mean annual growth rate.
	Rationale:	Provide rotation ages that maintain high productivity and abide by Forest Service Manual direction.
	Tradeoff:	Significant reduction in present net value (PNV) but not as substantial as NDY (see Section VI).
-	Constraint:	Ensure that shifts in timber harvest levels do not exceed the parameter for rapid change of more than 20 MMBF below the present current annual harvest (97 MMBF) or 20 MMBF above the local milling capacity (135 MMBF) in the first decade. This equates to a range of 75 to 155 MMBF.
	Purpose:	To prevent a drastic change in timber offered for sale in the first decade.
	Rationale:	Assures that increases in timber harvest can be utilized by either new mills or increases in existing milling facilities.
	Tradeoff:	Slight reduction in PNV and timber harvest schedule. Most drastic changes are evident in the first decade.
-	Constraint:	Limit amount of access to analysis areas 400 acres or larger in the first 4 decades.
	Purpose:	Assure that basic soil, water quality, water yield, fisheries objectives, and legal size of opening requirements are maintained.
	Rationale:	Soil, water, and fisheries resources must be maintained at legally defined levels.
	Tradeoff:	PNV is reduced along with a significant change in base harvest schedule.
-	Constraint:	Riparian zones are protected by limiting timber harvest to 10 percent of the inventoried area per decade.
	Purpose:	Protect the areas that are most critical to a wide range of resources including timber, wildlife and fish, recreation, and water.
	Rationale:	Riparian ecosystems tend to be overcut if timber harvest is not constrained to protect other resources.
	Tradeoff:	Minor reduction in PNV and timber volume.
-	Constraint:	A minimum of 10 percent old growth is maintained on the suitable timber base Forestwide. A minimum of 5 percent of any prescription watershed must be maintained as old growth.
	Purpose:	Help maintain viable wildlife populations on traditional ranges.
	Rationale:	Old growth would not be maintained on the more productive timber sites without a constraint.
	Tradeoff:	Minor reduction in PNV and timber yield.
-	Constraint:	Limit the acres of regeneration harvest for the first 2 decades to levels that will ensure the protection of habitat for minimum harvestable levels of anadromous fish Forestwide.

Purpose:	Protect stream habitat to levels that are capable of maintaining minimum harvestable levels of anadromous fish.
Rationale:	Minimum harvestable levels of anadromous fish are a management requirement.
Tradeoff:	PNV is reduced by limits on acres of regeneration harvest in the first 2 decades.

C. Development of Alternatives

Alternative A (Current Direction)

The goal of this alternative is to continue management direction as set out in plans formulated and approved prior to passage of the National Forest Management Act, and included in existing policies, standards, and guidelines. This is the "no-action" alternative required by the National Environmental Policy Act (NEPA).

The criteria and assumptions underlying the development of this alternative are:

- Timber production is increased over time, not to exceed the long-term sustained yield capacity (LTSYC). Timber merchantability standards, yield tables, and inventory data are updated to current and/or proposed standards. However, suitable lands identified in the 1973 Timber Management Plan or in approved unit plans were available to determine timber harvest scheduling.

- Minimum management requirements (MMR), which were not previously required by law, are included with the understanding that current management adjusts to changes in law and policy.

- Resource Planning Act (RPA) targets for livestock are met.

- A burning program for deer/elk winter range habitat improvement of 550 acres per year is scheduled.

- This alternative is modeled so that appropriate budget levels will not exceed the historic FY 1980-82 level of $10.1 million.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B.)

- Constraint: Timber harvest is limited to acres identified as suitable in the 1973 Timber Management Plan or in approved unit plans.
  Purpose: Maintain direction of current timber management plans.
  Rationale: Conforms with direction from most current timber harvest plans.

- Constraint: Timber harvests are constrained to Visual Quality Objectives (VQOs) in approved land use plans.
  Purpose: Maintain direction in current VQO inventory.
  Rationale: Conforms with direction from most current timber harvest plans.

- Constraint: Exclude Rapid River and Rackliff-Gedney roadless area timber from development.
  Purpose: Maintain direction in current unit plans.
  Rationale: Conforms with direction from most current timber harvest plans.

- Constraint: Limit acres of regeneration harvest on suitable lands to 61,913 acres in decade 1 and 107,539 acres in decade 2.
  Purpose: Maintain fisheries habitat on suitable lands at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives outside of roadless areas.

- Constraint: Budget constrained to FY 1980-82 level of $10.1 million (1978 dollars).
  Purpose: Constrained budget is used to identify what resource outputs are linked to current funding levels throughout the planning horizon.
  Rationale: Constrained budget levels are required to meet the objectives of the "no-action" alternative by NEPA (36 CFR 219.12(E)(2).

Alternative C

The goal of this alternative is to emphasize nonmarket opportunities. Water, fish (wild gene pools), wildlife, recreation, and other amenities are highlighted. Other resources would be managed at economically and environmentally feasible levels.

The criteria and assumptions underlying the development of this alternative are:

- Fisheries, semiprimitive recreation, and wildlife resources are emphasized under this alternative by excluding new road construction in the following areas: Rackliff-Gedney (Nez Perce portion), East Meadow Creek, West Meadow Creek, Rapid River (Nez Perce portion), Jersey-Jack, and portions of Silver Creek-Pilot Knob. No new road construction will be allowed in the first two decades in Newsome Creek and the main fork of Red River.

- Big-game habitat management is enhanced by burning at least 2,650 acres of deer/elk winter range annually, and by managing summer range using the North Idaho Elk Coordinating Guidelines to make possible the following habitat effectiveness levels: 100 percent of existing habitat where roads are excluded; 75 percent in high elk objective

areas; 50 percent in all other areas, and by excluding development in certain roadless areas.

- Anadromous fisheries habitat will be managed to provide for levels of fish exceeding minimum harvestable, in line with providing quality fishing experiences both on- and off-Forest. These levels will limit timber harvest and road construction in high quality habitat watersheds.

- Development of timber resources will be compatible with the objectives for managing fisheries, recreation, and wildlife resources, and not to exceed the LTSYC.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B.)

- Constraint: Timber harvests are constrained to revised VQOs for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Exclude further road and timber development in areas of high recreation, wildlife, and fisheries value.
  Purpose: Maintain the high quality status of recreation/wildlife/fisheries resources in roadless areas.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Provide for at least 2,650 acres of deer/elk winter range burning annually.
  Purpose: To maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres.
  Purpose: To allow for proper dispersion of cutting units to meet elk objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvest on suitable lands to 33,508 acres in decade 1 and 45,481 acres in decade 2.
  Purpose: Provide for high levels of harvestable fish.
  Rationale: High harvestable levels of fish are required to meet the objectives of this alternative.

Alternative D

The goal of this alternative is to emphasize market opportunities for outputs that have an established market price. Other resources would be managed at economically and environmentally feasible levels.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources is emphasized on all tentatively suitable lands outside the classified areas, not to exceed the long-term sustained yield capacity (LTSYC), and within the constraints of minimum management requirements and minimum harvestable fisheries habitat requirements.

- Anadromous fisheries habitat will be managed to provide for minimum harvestable levels of fish from suitable acres.

- Resource Planning Act targets for livestock will be met or exceeded.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Limit acres of regeneration harvest on suitable lands to 70,419 acres in decade 1 and 120,702 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives outside classified areas.

Alternative E

The goal of this alternative is to determine how the Forest's Resource Planning Act (RPA) assignments, as set out in the Regional Guide, can best be met. This is required by the National Forest Management Act (NFMA).

The criteria and assumptions underlying the development of this alternative are:

- RPA targets for timber, fisheries, range, and elk are the primary objectives of this alternative. All tentatively suitable lands are available for harvest.

- RPA goals for big-game habitat management are enhanced by burning at least 2,500 acres of deer/elk winter range annually, and by managing summer range using the North Idaho Elk Coordinating Guidelines.

- Anadromous fisheries habitat will be managed to provide for high harvestable levels of fish on suitable lands.

- RPA targets for livestock will be met.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised visual quality objectives (VQO) for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Provide for 2,500 acres of deer/elk winter range burning annually.
  Purpose: Maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.

- Constraint: Limit acres of regeneration harvest on suitable lands to 34,311 acres in decade 1 and 53,262 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at high harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives outside of classified areas.

Alternative F

The goal of this alternative is to emphasize fish and wildlife resources with a specified minimum level of timber production.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the long-term sustained yield capacity (LTSYC). Timber harvest will be at least 75 million board feet (MMBF) annually for the first decade.

- Fisheries, semiprimitive recreation, and wildlife resources are emphasized under this alternative by excluding new road construction in the following areas: Jersey-Jack, Mallard, Rapid River (Nez Perce portion), Rackliff-Gedney (Nez Perce portion), and East Meadow Creek. No new road construction will be allowed in the first two decades in Newsome Creek and the main fork of Red River.

- Big-game habitat management is emphasized by burning at least 2,650 acres of deer/elk winter range annually, by managing summer range using the North Idaho Elk Coordinating Guidelines, and by excluding new road construction in certain roadless areas.

- Anadromous fisheries habitat will be managed to provide high harvestable levels of fish on suitable acres.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised VQOs for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Exclude further road development in areas of high recreation/wildlife/fisheries value.
  Purpose: Maintain the existing high quality status of recreation/wildlife/fisheries resources in the roadless areas.
  Rationale: Required to meet the objectives of this alternative and emphasize nonmarket resources.

- Constraint: Provide for at least 2,650 acres of deer/elk winter range burning annually.
  Purpose: Maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres per decade.
  Purpose: To allow for proper dispersion of cutting units to meet all objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvest on suitable lands to 45,472 acres in decade 1 and 64,825 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative G (Preferred Alternative)

The goal of this alternative is to emphasize fish and wildlife resources through specific drainage objectives, and provide a high level of market outputs.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, and will not be allowed to increase above the LTSYC.

- Fisheries, semiprimitive recreation, and wildlife resources are emphasized under this alternative by excluding new road construction in the following areas: Rapid River (Nez Perce portion), East Meadow Creek, and approximately 13,300 acres in the Silver Creek-Pilot Knob roadless area.

- Big-game habitat management is enhanced by burning 5,000 acres of deer/elk winter range annually. Summer range will be managed using the North Idaho Elk Coordinating Guidelines to achieve the following habitat effectiveness levels: 100 percent in roadless areas; 75 percent in high elk objective areas; 50 percent in moderate elk objective areas; and 25 percent in low elk objective areas.

- Anadromous fisheries habitat will be managed to provide levels exceeding minimum harvestable fish on suitable lands. This level will limit timber harvest and road construction in high quality habitat watersheds.

- Resource Planning Act (RPA) goals for livestock will be met.

- Increases in timber harvest levels beyond the planning period (1988-1997) will be within the range of potential demand for this Forest.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised visual quality objectives (VQOs) for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Exclude further road development in areas of high recreation/wildlife/fisheries value.
  Purpose: Maintain the existing high quality status of recreation/wildlife/fisheries resources in the roadless areas.
  Rationale: Required to meet the objectives of this alternative and emphasize nonmarket resources.

- Constraint: Provide for 5,000 acres of deer/elk winter range burning annually.
  Purpose: Maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres per decade.
  Purpose: To allow proper dispersion of cutting units to meet elk objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvests on suitable lands to 46,517 acres in decade 1 and 62,652 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at high harvestable levels.
  Rationale: Greater than minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

- Constraint: Timber harvest levels per decade are allowed to increase up to the upper bound on the range of potential demand developed for this Forest. (See Appendix D for additional information).
  Purpose: To be able to meet future potential demand.
  Rationale: Required to meet the objectives of this alternative.

