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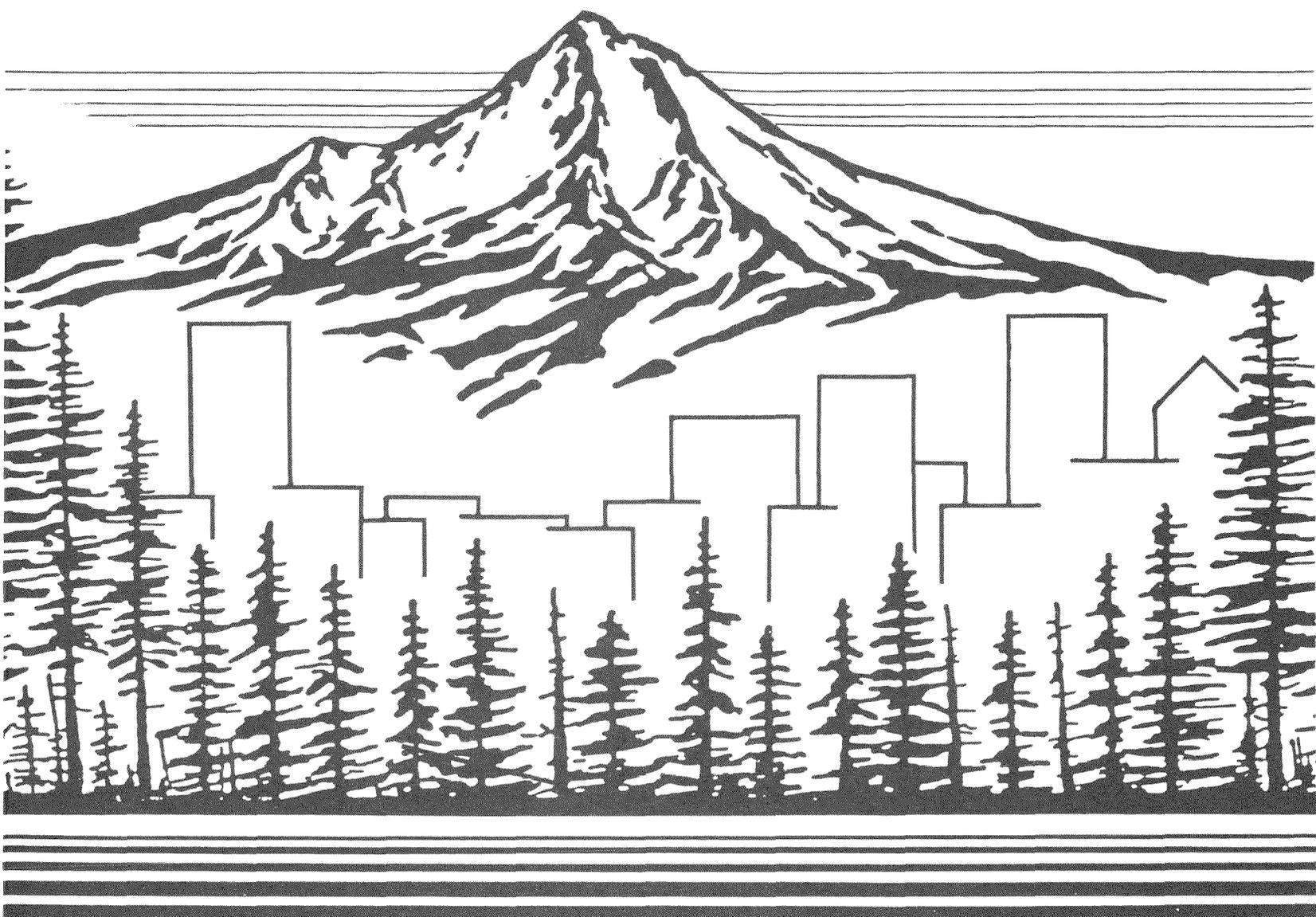
1988



Appendices – Draft Environmental Impact Statement

Proposed Land and Resource
Management Plan

Mt. Hood National Forest



INTRODUCTION

This volume contains the appendicies to the DEIS. These appendicies, which are listed below, provide more detailed information on a variety of topics referenced in the DEIS. Each appendix contains its own table of contents.

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APPENDIX A

APPENDIX A

PUBLIC ISSUE, MANAGEMENT CONCERN, AND
OPPORTUNITY DEVELOPMENT PROCESS

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DEIS-APPENDIX - A

PUBLIC ISSUE, MANAGEMENT CONCERN AND OPPORTUNITY DEVELOPMENT PROCESS

I. PUBLIC ISSUE, MANAGEMENT CONCERN, AND RESOURCE USE AND DEVELOPMENT OPPORTUNITY IDENTIFICATION PROCESS

A. Chronological Summary/Early Phase

The Forest Planning process began in September of 1979. One of the first steps to be taken was that of trying to define, identify and focus attention on what were the important items that should be considered as we set about the difficult and complex task of preparing a Forest Plan. Those items are now called Public Issues, management concerns, and resource use and development opportunities (ICOs for short).

The process of identifying Public Issues for consideration in the Forest planning process began in November 1979. At that time, the Forest Interdisciplinary Planning Team (IDT) compiled a preliminary set of ICOs. They drew upon information gathered in previous planning efforts as well as from discussions with Forest employees.

The preliminary list of Public Issues and management concerns compiled from previous planning efforts and distributed