Alternative G1

The goal of this alternative is to emphasize fish and wildlife resources through specific drainage objectives, and provide a high level of market outputs. Timber harvest levels are increased by modeling a departure from the long-term sustained yield capacity past the fifth decade, but within the parameters for community stability. This alternative is essentially the same as Alternative G, except for a slight increase in the timber harvest during the Plan period and in later decades. These differences are due to eliminating the non-declining yield constraint to model a departure in LTSYC.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, and will not be allowed to increase above the long-term sustained yield capacity (LTSYC) beginning in the fifth decade. The harvest level will never drop below the LTSYC and is projected to be equal to the LTSYC level by the end of the planning horizon. Any increases or decreases in the harvest level will be constrained to 25 percent of the previous decade's harvest level.

- Fisheries, semiprimitive recreation, and wildlife resources are emphasized under this alternative by excluding new road construction

in the following areas: Rapid River (Nez Perce portion), East Meadow Creek, and approximately 13,300 acres in the Silver Creek-Pilot Knob roadless area.

- Big-game habitat management is enhanced by burning at least 5,000 acres of deer/elk winter range annually. Summer range will be managed using the North Idaho Elk Coordinating Guidelines, to achieve the following habitat effectiveness levels: 100 percent in roadless areas; 75 percent in high elk objective areas; 50 percent in moderate elk objective areas; and 25 percent in low elk objective areas.

- Anadromous fisheries habitat will be managed to provide levels exceeding minimum harvestable fish on suitable lands. This level will limit timber harvest and road construction in high quality habitat watersheds.

- RPA goals for livestock will be met.

- Rapid increases in timber harvest levels will not be allowed.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints). Timber harvests depart from the LTSYC.

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised VQOs for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Exclude further road development in areas of high recreation/wildlife/fisheries value.
  Purpose: Maintain the existing high quality status of recreation/wildlife/fisheries resources in the roadless areas.
  Rationale: Required to meet the objectives of this alternative and emphasize nonmarket resources.

- Constraint: Provide for at least 5,000 acres of deer/elk winter range burning annually.
  Purpose: Maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres per decade.
  Purpose: To allow proper dispersion of cutting units to meet elk objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvests on suitable lands to 46,517 acres in decade 1 and 62,652 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at high harvestable levels.
  Rationale: Greater than minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

- Constraint: Timber harvest levels per decade are allowed to increase up to the upper bound on the range of potential demand developed for this Forest. (See Appendix D for additional information).
  Purpose: To be able to meet future potential demand.
  Rationale: Required to meet the objectives of this alternative.

Alternative H

The goal of this alternative is to maximize the Forest's wilderness resource. Market outputs from lands outside existing and proposed wilderness would be maximized. All roadless areas in the inventory, 503,162 acres, would be recommended to Congress for wilderness classification.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the long-term sustained yield capacity (LTSYC).

- This alternative proposes an additional 503,162 acres for wilderness, or 100 percent of the current roadless inventory. Market outputs from lands outside the wilderness will be emphasized.

- Anadromous fisheries habitat will be managed to provide minimum harvestable levels of fish on suitable acres.

- Resource Planning Act (RPA) goals for livestock will be met or exceeded.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Assign 503,162 acres to wilderness management.
  Purpose: Provide for a maximum level of additional wilderness on the Forest, and to identify the impacts on other resources.
  Rationale: To provide a maximum level wilderness proposal.

- Constraint: Limit acres of regeneration harvest on suitable lands to 39,633 acres in decade 1 and 62,273 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative H1

The goal of this alternative is to maximize the Forest's wilderness resource, and increase timber harvests by departing from the long-term sustained yield capacity (LTSYC). Market outputs from lands outside the wilderness would be maximized, but not to the point minimum management requirements for resource protection are not met. All roadless areas in the inventory, 503,162 acres, would be recommended to Congress for wilderness classification. This alternative is essentially the same as alternative H except for the increase in timber harvest in later decades.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be emphasized, but only where they are compatible with the objectives of fisheries, recreation, and wildlife resources. Timber harvests will be allowed to increase above the LTSYC beginning in the fifth decade. The harvest level will never drop below the LTSYC and will be equal to the LTSYC by the end of the planning horizon. Any increases or decreases in the harvest level will be constrained to 25 percent of the previous decade's harvest level.

- This alternative proposes an additional 503,162 acres for wilderness, or 100 percent of the current roadless inventory. Market outputs from lands outside the wilderness will be emphasized.

- Big-game habitat management is enhanced by managing summer range using the North Idaho Elk Coordinating Guidelines.

- Anadromous fisheries habitat will be managed to provide minimum harvestable levels of fish on suitable acres.

- RPA goals for livestock will be met or exceeded.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints). Timber harvests depart from the LTSYC.

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Assign an additional 503,162 acres to wilderness management.
  Purpose: Provide for a maximum level of additional wilderness on the Forest, and to identify the impacts on other resources.
  Rationale: To provide a maximum level wilderness proposal.

- Constraint: Limit acres of regeneration harvest on suitable lands to 39,633 acres in decade 1 and 62,273 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative I

The goal of this alternative is to furnish a high-acreage addition to the Forest's wilderness resource. Market outputs from lands outside the wilderness would be maximized, subject to constraints imposed by minimum management requirements. Six roadless areas -- Rapid River (Nez Perce portion), East Meadow Creek, West Meadow Creek, Rackliff-Gedney (Nez Perce portion), and portions of Mallard and Gospel-Hump (Jersey-Jack) would be recommended to Congress for wilderness classification. This would total 326,617 acres, or 65 percent of all roadless acreage on the Forest.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be emphasized, but only where they are compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the LTSYC.

- This alternative proposes 326,617 acres for wilderness or 65 percent of the current roadless inventory. Market outputs from lands outside the wilderness will be emphasized.

- Anadromous fisheries habitat will be managed to provide minimum harvestable levels of fish on suitable acres.

- Resource Planning Act goals for livestock will be met or exceeded.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Assigns an additional 326,617 acres to wilderness management.
  Purpose: Provide for a high acreage level of additional wilderness on the Forest, and to identify the impacts on other resources.
  Rationale: To provide a high level wilderness proposal.

- Constraint: Limit acres of regeneration harvest on suitable lands to 51,203 acres in decade 1 and 77,735 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative J

The goal of this alternative is to furnish a medium-acreage addition to the Forest's wilderness resource. Market outputs from lands outside the wilderness would also be emphasized. Five roadless areas -- Rapid River (Nez Perce portion), East Meadow Creek, Rackliff-Gedney (Nez Perce portion), and portions of Mallard and Gospel-Hump (Jersey-Jack) -- would be recommended to Congress for wilderness classification. This would total 219,105 acres, or 44 percent of all roadless acreage on the Forest.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be emphasized, but only where they are compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the long-term sustained yield capacity (LTSYC).

- This alternative proposes 219,105 acres for wilderness, or 44 percent of the current roadless inventory. Market outputs from lands outside the wilderness will be emphasized, but within the constraints imposed by minimum management requirements and specific wildlife and fisheries objectives.

- Anadromous fisheries habitat will be managed to provide minimum harvestable levels of fish Forestwide.

- Resource Planning Act goals for livestock will be met or exceeded.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Assigns an additional 219,105 acres to wilderness management.
  Purpose: Provide for a medium-level of additional wilderness on the Forest, and identify the impacts on other resources.
  Rationale: To provide a medium-level wilderness proposal.

- Constraint: Limit acres of regeneration harvest on suitable lands to 56,472 acres in decade 1 and 93,658 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at minimum harvestable levels.
  Rationale: Minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative K

The goal of this alternative is to furnish a moderate-acreage addition to the Forest's wilderness resource and to emphasize fish and wildlife resources outside the wilderness through specific drainage objectives. Three roadless areas -- East Meadow Creek, Rackliff-Gedney (Nez Perce portion), and Rapid River (Nez Perce portion) -- would be recommended to Congress for wilderness classification. This would total 172,966 acres, or 34 percent of all roadless acreage on the Forest.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the LTSYC.

- This alternative proposes an additional 172,966 acres for wilderness or 34 percent of the current roadless inventory.

- Big-game habitat management is enhanced by burning at least 1,400 acres of deer/elk winter range annually. Summer range will be managed using the North Idaho Elk Coordinating Guidelines to achieve the following habitat effectiveness levels: 100 percent in roadless areas; 75 percent in high elk objective areas; 50 percent in moderate elk objective areas; and 25 percent in low elk objective areas.

- Anadromous fisheries habitat will be managed to provide for levels exceeding minimum harvestable fish on suitable acres. This level will limit timber harvest and road construction in high quality habitat watersheds.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised visual quality objectives (VQOs) for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Assign an additional 172,966 acres to wilderness management.
  Purpose: Provide for a moderate level of additional wilderness on the Forest, and to identify the impacts on other resources.
  Rationale: To provide a moderate level wilderness proposal.

- Constraint: Provide for at least 1,400 acres of deer/elk winter range burning annually.
  Purpose: To maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres per decade.
  Purpose: To allow for proper dispersion of cutting units to meet elk objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvest on suitable lands to 53,008 acres in decade 1 and 73,432 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at levels exceeding minimum harvestable levels.
  Rationale: Greater than minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

Alternative L

The goal of this alternative is to furnish a low-acreage addition to the Forest's wilderness resource and to emphasize fish and wildlife resources outside the wilderness through specific drainage objectives. One roadless area -- East Meadow Creek -- would be recommended to Congress for wilderness classification. This would total 94,203 acres, or 19 percent of the roadless acreage on the Forest. Rapid River (Nez Perce portion) and Rackliff-Gedney (Nez Perce portion) would remain roadless.

The criteria and assumptions underlying the development of this alternative are:

- Development of timber resources will be compatible with the objectives of fisheries, recreation, and wildlife resources, not to exceed the long-term sustained yield capacity (LTSYC).

- This alternative proposes an additional 94,203 acres for wilderness, or 19 percent of the current roadless inventory.

- Big-game habitat management is enhanced by burning at least 2,500 acres of deer/elk winter range annually. Summer range will be managed using the North Idaho Elk Coordinating Guidelines to achieve the following habitat effectiveness levels: 100 percent in roadless areas; 75 percent in high elk objective areas; 50 percent in moderate elk objective areas; and 25 percent in low elk objective areas.

- Anadromous fisheries habitat will be managed to provide levels exceeding minimum harvestable levels on suitable acres. This level will limit timber harvest and road construction in high quality habitat watersheds.

The constraints used to meet the criteria and assumptions are:

- Constraint: Timber policy constraints (see Common Constraints).

- Constraint: Minimum management requirements (see Section VI-B).

- Constraint: Timber harvests are constrained to revised VQOs for use in modeling alternatives.
  Purpose: Attain management by proposed VQOs.
  Rationale: Conforms with most recent management proposal.

- Constraint: Assign an additional 94,203 acres to wilderness management.
  Purpose: Provide for a low-level of additional wilderness on the Forest, and to identify the impacts on other resources.
  Rationale: To provide a low level wilderness proposal.

- Constraint: Provide for at least 2,500 acres of deer/elk winter range burning annually.
  Purpose: To maintain existing permanent browse areas in a condition suitable with high deer/elk habitat objectives.
  Rationale: Required to meet the objectives of this alternative.

- Constraint: Regeneration harvest is limited to a maximum of 12 percent of the suitable acres per decade.
  Purpose: To allow for proper dispersion of cutting units to meet elk objectives.
  Rationale: To meet the objectives of this alternative.

- Constraint: Limit acres of regeneration harvest on suitable lands to 53,008 acres in decade 1 and 73,432 acres in decade 2.
  Purpose: Maintain fisheries habitat in developed areas at levels exceeding minimum harvestable populations.
  Rationale: Greater than minimum harvestable levels of fish habitat are required to meet legal commitments and management objectives of this alternative.

VIII. SUMMARY OF EFFECTS OF CONSTRAINTS, BENCHMARKS, AND ALTERNATIVES

A. Overview

The purpose of estimating and displaying the effects is to compare present net value, social and economic impacts, outputs of goods and services, and overall protection and enhancement of environmental resources. This comparative analysis is the basis for evaluating alternatives and selecting a Preferred Alternative, which are planning steps 7 and 8. This section focuses on the economic effects of alternatives and benchmarks. The constraints are discussed in detail in Section VII, and social and environmental effects are discussed in Chapters II and IV of the EIS.

B. Process for Evaluating Significant Constraints

Management objectives of benchmarks and alternatives were achieved by constraining FORPLAN as described in Section VII. The cost-efficiency tradeoffs of individual objectives can be determined by comparing the PNV of a FORPLAN solution which meets the objective and one which does not. The change in PNV is the cost-efficiency tradeoff of achieving a specific objective if both solutions have cost-efficient prescriptions, both solutions maximize PNV, and the constraints are cost-efficient. The cost-efficiency tradeoff was not determined for individual alternative objectives because of the prohibitive costs of analyzing every constraint used to develop alternatives. By comparing alternatives, the economic tradeoffs of the groups of objectives which have the most significant impact on PNV can be determined. These cost-efficiency tradeoffs can then be compared to environmental and social consequences to help decisionmakers identify the alternative which maximizes net public benefits.

Sensitivity analysis was performed to estimate the impact that different timber price assumptions would have on the assignment of land and on the economics of timber management. This analysis was done on the Max PNV benchmark, Alternative D, and Alternative G. Additional analysis was performed using updated wildlife/recreation values on Alternative G to determine the impacts on present net value, land assignments, and resource outputs. For additional information about this sensitivity analysis, see Appendix D.

A major factor in the economic tradeoff analysis is the order in which the objectives are analyzed. For example, the economic tradeoff of meeting hypothetical management objectives X and Y can be determined by comparing FORPLAN solutions with various combinations of the two objectives. The change in PNV due to meeting only X may be $5 million, and the change due to meeting only Y may be $11 million; however, the change due to meeting both X and Y will probably be less than $16 million. In addition, the cost of meeting objective X in one alternative will not necessarily be the same as meeting the same objective in another alternative. Therefore, the economic tradeoffs discussed in this section are only relevant to the actual alternative where the objectives were analyzed.

Tradeoffs among alternatives were not developed for individual alternative objectives due to the high cost of analyzing every constraint used to develop the alternatives. Still, by comparing the alternatives, the economic tradeoffs

of a set of objectives can be determined. The efficiency tradeoffs (differences in present net value) can be compared to environmental and social indicators which will aid in identifying the alternative that maximizes net public benefits.

C. Tradeoffs Among Alternatives

This discussion focuses on economic tradeoffs. The economic tradeoffs displayed in the following pages are related to the analysis displayed in Chapter II, Section 17 of the EIS. This analysis displays differences in economic values among the alternatives. Resource outputs and socio-economic effects are displayed in Chapter II, and environmental effects are discussed in Chapters II and IV of the EIS.

1. Response to Public Issues and Concerns

Alternatives were designed to address the 13 major issues. A single alternative cannot fully resolve all issues because of the conflicts among issues. Relationships between priced and nonpriced outputs illustrate the interactions of attempting to resolve various issues. Competitive public issues, management concerns, and resource opportunities exist and it is impossible to fully meet all wants and desires at the same time. By examining an array of priced and nonpriced outputs it becomes possible to see what is given up and what is achieved as a range of alternatives is explored. An understanding of the tradeoffs between alternatives is required to help decisionmakers decide which alternative maximizes net public benefit. The mixes of priced and nonpriced outputs resulting from each alternative are a direct result of the varied attempts to resolve the public issues discussed in Chapter I.

Appendix A in the EIS fully discusses each of the ICOs. The indicators of responsiveness for the Alternatives for each ICO are as follows:

- The level of timber harvest while responding to other demands.
  Indicators:
  - volume of timber harvested in the first decade
  - long-term sustained yield
  - suitable acres managed for timber harvest

- Compatibility of timber harvest, road development, water quality, and anadromous fish.
  Indicators:
  - population of anadromous and resident fish
  - percent of habitat effectiveness

- Areas to be managed as roadless or wilderness while meeting other demands.
  Indicators:
  - acres of wilderness
  - acres of roadless areas

- Quality of habitat for wildlife.
  Indicators:
    population of elk
    level of management objectives
    acres of winter range burned annually

- Acres to be managed for nonmotorized recreation use.
  Indicators:
    acres managed for semiprimitive nonmotorized recreation use

- The emphasis of recreation management for each alternative.
  Indicators:
    measure of the primary recreation objective

- Road accessibility and quality of roads.
  Indicators:
    miles of road built per decade

- Management for special recreation areas.
  Indicators:
    level of management by area

- Range Management.
  Indicators:
    Animal unit months produced

- Compatibility of timber harvest, road development, and big-game habitat needs.
  Indicators:
    miles of road built per decade
    big-game habitat effectiveness

- Mineral Management.
  Indicators:
    acres withdrawn from mineral entry

- Fire Management.
  Indicators:
    Acres managed for initial attack are the same for all alternatives

- Acres managed for scenic quality.
  Indicators:
    acres of retention and partial retention

- Community Stability.
  Indicators:
    Employment and Income levels by economic sector

Table B-35 identifies the tradeoffs between monetary goals (Returns to the Treasury and PNV), and addresses the issues. The descriptions of tradeoffs proceed from the alternatives with the highest PNV to the lowest. Table B-36 compares the responses of each alternative to major issues.

Table B-35
Indicators of Responsiveness of Alternatives to Major Issues and National Concerns (Decade 1 - Planned, Decade 5 - Projected)
(Outputs Other Than Nonperiodic Are Average Annual Outputs)

		Decades 1/5 Avg. Per Year		Timber Issues		
Alter-natıve	PNV ($Million)	Net Cash Receipts ($Million)	Non Cash Benefits ($Million)	First Decade Harvest Avg.Annual MMBF	LTSYC (MMBF)	Suıtable Tımber Lands (Thousand Acres)
D	1,113.4	-5.4/51.1	10.4/19.6	157	242	1,056
G1	1,067.2	-7.2/56.4	11.1/21.5	111	210	912
J	1,013.5	-5.5/42.4	10.5/19.8	137	205	896
F	1,005.2	-6.5/42.8	10.6/20.5	116	206	889
G(PA)	986.3	-6.5/42.9	11.1/21.6	108	210	912
K	980.1	-6.3/42.4	10.9/21.4	102	206	925
L	976.9	-6.3/42.4	10.8/21.2	102	206	925
C	944.1	-6.8/39.7	10.6/20.8	74	197	837
E	923.5	-8.1/44.5	9.9/20.1	127	228	974
I	915.7	-5.8/36.8	10.7/20.1	123	176	764
H1	877.7	-6.1/40.2	10.4/19.4	89	150	655
H	822.1	-5.6/29.6	10.4/19.4	94	150	655
A(CD)	806.5	-5.3/28.9	10.5/19.8	84	150	657

Table B-35 (Continued)
Indicators of Responsiveness of Alternatives to Major Issues and National Concerns (Decade 1 - Planned, Decade 5 - Projected)
(Outputs Other Than Nonperiodic Are Average Annual Outputs)

	Water Quality & Fish Habitat			Wilderness & Roadless	
Alter-native	Anadromous Fish Decades 1/5 (Thousand Smolts)	Resident Fish Decades 1/5 (Thousand Catch.Trout)	Habitat Potential (Current Potential 86 Percent)	Proposed Wilderness (Acres)	Roadless Area Management (Acres)
D	667/594	351/325	72	0	0
G1	706/710	358/340	87	0	126,846
J	674/612	356/341	74	219,105	0
F	677/622	357/344	76	0	250,519
G(PA)	706/710	358/340	87	0	126,846
K	699/687	351/325	87	172,966	0
L	699/687	351/325	87	94,203	78,763
C	695/693	356/340	84	0	330,419
E	693/668	351/324	81	0	0
I	676/619	358/346	75	326,617	0
H1	689/627	361/350	75	503,162	0
H	679/627	359/350	76	503,162	0
A(CD)	682/634	361/356	78	0	78,763

Table B-35 (Continued)
Indicators of Responsiveness of Alternatives to Major Issues and National Concerns (Decade 1 - Planned, Decade 5 - Projected)
(Outputs Other Than Nonperiodic Are Average Annual Outputs)

	Quality of Wildlife Habitat		Recreation		Roads
Alternative	Elk Winter Range Decades 1/5 (Thousand Elk)	Wildlife Habitat Improvement Decades 1/5 (Acres)	Semi-Prim. Recreation Opportunity (Acres)	(Percent[1])	Average Annual Miles Constructed Decades 1/5
D	15.0/18.5	0/0	111,000	13	115/50
G1	20.4/24.2	5,000/5,000	238,000	27	85/55
J	14.4/15.6	0/0	74,000	9	103/42
F	17.0/23.3	2,690/2,760	257,000	30	93/43
G(PA)	20.4/23.7	5,000/5,000	238,000	27	83/43
K	17.0/19.0	1,420/1,490	100,000	12	92/43
L	17.0/21.4	2,500/2,570	158,000	18	94/43
C	15.5/21.2	2,690/2,760	316,000	36	65/40
E	16.5/21.7	2,500/2,570	185,000	21	97/47
I	14.8/15.5	0/0	68,000	8	95/18
H1	13.8/13.9	0/0	55,000	6	76/30
H	13.9/14.0	0/0	55,000	6	76/31
A(CD)	16.0/16.8	550/550	466,000	54	71/14

1/ Current inventory for semiprimitive opportunity is 869,200 acres.

Table B-35 (Continued)
Indicators of Responsiveness of Alternatives to Major Issues and National Concerns (Decade 1 - Planned, Decade 5 - Projected)
(Outputs Other Than Nonperiodic Are Average Annual Outputs)

Alternative	Range Management: Decades 1/5 (Thousand AUM/Yr)	Big-Game Habitat: Development in Roadless Habitat[2] (Acres)	Big-Game Habitat: Development in Roadless Habitat[2] (Percent)	Minerals Management: Acres Withdrawn
D	43/52	503,162	100	926,188
G1	43/48	376,316	75	926,188
J	42/46	284,057	56	1,145,293
F	42/46	252,643	50	926,188
G(PA)	43/48	376,316	75	926,188
K	42/46	330,196	66	1,099,154
L	42/47	330,196	66	1,020,391
C	42/42	172,743	34	926,188
E	40/41	503,162	100	926,188
I	42/46	176,545	35	1,252,805
H1	42/45	0	0	1,429,350
H	42/45	0	0	1,429,350
A(CD)	43/51	424,399	84	926,188

2/ Current roadless area big-game habitat is 503,162 acres (excludes wilderness).

Table B-35 (Continued)
Indicators of Responsiveness of Alternatives to Major Issues and National Concerns (Decade 1 - Planned, Decade 5 - Projected)
(Outputs Other Than Nonperiodic Are Average Annual Outputs)

	Visual Quality		Community Stability Decades 1/5		
Alter-native	Retention (Acres Managed)	Partial Retention	Changes in Jobs (Person-Year)	Income ($Million)	Returns to State ($Million)
D	0	0	799/2115	17.3/45.5	5.7/22.6
G1	4,803	122,546	195/2438	3.5/52.9	4.0/25.1
J	0	0	527/1650	11.2/34.6	5.1/19.1
F	4,803	123,578	323/1726	6.4/36.3	4.6/19.7
G(PA)	4,803	122,546	159/1739	2.7/36.7	3.9/19.6
K	4,803	123,300	90/1595	1.0/33.2	3.9/19.4
L	4,803	123,641	90/1595	1.0/33.2	3.9/19.4
C	4,803	109,198	-280/1558	-7.5/32.3	2.8/18.3
E	4,803	123,582	432/1964	8.8/41.8	4.3/20.4
I	0	0	336/1280	6.9/26.1	4.6/16.2
H1	0	0	-85/1485	-2.1/30.8	3.4/17.9
H	0	0	-46/1003	-2.4/19.5	3.4/14.1
A(CD	23	14,348	-186/840	-5.0/15.8	3.5/13.1

Table B-36
Comparison of Alternatives for Response to Major Issues and Concerns
(Decade 1 - Planned; Decade 5 - Projected)

Issue/Concern	Current Direction A	C
1. Timber Harvest Levels	84 MMBF in 1st decade. 143 MMBF in 5th decade.	74 MMBF in 1st decade. 197 MMBF in 5th decade.
2. Timber-Anadromous Fishery	Maintain water quality to support a minimum harvestable fishery population.	Maintain water quality to support a fishery population that exceeds minimum harvestable levels.
3. Roadless/ Wilderness	78,763 acres are recommended for roadless area management.	330,419 acres are recommended for roadless area management.
4. Wildlife (Elk) Demands	Little emphasis is placed on managing winter range for elk. 550 acres of winter range burned annually.	Emphasis on winter range habitat management 2,700 to 3,200 acres of winter range burned annually.
5. Motorized vs. Nonmotorized Recreation	997,075 acres will be managed for semi-primitive non-motorized or primitive recreation.	1,223,565 acres will be managed for semiprimitive non-motorized or primitive recreation.
6. Recreation Uses	Roaded natural recreation opportunities will be emphasized.	Semiprimitive recreation opportunities will be emphasized.
7. Road Standards	Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
8. Special Recreation Areas	Quality is maintained in all alternatives.	Quality is maintained in all alternatives.
9. Livestock Grazing	43,000 AUMs in 1st decade. 51,000 AUMs in 5th decade.	42,000 AUMs in 1st decade. 42,000 in 5th decade.

D	E	F
157 MMBF in 1st decade. 242 MMBF in 5th decade.	127 MMBF in 1st decade. 228 MMBF in 5th decade.	116 MMBF in 1st decade. 206 MMBF in 5th decade.
Maintain water quality to support a minimum harvestable fishery population.	Maintain water quality to support a fishery population that exceeds minimum harvestable levels.	Maintain water quality to support a minimum harvestable fishery population.
No areas are recommended for roadless or wilderness management.	No areas are recommended for roadless or wilderness management.	250,519 acres are recommended for roadless management.
No emphasis is placed on managing winter range for elk.	Emphasis on winter range habitat management. 2,500 to 2,900 acres of winter range burned annually.	Emphasis on winter range habitat management. 2,700 to 3,200 acres of winter range burned annually.
926,188 acres remain wilderness. These lands provide primitive recreation.	926,188 acres remain wilderness. These lands provide primitive recreation.	1,151,655 acres will be managed for semiprimitive non-motorized or primitive recreation.
Roaded natural recreation opportunities will be emphasized.	Roaded natural recreation opportunities will be emphasized.	Semiprimitive recreation opportunities will be emphasized.
Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
Quality is maintained in all alternatives.	Quality is maintained in all alternatives.	Quality is maintained in all alternatives.
43,000 AUMs in 1st decade. 52,000 AUMs in 5th decade.	40,000 AUMs in 1st decade. 41,000 AUMs in 5th decade.	42,000 AUMs in 1st decade. 46,000 AUMs in 5th decade.

Table B-36 (Continued)
Comparison of Alternatives for Response to Major Issues and Concerns (Decade 1 - Planned; Decade 5 - Projected)

Issue/Concern	Current Direction A	C
10. Timber-Wildlife	An emphasis is placed on wildlife by prescribing high summer range objectives for elk.	An emphasis is placed on wildlife by prescribing high summer range objectives for elk.
11. Minerals	79 percent of high/very high mineral potential lands remain open to mineral entry.	79 percent of high/very high mineral potential land remain open to mineral entry.
12. Fire Management	All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
13. Visual Quality	Retention and partial retention VQOs are prescribed. Harvest occurs on 14,000 acres of these areas.	Retention and partial retention VQOs are prescribed. Harvest occurs on 114,000 acres of these areas.

D	E	F
No emphasis is placed on elk summer range management.	No emphasis is placed on elk summer range management.	An emphasis is placed on wildlife by prescribing high summer objectives for elk.
79 percent of high/very high mineral potential lands remain open to mineral entry.	79 percent of high/very high mineral potential lands remain open to mineral entry.	79 percent of high/very high mineral potential land remain open to mineral entry.
All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
No retention or partial retention VQOs are prescribed.	Retention and partial retention VQOs are prescribed. Harvest occurs on 128,000 acres of these areas.	Retention and partial retention VQOs are prescribed. Harvest occurs on 128,000 acres of these areas.

Table B-36 (Continued)
Comparison of Alternatives for Response to Major Issues Concerns (Decade 1 - Planned; Decade 5 - Projected)

Issue/Concern	Preferred Alternative G	G1
1. Timber Harvest Levels	108 MMBF in 1st decade. 210 MMBF in 5th decade.	111 MMBF in 1st decade. 275 MMBF in 5th decade.
2. Timber-Anadromous Fishery	Maintain water quality to support a fishery population that exceeds minimum harvestable levels.	Maintain water quality to support a fishery population that exceeds minimum harvestable levels.
3. Roadless/ Wilderness	126,846 acres are recommended for roadless area management.	126,846 acres are recommended for roadless area management.
4. Wildlife (Elk) Demands	Emphasis on winter range habitat management. 5,000 acres of winter range burned annually.	Emphasis on winter range habitat management. 5,000 acres of winter range burned annually.
5. Motorized vs. Nonmotorized Recreation	1,040,349 acres will be managed for semiprimitive non-motorized or pimitive recreation.	1,040,349 acres will be managed for semiprimitive non-motorized or primitve recreation.
6. Recreation Uses	Semiprimitive recreation opportunities will be emphasized.	Semiprimitive recreation opportunities will be emphasized.
7. Road Standards	Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
8. Special Recreation Areas	Quality is maintained in all alternatives	Quality is maintained in all alternatives.
9. Livestock Grazing	43,000 AUMs in 1st decade. 48,000 AUMs in 5th decade.	43,000 AUMs in 1st decade. 48,000 AUMs in 5th decade.

H	H1
94 MMBF in 1st decade. 150 MMBF in 5th decade.	89 MMBF in 1st decade. 197 MMBF in 5th decade.
Maintain water quality to support a minimum harvestable fishery population.	Maintain water quality to support a minimum harvestable fishery population.
503,162 acres are recommended for wilderness management.	503,162 acres are recommended for wilderness management.
No emphasis is placed on managing winter range for elk.	No emphasis is placed on managing winter range for elk.
1,429,350 acres are classified wilderness. These lands provide primitive recreation opportunities.	1,429,350 acres are classified wilderness. These lands provide primitive recreation opportunities.
Primitive recreation opportunities will be emphasized.	Primitive recreation opportunities will be emphasized.
Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
Quality is maintained in all alternatives.	Quality is maintained in all alternatives.
42,000 AUMs in 1st decade. 45,000 AUMs in 5th decade.	42,000 AUMs in 1st decade. 45,000 AUMs in 5th decade.

Table B-36 (Continued)
Comparison of Alternatives for Response to Major Issues and Concerns (Decade 1 - Planned; Decade - Projected)

Issue/Concern	Preferred Alternative G	G1
10. Timber-Wildlife	An emphasis is placed on wildlife by prescribing high summer range objectives for elk.	An emphasis is placed on wildlife by prescribing high summer range objectives for elk.
11. Minerals	79 percent of high/very high mineral potential lands remains open to mineral entry.	79 percent of high/very high mineral potential lands remains open to mineral entry.
12. Fire Management	All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
13. Visual Quality	Retention and partial retention VQOs are prescribed. Harvest occurs on 127,000 acres of these areas.	Retention and partial retention VQOs are prescribed. Harvest occurs on 127,000 acres of these areas.

H	H1
No emphasis is placed on elk summer range management outside of wilderness for elk.	No emphasis is placed on elk summer range management outside of wilderness for elk.
54 percent of high/very high mineral potential lands remains open to mineral entry.	54 percent of high/very high mineral potential lands remains open to mineral entry.
All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
No retention or partial retention VQOs are prescribed.	No retention or partial retention VQOs are prescribed.

Table B-36 (Continued)
Comparison of Alternatives for Response to Major Issues and Concerns (Decade 1 - Planned; Decade 5 - Projected)

Issue/Concern	I	J
1. Timber Harvest Levels	123 MMBF in 1st decade. 176 MMBF in 5th decade.	137 MMBF in 1st decade. 205 MMBF in 5th decade.
2. Timber-Anadromous Fishery	Maintain water quality to support a minimum harvestable fishery population.	Maintain water quality to support a minimum harvestable fishery population.
3. Roadless/ Wilderness	326,617 acres are recommended for wilderness management.	219,105 acres are recommended for wilderness management.
4. Wildlife (Elk) Demands	No emphasis is placed on managing winter or summer range for elk.	No emphasis is placed on managing winter or summer range for elk.
5. Motorized vs. Nonmotorized Recreation	1,252,805 acres are roadless or wilderness. These lands provide primitive recreation opportunities.	1,145,293 acres are roadless or wilderness. These lands provide primitive recreation opportunities.
6. Recreation Uses	Primitive recreation opportunities will be emphasized.	Primitive recreation opportunities will be emphasized.
7. Road Standards	Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
8. Special Recreation Areas	Quality is maintained in all alternatives.	Quality is maintained in all alternatives.
9. Livestock Grazing	42,000 AUMs in 1st decade. 46,000 AUMs in 5th decade.	42,000 AUMs in 1st decade. 46,000 AUMs in 5th decade.

K	L
102 MMBF in 1st decade. 206 MMBF in 5th decade.	102 MMBF in 1st decade. 206 MMBF in 5th decade.
Maintain water quality to support a fishery population that exceeds minimum harvestable levels.	Maintain water quality to support a fishery population that exceeds minimum harvestable levels.
172,966 acres are recommended for wilderness management.	Recommendations: 94,203 acres to wilderness; 78,763 acres to management without roads.
Emphasis on winter range habitat management. 1,350 to 1,500 acres of winter range are burned annually.	Emphasis on winter range habitat management. 2,500 to 2,900 acres of winter range are burned annually.
1,099,154 acres are wilderness. These lands provide primitive recreation opportunities.	1,091,278 acres will be managed for semiprimitive non-motorized or primitive recreation.
Primitive and roaded natural recreation opportunities will be emphasized.	Semiprimitive recreation opportunities will be emphasized.
Standards will be consistent with overall resource objectives.	Standards will be consistent with overall resource objectives.
Quality is maintained in all alternatives.	Quality is maintained in all alternatives.
42,000 AUMs in 1st decade. 46,000 AUMs in 5th decade.	42,000 AUMs in 1st decade. 47,000 AUMs in 5th decade.

Table B-36
(Continued)

Comparison of Alternatives for Response to Major Issues and Concerns (Decade 1 - Planned; Decade 5 - Projected)

Issue/Concern	I	J
10. Timber-Wildlife	No emphasis is placed on elk summer range management outside of wilderness.	No emphasis is placed on elk summer range management outside of wilderness.
11. Minerals	61 percent of high/very high mineral potential lands remain open to mineral entry.	68 percent of high/very high mineral potential lands remain open to mineral entry.
12. Fire Management	All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
13. Visual Quality	No retention or partial retention VQOs are prescribed.	No retention or partial retention VQOs are prescribed.

K	L
An emphasis is placed on wildlife by prescribing high summer range objectives for elk.	An emphasis is placed on wildlife by prescribing high summer range objectives for elk.
72 percent of high/very high mineral potential lands remain open to mineral entry.	73 percent of high/very high mineral potential lands remain open to mineral entry.
All alternatives have the same emphasis on fire management.	All alternatives have the same emphasis on fire management.
Retention and partial retention VQOs are prescribed. Harvest occurs on 128,000 acres of these areas.	Retention and partial retention VQOs are prescribed. Harvest occurs on 128,000 acres of these areas.

2. Economic Tradeoffs

This discussion identifies the economic consequences of implementing the alternatives by comparing each alternative to the maximum present net value (Max PNV) benchmark (06D) and to at least three other alternatives: the alternative with the next lowest discounted costs, the alternative with the next lowest PNV, and the Current Management Alternative (A). In some cases, alternatives with similar objectives are also compared. The comparisons form the basis for balancing economic tradeoffs with nonpriced resource outputs in selecting the Preferred Alternative.

One measure of the cost of an alternative is the discounted cost which represents the equivalent payment required by the government to implement an alternative. The minimum cost of federal ownership is defined by the minimum level benchmark at $51 million. Table B-37 displays the discounted costs, discounted benefits, and PNV in order of increasing costs. As the timber program and road construction declines, so do PNV and overall costs of the alternatives. By comparing the discounted benefits and costs of an alternative with another alternative with similar goals, the economic consequences of the additional expenditures can be compared to the additional nonpriced benefit values.

Table B-37
Alternatives in Order of Increasing Discounted Costs[1]

Alternative	Present Value Costs		Present Value Benefits		Present Net Value	
	$ Million	Change	$ Million	Change	$ Million	Change
Min Level	51	-	376	-	325	-
A(CD)	291	240	1097	721	806	481
H	311	20	1138	41	822	16
H1	313	2	1191	53	878	56
C	345	32	1289	98	944	66
I	360	15	1275	-14	915	29
G(PA)	362	2	1349	74	986	71
K	364	2	1344	-5	980	-6
L	364	0	1341	-3	977	-3
G1	381	17	1448	107	1067	90
F	385	4	1390	-58	1005	-62
J	391	6	1404	14	1013	8
E	398	7	1322	-82	923	-90
D	418	20	1532	210	1113	190
Max PNV	462	44	1582	50	1119	6

1/ All costs in millions of 1978 dollars

Another measure of the cost of an alternative is the change in PNV between alternatives. The maximum net value of the Forest is defined by the Max PNV benchmark (06D) as $1,119 million. The difference between $1,119 million and the PNV of an alternative represents the foregone investment opportunity to the government for implementing that alternative, or the opportunity cost. Table B-38 displays the present net value, present value benefits, and present value costs for each alternative.

Table B-38
Present Net Value, Present Value Benefits, and Present Value Costs by Alternative[1/2/]
($ million)

Alternative	Present Net Value	Present Value Benefits				Present Value Costs				
		Timber	Range	Rec/ Wildlife	Other	Timber	Roads	Range	Rec/ Wildlife	Other
Max PNV	1119	1223	12	348	<1	116	233	5	12	96
D	1113	1158	12	362	<1	104	201	5	12	96
G1	1067	1036	12	400	<1	82	178	5	20	96
J	1013	1024	12	368	<1	95	181	5	14	96
F	1005	1000	12	379	<1	89	179	5	16	96
G(PA)	986	936	12	400	<1	77	165	5	20	96
K	980	939	12	393	<1	78	169	5	16	96
L	977	939	12	390	<1	78	169	5	16	96
C	944	893	12	384	<1	76	152	5	16	96
E	923	955	12	355	<1	93	189	5	15	96
I	915	890	12	374	<1	83	162	5	14	96
H1	878	818	12	361	<1	71	126	5	15	96
H	822	760	12	361	<1	71	124	5	15	96
A(CD)	806	715	12	370	<1	57	120	5	13	96

1/ All costs in millions of 1978 dollars

2/ Note: The direct comparison of individual resource benefits and costs is misleading because not all costs are allocated to each resource, i.e., the "other" cost category contains unseparable joint costs associated with several resources.

A summary of net public benefits is displayed in Table B-39. Following this table is a discussion of changes in net subjective value (NSV) for each alternative.

Table B-39
Summary of Net Public Benefits (Planned in Decade 1; Projected in Other Decades)

Alternatives (In Order of Descending PNV)	D	G1	J	F	G(PA)	K
Priced Benefits						
PNV ($ million)	1113.434	1067.249	1013.541	1005.246	986.291	980.091
Opportunity Cost ($ million)	6.244	52.429	106.137	114.432	133.387	139.587
Nonpriced Benefits						
Community Stability - Change in potential employment and response to parameter of economic stability						
Person-Yrs[1]	799	195	527	323	159	90
Percent	39	9	26	16	8	4
T&E Species - Development in roadless habitat						
Thousand (M) Acres[2]	503	376	284	253	376	330
Percent	100	75	56	50	75	66
Cultural Resources - Acres considered for clearing & average program for first 5 decades[3]						
Inventory (M Acres)	1056/	925/	896/	896/	925/	925/
(Percent)	26	11	7	7	11	11
Program (M Acres)	9489/	8587/	8258/	8015/	7712/	7712/
(Percent)	111	91	84	78	71	71
Semiprimitive Recreation Opportunity - Acres available for semiprimitive rec.						
Thousand Acres[4]	111	238	74	257	238	100
Percent	13	27	9	30	27	12
Big-Game Habitat - Development in roadless habitat						
Thousand Acres[5]	503	376	284	253	376	330
Percent	100	75	56	50	75	66

See footnotes at end of Table.

L	C	E	I	H1	H	A(CD)
976.879	944.093	923.465	915.684	877.665	822.054	806.534
142.799	175.585	196.213	203.994	242.013	297.624	313.144
90	-280	432	336	-85	-46	-186
4	-14	21	16	-4	-2	-9
330	173	503	177	0	0	424
66	34	100	35	0	0	84
925/	837/	974/	764/	666/	666/	657/
11	0	17	-9	-20	-20	-21
7712/	7486/	10324/	7681/	7983/	6862/	7272/
71	66	129	71	77	52	62
158	316	185	68	55	55	466
18	36	21	8	6	6	54
330	173	503	177	0	0	424
66	34	100	35	0	0	84

Table B-39 (Continued)
Summary of Net Public Benefits (Planned in Decade 1; Projected in Other Decades)

Alternatives (In Order of Descending PNV)	D	G1	J	F	G(PA)	K
VQO - Acres of timber harvest with VQO of retention or partial retention						
Thousand Acres[6]	0	127	0	128	127	128
Percent	0	35	0	35	35	35
Anadromous Fishery Goals - Comparison of habitat potential minimum harvestable habitat parameter						
Percent	72	87	74	76	87	87
Comparison[7]	A	B	A	A	B	B
Old Growth - Percent of old Growth Forestwide						
Percent	16	23	28	27	35	27
Wilderness - Thousand Acres Proposed	0	0	219	0	0	173

1/ Change from Base Year (1980) Forest resource-related employment of 2,065 person-years.
2/ Current Roadless Area - T&E Habitat is 503,162 acres (excludes wilderness).
3/ Current inventory is based on surveying 835,280 acres suitable for timber inventory at approximately 4500 acres per year.
4/ Current inventory is 869,200 acres (excludes wilderness).
5/ Current roadless area - big-game habitat is 503,162 acres (excludes wilderness).
6/ Current inventory is 362,600 acres.
7/ A - Meets harvestable surplus habitat potential.
B - Exceeds harvestable surplus habitat potential.
Current potential is 86 percent of biological potential.

L	C	E	I	H1	H	A(CD)
128	114	128	0	0	0	14
35	32	35	0	0	0	4
87	84	81	75	75	76	78
B	B	B	A	A	A	A
27	36	26	37	40	49	52
94	0	0	327	503	503	0

The following discussion identifies the change in each net subjective value for each alternative:

a. Alternative A (Current Direction)

PNV: $807 million
Opportunity Cost: $313 million

Alternative A has an opportunity cost of $313 million which is due to increasing anadromous fishery habitat potential from minimum viable to minimum harvestable levels, continuing the direction outlined in existing land management plans, and imposing a ceiling on appropriated budget levels of $10.1 million annually.

Under this alternative, market values are emphasized, but because of the budget ceiling, present net value is below that of the other alternatives.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be decreased by 186 jobs in the first decade below the base year (1980) level, a 9-percent reduction. This is the second largest decrease in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels stabilize in the second decade along with timber harvest levels (150 million board feet (MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 424,399 acres, 84 percent of the inventoried roadless area on the Forest to roaded development. The potential for human intrusion in T&E species habitat will increase, and there will be a greater need for coordination between timber harvest and habitat management. Only 78,763 acres would remain unroaded.

(3) Cultural Resources

This alternative decreases the area considered for cultural resource inventory to 657,000 acres, a 21-percent change. This is the largest decrease of all alternatives and would cause a less thorough analysis of cultural sites than the current program. However, the average annual inventory program projected for the first 5 decades would be 7,272 acres, 62 percent above the current level. This increase is the tenth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the highest opportunity for semiprimitive recreation; 54 percent (466,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is in direct response to the reduction in lands suitable for timber harvest resulting from the constraints imposed in this alternative. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness

could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative A would eventually open 424,399 acres, 84 percent of the inventoried roadless area, to roaded development; and this would have a substantial impact on big game. A more thorough program of timber harvest and habitat management coordination for big game would be needed. Only 78,763 acres would remain unroaded.

(7) Visuals

Four percent, or 14,000 acres, of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 78 percent of biological potential, the fourth highest level of all alternatives. This is a result of individual drainage objectives to protect key fishery habitat. This level of fishery satisfies the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 52 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the highest level of all alternatives, requires the least coordination between timber harvest and habitat management activities, and provides for suitable habitat to maintain old-growth-dependent species. The large acreage is a result of the decrease in acres suitable for timber harvest.

(10) Wilderness

No new wilderness is recommended in this alternative.

b. Alternative C

PNV: $944 million
Opportunity Cost: $176 million

Alternative C has an opportunity cost of $176 million which results from providing high levels of nonmarket outputs by excluding timber management in specific roadless areas, and by establishing high fishery and wildlife goals.

Under this alternative, nonmarket values are emphasized and present net value is decreased primarily because of the reduction in timber harvest.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be decreased by 280 jobs in the first decade below the base year (1980) level, a 14-percent reduction. This is the largest decrease in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels in the second decade are projected to show substantial increase primarily as a result of increases in timber harvest levels and Forest Service expenditures, but these increases are offset by long-range stability in timber harvest levels (197 MMBF) by the third decade.

(2) T&E Species

This alternative opens 172,743 acres, 34 percent of the inventoried roadless area on the Forest to roaded development. The potential for human intrusion will increase, and there will be a greater need for coordination between timber harvest and habitat management. However, 330,419 acres would remain unroaded, and would minimize the probability of conflict.

(3) Cultural Resources

This alternative maintains the area considered for cultural resource inventory at 837,000 acres, approximately the current situation, and would maintain the thoroughness of the existing analysis of cultural sites. However, the average annual inventory program for the first 5 decades would be 7,486 acres, 66 percent above the current level. This increase is the ninth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the second highest opportunity for semiprimitive recreation; 36 percent (316,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This results from emphasizing fishery, wildlife, and recreation opportunities in specific inventoried roadless areas. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative C would eventually open 172,743 acres, 34 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 330,419 acres would remain unroaded, which minimizes the probability of conflict.

(7) Visuals

Thirty-two percent, or 114,000 acres, of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 84 percent of biological potential under this alternative, the second highest level of all alternatives. This is a result of individual drainage objectives and land allocations to protect key fishery habitat. This level of fishery exceeds the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 36 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the fifth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No additional wilderness is recommended in this alternative.

c. Alternative D

PNV: $1,113 million
Opportunity Cost: $6 million

Alternative D has the lowest opportunity cost of any alternative at $6 million. This is a result of maximizing market outputs while managing other resources at economically and environmentally feasible levels.

Market values are emphasized by maximizing timber outputs.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be increased by 799 jobs in the first decade above the base year (1980) level, a 39-percent increase. This is the largest increase in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels in the second decade show substantial increase primarily as a result of increases in timber harvest levels and Forest Service expenditures, but these increases are offset by long range stability in timber harvest levels (242 MMBF) by the third decade.

(2) T&E Species

This alternative opens all of the inventoried roadless areas on the Forest to roaded development. The potential for human intrusion in T&E species habitat will definitely increase, and the highest need for coordination between timber harvesting and habitat management will be required.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 1,056,000 acres, a 26-percent change. This is the largest increase of all alternatives and would provide for more thorough analysis of cultural sites than the current program. The average annual inventory program for the first 5 decades would be 9,489 acres, 111 percent above the current level. This increase is the second highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the seventh highest opportunity for semiprimitive recreation; 13 percent (111,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative D would eventually open all of the inventoried roadless areas to roaded development, and would have the greatest impact on big game of any alternative. An intense program of timber harvest and habitat management coordination would be needed.

(7) Visuals

All of the inventoried sensitive VQO areas that have prescriptions for timber harvest with retention or partial retention VQOs are harvested in this alternative. This is the most significant impact of all alternatives. However, this alternative does meet the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 72 percent of biological potential, the lowest level of all alternatives. This is a result of maximizing market outputs Forestwide, although habitat is still protected by using individual drainage objectives to protect key fishery. This level of fishery meets the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, only 16 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the second lowest level of all alternatives, and will require the highest level of coordination between timber harvest and habitat management activities. It is questionable whether this alternative will protect suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No additional wilderness is recommended in this alternative.

d. Alternative E

PNV: $923 million
Opportunity Cost: $196 million

Alternative E has an opportunity cost of $196 million. This is due to an objective of trying to simultaneously achieve the Forest's RPA targets outlined in the Regional Guide. Under this alternative, neither market nor nonmarket values are emphasized as a result of trying to achieve assigned resource outputs.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be increased by 432 jobs in the first decade above the base year (1980) level, a 21-percent increase. This is the third largest increase in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels in the second and third decades show a substantial increase primarily as a result of increases in timber harvest levels and Forest Service expenditures, but these increases are offset by long-range stability in timber harvest levels (228 MMBF) by the fourth decade.

(2) T&E Species

This alternative opens all of the inventoried roadless areas on the Forest to roaded development. The potential for human intrusion in T&E species habitat will definitely increase, and the highest need for coordination between timber harvesting and habitat management will be required.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 974,000 acres, a 17-percent change. This is the second largest increase of all alternatives and would provide for more thorough analysis of cultural sites than the current program. The average annual inventory program for the first 5 decades would be 10,324 acres, 129 percent above the current level. This increase is the highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the fifth highest opportunity for semiprimitive recreation; 21 percent (185,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative E would eventually open all of the inventoried roadless areas to roaded development, and would have the most substantial impact on big game of any alternative. A more thorough program of timber harvest and habitat management coordination would be needed.

(7) Visuals

Thirty-five percent, or 128,000 acres of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 81 percent of biological potential under this alternative, the third highest level of all alternatives. This is a result of individual drainage objectives to protect key fishery habitat at levels which exceed minimum harvestable populations.

(9) Old-Growth Habitat

Under this alternative, 26 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the ninth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No new wilderness is recommended in this alternative.

e. Alternative F

PNV: $1,005 million
Opportunity Cost: $114 million

Alternative F has an opportunity cost of $114 million, which is a result of emphasizing fishery, wildlife, and recreation resources while maintaining a minimum level of timber production.

Under this alternative, nonmarket benefits are emphasized and PNV is reduced as a result of restricting timber harvest in specific roadless areas.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would increase by 323 jobs in the first decade above the base year (1980) level, a 16 percent increase. This is the fifth largest increase in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels stabilize in the second decade along with timber harvest levels (206 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 252,643 acres, 50 percent of the inventoried roadless area on the Forest, to roaded development. The potential for human intrusion in T&E species habitat will increase, and there will be a greater need for coordination between timber harvest and habitat management. However, 250,519 acres would remain unroaded. These areas would require only limited coordination.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 896,000 acres, a 7-percent change. This is the fourth largest increase of all alternatives and would provide for a more thorough analysis of cultural sites than the current program. The average annual inventory program for the first five decades would be 8,015 acres, 78 percent above the current level. This increase is the fifth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the third highest opportunity for semiprimitive recreation; 30 percent (257,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is a result of emphasizing fishery, wildlife, and recreation opportunities in specific inventoried roadless areas. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative F would eventually open 252,643 acres, 50 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 250,519 acres would remain unroaded, requiring only limited coordination.

(7) Visuals

Thirty-five percent, or 128,000 acres of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 76 percent of biological potential under this alternative, the fifth highest level of all alternatives. This is a result of individual drainage objectives to protect key fishery habitat. This level of fishery meets the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 27 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the eighth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No new wilderness is recommended in this alternative.

f. Alternative G (Preferred Alternative)

PNV: $986 million
Opportunity Cost: $133 million

Alternative G has an opportunity cost of $133 million which is a result of emphasizing fishery and wildlife resources while still providing a high level of market resources.

Under this alternative, PNV is reduced as a result of restricting timber harvest in specific roadless areas and implementing high fishery and wildlife objectives.

Following is a summary of the major nonpriced outputs in this alternative.

(1) Community Stability

Potential employment in the regional area would increase by 159 jobs in the first decade above the base year (1980) level, an 8-percent increase. This represents little change from the present situation and is within the parameter for rapid change. Employment levels stabilize in the fourth decade along with timber harvest levels (210 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 376,316 acres, 75 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvest and habitat management because of the increase of human intrusion in T&E species habitat. However, 126,846 acres would remain unroaded and would minimize the conflict.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 925,000 acres, an 11-percent change. This is the third largest increase of all alternatives and would provide for a more thorough analysis of cultural sites than the current program. The average annual inventory program for the first five decades would be 7,712 acres, 71 percent above the current level. This increase is the seventh highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the fourth highest opportunity for semiprimitive recreation; 27 percent (238,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is a result of emphasizing fishery, wildlife, and recreation opportunities in specific inventoried roadless areas. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative G would eventually open 376,316 acres, 75 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 126,846 acres would remain unroaded, requiring only limited coordination.

(7) Visuals

Thirty-five percent, or 127,000 acres of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification

and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is managed at 87 percent of biological potential under this alternative, the highest level of all alternatives. This is a result of individual drainage objectives to protect key fishery habitat. This level of fishery exceeds the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 35 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the sixth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No new wilderness is recommended in this alternative.

g. Alternative G1

PNV: $1,067 million
Opportunity Cost: $52 million

Alternative G1 has an opportunity cost of $52 million which is a result of emphasizing fishery and wildlife resources while still providing a high level of market resources.

Under this alternative, PNV is reduced as a result of restricting timber harvest in specific roadless areas and implementing high fishery and wildlife objectives. However, market outputs are increased over alternative G by allowing timber harvest to depart from the long-term sustained yield capacity level between the fifth and tenth decades.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be increased by 195 jobs in the first decade above the base year (1980) level, a 9-percent increase. This represents little change from the present situation, and is within the parameter for rapid change. Employment levels in subsequent decades show substantial increase, primarily as a result of increases in timber harvest levels and Forest Service expenditures, but they are all within the parameter for rapid change up to and including the long-term sustained yield capacity level of 210 MMBF.

(2) T&E Species

This alternative opens 376,316 acres, 75 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvesting and habitat management because of the increase of human intrusion in T&E species habitat. However, 126,846 acres would remain unroaded, and would minimize the conflict.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 925,000 acres, an 11-percent change. This is the third largest increase of all alternatives and would provide for more thorough analysis of cultural sites than the current program. The average annual inventory program for the first 5 decades would be 8,587 acres, 91 percent above the current level. This increase is the third highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the fourth highest opportunity for semiprimitive recreation; 27 percent (238,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is a result of emphasizing fishery, wildlife, and recreation opportunities outside wilderness. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative G1 would eventually open 376,316 acres, 75 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 126,846 acres would remain unroaded, requiring only limited coordination.

(7) Visuals

Thirty-five percent or 127,000 acres of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is managed at 87 percent of biological potential under this alternative, the highest level of all alternatives. This is the result of individual drainage objectives to protect key fishery habitat. This level of fishery exceeds the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 23 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the tenth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

No new wilderness is recommended in this alternative.

h. Alternative H

PNV: $822 million
Opportunity Cost: $298 million

Alternative H has an opportunity cost of $298 million, a result of maximizing the Forest's wilderness resource by proposing all inventoried roadless areas for wilderness classification.

Under this alternative, market benefits are emphasized outside of wilderness, but PNV is reduced as a result of excluding development in wilderness.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be reduced by 46 jobs in the first decade below the base year (1980) level, a 2-percent reduction. This represents little change from the current situation, and is within the parameter for rapid change. Employment levels stabilize in the second decade along with timber harvest levels (150 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative leaves all inventoried roadless areas unroaded, reducing the potential for human intrusion in T&E Species habitat.

(3) Cultural Resources

This alternative decreases the area considered for cultural resource inventory to 666,000 acres, a 20-percent change. This is the second largest decrease of all alternatives and would provide for less thorough analysis of cultural sites than the current program. However, the average annual inventory program for the first five decades would be 6,862 acres, 52 percent above the current level. This increase is the eleventh highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the eleventh highest opportunity for semiprimitive recreation; 6 percent (55,000 acres) of the current inventoried semiprimitive

acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness, and is an unavoidable consequence of expanding the wilderness acreage on the Forest.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative H would leave all inventoried roadless areas roadless, and would eliminate the need for coordination efforts in these areas.

(7) Visuals

All of the inventoried sensitive VQO areas that have prescriptions for timber harvest with retention or partial retention VQOs are harvested in this alternative. However, this alternative does meet the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 76 percent of biological potential under this alternative, the fifth highest level of all alternatives. This is a result of individual drainage objectives and wilderness recommendations which protect key fishery habitat. This level of fishery meets the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 48 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the second highest level of all alternatives, will require little coordination between timber harvest and habitat management activities, and will provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends all 503,162 acres in the roadless inventory for wilderness. If approved by Congress, the wilderness resource on the Forest would total 1,429,350 acres.

i. Alternative H1

PNV: $878 million
Opportunity Cost: $242 million

Alternative H1 has an opportunity cost of $242 million which is due to the objective of maximizing the Forest's wilderness resource by proposing all roadless areas for wilderness classification.

Under this alternative, market benefits are emphasized outside the wilderness, but PNV is reduced as a result of excluding development in wilderness. However, market outputs are increased over Alternative H by allowing timber harvest to depart from the long-term sustained yield capacity level between the fifth and tenth decades.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be reduced by 85 jobs in the first decade below the base year (1980) level, a 4-percent reduction. This represents little change from the current situation, and is within the parameter for rapid change. Employment levels in subsequent decades show substantial increase primarily as a result of increases in timber harvest levels and Forest Service expenditures. These changes are within the parameter for rapid change, but long-range stability is not attained until the tenth decade.

(2) T&E Species

This alternative leaves all inventoried roadless areas unroaded, reducing the potential for human intrusion in T&E Species habitat.

(3) Cultural Resources

This alternative decreases the area considered for cultural resource inventory to 666,000 acres, a 20-percent change. This is the second largest decrease of all alternatives and would provide for less thorough analysis of cultural sites than the current program. However, the average annual inventory program for the first 5 decades would be 7,983 acres, 77 percent above the current level. This increase is the sixth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the eleventh highest opportunity for semiprimitive recreation; 6 percent (55,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness, and is an unavoidable consequence of expanding the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative H1 would leave all inventoried roadless areas roadless and would eliminate the need for coordination efforts in these areas.

(7) Visuals

All of the inventoried sensitive VQO areas that have allocations for timber harvest with retention or partial retention VQOs are harvested in this alternative. However, the alternative does meet the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 75 percent of biological potential under this alternative, the sixth highest level of all alternatives. This is a result of individual drainage objectives and wilderness recommendations which protect key fishery habitat. This level of fishery meets the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 40 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the third highest level of all alternatives, will require little coordination between timber harvest and habitat management activities, and will provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends all 503,162 acres in the roadless inventory for wilderness classification. If approved by Congress, the wilderness resource on the Forest would total 1,429,350 acres.

j. Alternative I

PNV: $916 million
Opportunity Cost: $204 million

Alternative I has an opportunity cost of $204 million which is a result of proposing 326,617 acres of roadless areas for wilderness classification.

Under this alternative, market benefits are emphasized outside wilderness but PNV is reduced as a result of excluding development in wilderness.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would increase by 336 jobs in the first decade above the base year (1980) level, a 16-percent increase. This is the fourth largest increase in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels stabilize in the second decade along with timber harvest levels (176 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 176,545 acres, 35 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvest and habitat management. However, 326,617 acres would remain unroaded. These areas would require only limited coordination.

(3) Cultural Resources

This alternative decreases the area considered for cultural resource inventory to 764,000 acres, a 9-percent change. This is the third largest decrease of all alternatives and would provide for a less thorough analysis of cultural sites than the current program. However, the average annual inventory program for the first five decades would be 7,681 acres, 71 percent above the current level. This increase is the eighth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the tenth highest opportunity for semiprimitive recreation; 8 percent (68,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness, and is an unavoidable consequence of expanding the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative I would eventually open 176,545 acres, 35 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 326,617 acres would be allocated to wilderness, requiring only limited coordination.

(7) Visuals

All of the inventoried sensitive VQO areas that have prescriptions for timber harvest with retention or partial retention VQOs are harvested in this alternative. However, this alternative does meet the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 75 percent of biological potential under this alternative, the sixth highest level of all alternatives. This is a result of individual drainage objectives and wilderness recommendations which protect key fishery habitat. This level of fishery meets the management objective

of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 37 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the fourth highest level of all alternatives, will require little coordination between timber harvest and habitat management activities, and will provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends 326,617 acres of the roadless inventory for wilderness classification. If approved by Congress, the wilderness resource on the Forest would total 1,252,805 acres.

k. Alternative J

PNV: $1,014 million
Opportunity Cost: $106 million

Alternative J has an opportunity cost of $106 million which is the result of proposing 219,105 acres of roadless areas for wilderness classification and maximizing market outputs outside the classified area.

Under this alternative, market benefits are emphasized outside wilderness and PNV is reduced as a result of excluding development in wilderness.

Following is a summary of the nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be increased by 527 jobs in the first decade above the base year (1980) level, a 26-percent increase. This is the second largest increase in potential employment in the first decade of all alternatives, although it is still within the parameter for rapid change. Employment levels in the second decade show substantial increase primarily as a result of increases in timber harvest levels and Forest Service expenditures, but these increases are offset by long-range stability in timber harvest levels (205 MMBF) by the third decade.

(2) T&E Species

This alternative opens 284,057 acres, 56 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvest and habitat management. However, 219,105 acres would remain unroaded. These areas would require only limited coordination.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 896,000 acres, a 7-percent change. This is the fourth largest increase of all

alternatives and would provide for more thorough analysis of cultural sites than the current program. The average annual inventory program for the first five decades would be 8,258 acres, 84 percent above the current level. This increase is the fourth highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the ninth highest opportunity for semiprimitive recreation; 9 percent (74,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness, and is an unavoidable consequence of expanding the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative J would eventually open 284,057 acres, 56 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 219,105 acres would be allocated to wilderness, requiring only limited coordination.

(7) Visuals

All of the inventoried sensitive VQO areas that have prescriptions for timber harvest with retention or partial retention VQOs are harvested in this alternative. However, this alternative does meet the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 74 percent of biological potential under this alternative, the second lowest level of all alternatives. This is a result of individual drainage objectives and wilderness recommendations which protect key fishery habitat. This level of fishery meets the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 28 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the seventh highest level of all alternatives, will require little coordination between timber harvest and habitat management activities, and will provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends 219,105 acres of the roadless inventory for wilderness classification. If approved by Congress, the wilderness resource on the Forest would total 1,145,293 acres.

1. Alternative K

PNV: $980 million
Opportunity Cost: $140 million

Alternative K has an opportunity cost of $140 million which results from proposing 172,966 acres of inventoried roadless areas for wilderness classification and emphasizing fish and wildlife resources outside of these classified areas.

Under this alternative, PNV is reduced as a result of excluding development in wilderness and implementing high fishery and wildlife goals.

Following is a summary of the major nonpriced outputs in this alternative:

(1) Community Stability

Potential employment in the regional area would be increased by 90 jobs in the first decade above the base year (1980) level, a 4-percent increase. This represents little change from the present situation and is within the parameter for rapid change. Employment levels stabilize in the fourth decade along with timber harvest levels (206 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 330,196 acres, 66 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvest and habitat management. However, 172,966 acres would remain unroaded, requiring only limited coordination.

(3) Cultural Resources

This alternative increases the area considered for cultural resource inventory to 925,000 acres, an 11-percent change. This is the third largest increase of all alternatives and would provide for more thorough analysis of cultural sites than the current program. The average annual inventory program for the first five decades would be 7,712 acres, 71 percent above the current level. This increase is the seventh highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the eighth highest opportunity for semiprimitive recreation; 12 percent (100,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is a result of emphasizing fishery, wildlife, and recreation opportunities outside wilderness. As road systems are developed in

areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative K would eventually open 330,196 acres, 66 percent of the inventoried roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 172,966 acres would be allocated to wilderness, requiring only limited coordination.

(7) Visuals

Thirty-five percent, or 128,000 acres, of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 87 percent of biological potential under this alternative, the highest level of all alternatives. This is a result of individual drainage objectives and wilderness recommendations which protect key fishery habitat. This level of fishery exceeds the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 27 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the eighth highest level of all alternatives. While coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends 172,966 acres of the roadless inventory for wilderness classification. If approved by Congress, the wilderness resource on the Forest would total 1,099,054 acres.

m. Alternative L

PNV: $977 million
Opportunity Cost: $143 million

Alternative L has an opportunity cost of $143 million and is a result of recommending 94,203 acres for wilderness classification and continued roadless management for 78,763 acres. Fishery, wildlife, and recreation resources outside of classified areas are emphasized. Under this alternative, PNV is reduced as a result of excluding development in wilderness, restricting timber harvest in specific roadless areas, and implementing high fishery and wildlife goals.

Following is a summary of the major nonpriced outputs in this alternative.

(1) Community Stability

Potential employment in the regional area would be increased by 90 jobs in the first decade above the base year (1980) level, a 4-percent increase. This represents little change from the present situation and is within the parameter for rapid change. Employment levels stabilize in the fourth decade along with timber harvest levels (206 MMBF) and Forest Service expenditures.

(2) T&E Species

This alternative opens 330,196 acres, 66 percent of the inventoried roadless area on the Forest, to roaded development. This will increase the need for coordination between timber harvest and habitat management. However, 172,966 acres would remain unroaded, requiring only limited coordination.

(3) Cultural Resources

This alternative increases the area considered for cultural inventory to 925,000 acres, an 11-percent change. This is the third largest increase of all alternatives and would provide for a more thorough analysis of cultural sites than the current program. The average annual inventory program for the first five decades would be 7,712 acres, 71 percent above the current level. This increase is the seventh highest overall and would enable a more rapid inventory of potential sites.

(4) Semiprimitive Recreation

This alternative provides the sixth highest opportunity for semiprimitive recreation; 18 percent (158,000 acres) of the current inventoried semiprimitive acres would be assigned to prescriptions which allow semiprimitive recreation opportunities. This is in response to emphasizing fishery, wildlife, and recreation opportunities outside wilderness. As road systems are developed in areas adjacent to wilderness, an increase in access to the wilderness could occur. This could reduce the opportunity for experiencing solitude within the wilderness.

(5) Lifestyles

Traditional lifestyles would be maintained under this alternative.

(6) Big-Game (Elk) Habitat

Alternative L would eventually open 330,196 acres, 66 percent of the roadless area, to roaded development. This would require a more thorough program of timber harvest and habitat management coordination for big game. However, 172,966 acres would remain unroaded or in wilderness, requiring only limited coordination.

(7) Visuals

Thirty-five percent or 128,000 acres of the inventoried sensitive VQO areas have prescriptions for timber harvest in areas that would achieve retention or partial retention VQOs. This is in addition to meeting the objectives for modification and maximum modification in other unclassified areas, as well as preservation in wilderness.

(8) Anadromous Fishery

Anadromous fishery habitat is maintained at 87 percent of biological potential under this alternative, the highest level of all alternatives. This is a result of individual drainage objectives to protect key fishery habitat. This level of fishery exceeds the management objective of maintaining habitat to support a harvestable population of anadromous fish Forestwide.

(9) Old-Growth Habitat

Under this alternative, 27 percent of the Forest is projected to be maintained in old-growth habitat by the end of the planning horizon. This is the eighth highest level of all alternatives, and while coordination between timber harvest and habitat management activities must increase, this alternative does provide for suitable habitat to maintain old-growth-dependent species.

(10) Wilderness

This alternative recommends 94,203 acres of the roadless inventory for wilderness classification. If approved by Congress, the wilderness resource on the Forest would total 1,020,391 acres.

3. Opportunity Costs

The following discussion relates the tradeoffs in resource outputs and appropriate opportunity costs among alternatives.

a. Maximum Present Net Value Benchmark (Max PNV)

PNV: $1,119 million
Opportunity Cost: 0

This benchmark maximizes PNV for the Forest while meeting minimum management requirements for resource protection, precluding timber management from existing wilderness, and harvesting a nondeclining flow of timber. A high level of timber harvest is projected to be scheduled over the 150 years (243 MMBF per year). A moderate amount of elk and livestock forage is produced, no additional wilderness is proposed, and all areas presently roadless would be opened to development.

b. Alternative A (Current Direction)

PNV: $807 million
Opportunity Cost: $313 million

The opportunity cost of Alternative A is $313 million and represents a 28- percent reduction from the maximum PNV benchmark. The foregone value is a result of increasing fishery habitat requirements from minimum viable to minimum harvestable levels and continuing current management direction ($194 million), as well as the impact of constraining the appropriated funding level to $10.1 million annually. As a result of these factors, net timber revenues are reduced 38 percent to $119 million because of the decrease in the long-term sustained yield capacity (LTSYC) to 150 MMBF. This is the lowest level of any alternative because lands suitable for timber harvest are reduced to only 657,000 acres. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $357 million, a 6-percent increase. The increase in these benefits is due to an emphasis on enhancing big-game (elk) habitat through winter range burning of 550 acres per year, and an increase in anadromous fishery habitat potential to levels which would assure minimum harvestable populations (78 percent of habitat potential). While recreation benefits are not significantly affected in this alternative, the capacity for semiprimitive recreation is projected to be reduced to 54 percent of current capacity over the planning horizon. Actual use is expected to increase.

c. Alternative C

PNV: $944 million
Opportunity Cost: $176 million

The opportunity cost of Alternative C is $176 million and represents a 16- percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber harvest on 330,419 acres of roadless areas to provide for high quality fishery, wildlife, and recreation benefits ($157 million), and an increase in anadromous fishery habitat requirements from minimum viable to those which exceed minimum harvestable levels ($13 million). As a result of these factors, net timber revenues are reduced 24 percent to $665 million because of the decrease in LTSYC to 197 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $368 million, a 10 percent increase, the third highest of any alternative. The increase in these benefits is due to an emphasis on enhancing big game (elk) habitat through winter range burning of 2,690 acres per year, protection of summer elk habitat, an increase in anadromous fishery habitat potential to levels which exceed minimum harvestable levels (84 percent of habitat potential), and protection of both wildlife and fishery habitat in areas proposed for roadless management. While recreation benefits are not significantly affected, the capacity for semiprimitive recreation is maintained at 36 percent of the current level over the planning horizon. However, actual use is expected to increase.

d. Alternative D

PNV: $1,113 million
Opportunity Cost: $6 million

The opportunity cost of Alternative D is $6 million and represents a 1-percent reduction from the maximum PNV benchmark. This alternative has the lowest opportunity cost of any alternative because the objective is to maximize market outputs. Large capital investments in the early decades are offset by high timber returns over the planning horizon. Also, the low level of nonmarket resource objectives allows timber activities to be concentrated in the most valuable timber types. The foregone value is a result of an increase in anadromous fishery habitat requirements Forestwide from those which would assure habitat for minimum viable populations to those which assure habitat for minimum harvestable populations . As a result of these factors, net timber revenues are reduced only 2 percent to $853 million because the LTSYC is maintained at 242 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $350 million, a 4-percent increase. The increase is due to an increase in anadromous fishery habitat potential to levels which assure habitat for minimum harvestable populations (72 percent of habitat potential). While recreation benefits are not significantly affected in this alternative, the opportunity for semi-primitive recreation is reduced to 13 percent of current capacity over the planning horizon. Actual use is expected to increase.

e. Alternative E

PNV: $923 million
Opportunity Cost: $196 million

The opportunity cost of Alternative E is $196 million and represents an 18-percent reduction from the maximum PNV benchmark. The foregone value is a result of inefficiencies generated by an attempt to simultaneously achieve Resource Planning Act targets for timber, fish, wildlife, and range, as outlined in the 1980 Regional Guide. This reduction occurs because timber harvests are shifted to less valuable areas. Net timber revenues are reduced 23 percent to $673 million because of the decrease in LTSYC to 228 MMBF. Net range benefits remain the same ($7 million) as in other alternatives. Net benefits for recreation, wildlife, and fishery are $340 million, a 1-percent increase. The minor increase in these benefits is due to an emphasis on providing only moderate increases in habitat for fishery and wildlife. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 21 percent of current capacity over the planning horizon. Actual use is expected to increase.

f. Alternative F

PNV: $1,005 million
Opportunity Cost: $114 million

The opportunity cost of Alternative F is $114 million and represents a 10- percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber harvest on 250,519 acres of roadless areas to provide for high

quality fishery, wildlife, and recreation benefits ($104 million), and an increase in anadromous fishery habitat requirements Forestwide from those which would assure habitat for minimum viable populations to those which would assure habitat for minimum harvestable populations ($6 million). As a result of these factors, net timber revenues are reduced 16 percent to $732 million because of the decrease in LTSYC to 206 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $363 million, an 8 percent increase. The increase in these benefits is due to an emphasis on enhancing big game (elk) habitat through winter range burning of 2,690 acres per year plus protection of summer range habitat, an increase in anadromous fishery habitat potential from minimum viable to levels which meet minimum harvestable populations (76 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed roadless areas. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 30 percent of current capacity over the planning horizon. However, actual use is expected to increase.

g. Alternative G (Preferred Alternative)

PNV: $986 million
Opportunity Cost: $133 million

The opportunity cost of Alternative G is $133 million and represents a 12- percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber harvest on 126,846 acres of roadless areas for high quality fishery, recreation, and wildlife benefits ($82 million) and an increase in anadromous fishery habitat requirements Forestwide from those which would assure habitat for minimum viable populations to those which exceed minimum harvestable levels ($51 million). As a result of these factors, net timber revenues are reduced 21 percent to $694 million because of the decrease in LTSYC to 210 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $380 million, a 13-percent increase and one of the highest level of any alternative. The increase in these benefits is due to an emphasis on enhancing big-game (elk) habitat through winter range burning of 5,000 acres per year plus protection of summer range habitat, an increase in anadromous fishery habitat potential to levels which exceed minimum harvestable (87 percent of habitat potential), and protection of both wildlife and fishery habitat in areas proposed for roadless management. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 27 percent of current capacity over the planning horizon. Actual use is expected to increase.

h. Alternative G1

PNV: $1,067 million
Opportunity Cost: $52 million

The opportunity cost of Alternative G1 is $52 million and represents a 5-percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber harvest on 126,846 acres of roadless areas for high quality

fishery, recreation, and wildlife benefits and an increase in anadromous fishery habitat requirements Forestwide from those which would assure habitat for minimum viable populations to those which exceed minimum harvestable levels. The opportunity cost of this alternative is less than Alternative G because the timber harvest departs from the long-term sustained yield beginning in the fifth decade, which results in higher net timber benefits. As a result of meeting non-market objectives, net timber revenues are reduced 12 percent to $776 million because of the decrease in LTSYC to 210 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $380 million, a 13-percent increase which is one of the highest levels. The increase in these benefits is due to an emphasis on enhancing big-game (elk) habitat through winter range burning of 5,000 acres per year plus protection of summer range habitat, an increase in anadromous fishery habitat potential to levels which exceed minimum harvestable (87 percent of habitat potential), and protection of both wildlife and fishery habitat in areas proposed for roadless management. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 27 percent of current capacity over the planning horizon. Actual use is expected to increase.

i. Alternative H

PNV: $822 million
Opportunity Cost: $298 million

The opportunity cost of Alternative H is $298 million and represents a 27-percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber management on 503,162 acres of roadless lands that are proposed for wilderness classification, and maintaining anadromous fishery habitat potential Forestwide at levels which would assure habitat for minimum harvestable populations. As a result of these factors, net timber revenues are reduced 34 percent to $565 million because of the decrease in LTSYC. This is the second lowest level of any alternative because lands suitable for timber management are reduced to only 655,000 acres. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $346 million, a 3-percent increase. The increase in these benefits is due to an increase in anadromous fishery habitat potential from minimum viable to levels which meet minimum harvestable (76 percent of habitat potential) and protection of both wildlife and fishery habitat in proposed wilderness. These benefits are not higher because market benefits are emphasized on all acres outside wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 6 percent of current capacity over the planning horizon. Actual use is expected to increase.

j. Alternative H1

PNV: $878 million
Opportunity Cost: $242 million

The opportunity cost of Alternative H1 is $242 million and represents a 21-percent reduction from the maximum PNV benchmark. The foregone value is a result of

excluding timber management on 503,162 acres of roadless areas that are proposed for wilderness classification, and maintaining anadromous fishery habitat potential Forestwide at levels which would assure habitat for minimum harvestable populations. The opportunity cost of this alternative is $56 million less than that of Alternative H because the timber harvest departs from the long-term sustained yield capacity beginning in the fifth decade, which results in higher net timber benefits. As a result of these factors, net timber revenues are reduced only 30 percent to $621 million although the LTSYC is the same as Alternative H and is a result of decreasing lands suitable for timber management to 655,000 acres. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $346 million, a 3-percent increase. The increase in these benefits is due to an increase in anadromous fishery habitat potential from minimum viable to levels which meet minimum harvestable (75 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed wilderness. These benefits are not higher because market benefits are emphasized on all acres outside wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 6 percent of current capacity over the planning horizon. Actual use is expected to increase.

k. Alternative I

PNV: $916 million
Opportunity Cost: $204 million

The opportunity cost of Alternative I is $204 million and represents an 18-percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber management on 326,617 acres of roadless lands that are proposed for wilderness classification ($187 million), and maintaining anadromous fishery habitat potential Forestwide at levels that would assure habitat for minimum harvestable populations ($17 million). As a result of these factors, net timber revenues are reduced 26 percent to $645 million because of the decrease in LTSYC to 176 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $360 million, a 7-percent increase. The increase in these benefits is due to an increase in anadromous fishery habitat potential from minimum viable to levels which meet minimum harvestable (75 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed wilderness. These benefits are not higher because market benefits are emphasized on all acres outside wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 8 percent of current capacity over the planning horizon. Actual use is expected to increase.

l. Alternative J

PNV: $1,014 million
Opportunity Cost: $106 million

The opportunity cost of Alternative J is $106 million and represents a 9-percent reduction from the maximum PNV benchmark. The foregone value is a result of

excluding timber management on 219,105 acres of roadless areas that are proposed for wilderness classification ($101 million), and maintaining anadromous fishery habitat potential Forestwide at levels that would assure habitat for minimum harvestable populations ($5 million). As a result of these factors, net timber revenues are reduced 14 percent to $748 million because of the decrease in LTSYC to 205 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUM) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $354 million, a 5-percent increase. The increase in these benefits is due to an increase in anadromous fishery habitat potential from minimum viable to levels which meet minimum harvestable (74 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed wilderness. These benefits are not higher because market benefits are emphasized on all acres outside wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 9 percent of current capacity over the planning horizon. However, actual use is expected to increase.

m. Alternative K

PNV: $980 million
Opportunity Cost: $140 million

The opportunity cost of Alternative K is $140 million and represents a 12- percent reduction from the maximum PNV benchmark. The foregone value is a result of excluding timber management on 172,966 acres of roadless lands that are proposed for wilderness classification ($89 million), and an increase in anadromous fishery habitat potential Forestwide from levels that would assure habitat for minimum viable populations to those which exceed habitat requirements for minimum harvestable levels ($51 million). The increase in fishery habitat potential is consistent with the objective of this alternative to emphasize fish and wildlife resources outside wilderness. As a result of these factors, net timber revenues are reduced 22 percent to $692 million because of the decrease in LTSYC to 206 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $377 million, a 12-percent increase and the largest increase of any alternative. The increase in these benefits is due to an emphasis on enhancing big-game (elk) habitat through winter range burning of 2,650 acres per year plus protection of summer range habitat, an increase in anadromous fishery habitat potential to levels which exceed minimum harvestable (87 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 12 percent of current capacity over the planning horizon. Actual use is expected to increase.

n. Alternative L

PNV: $977 million
Opportunity Cost: $143 million

The opportunity cost of Alternative L is $143 million and represents a 13- percent reduction from the maximum PNV benchmark. The foregone value is a result of

excluding timber management on 172,966 acres of roadless lands that are proposed for wilderness and continued roadless management ($89 million), and an increase in anadromous fishery habitat potential Forestwide from levels that would assure habitat for minimum viable populations to those which exceed habitat requirements for minimum harvestable levels ($54 million). The increase in fishery habitat potential is consistent with the objective of this alternative to emphasize fish and wildlife resources outside wilderness. As a result of these factors, net timber revenues are reduced 22 percent to $692 million because of the decrease in LTSYC to 206 MMBF. Net range benefits remain the same ($7 million) although resource outputs (AUMs) are increased over present levels. Net benefits for recreation, wildlife, and fishery are $374 million, an 11-percent increase, and the second largest increase of any alternative. The increase in these benefits is due to an emphasis on enhancing big game (elk) habitat through winter range burning plus protection of summer range habitat, an increase in anadromous fishery habitat potential to levels which exceed minimum harvestable (87 percent of habitat potential), and protection of both wildlife and fishery habitat in proposed roadless lands and wilderness. While recreation benefits are not significantly affected in this alternative, the opportunity for semiprimitive recreation is reduced to 18 percent of current capacity over the planning horizon. Actual use is expected to increase.

APPENDIX C

ROADLESS AREA EVALUATION

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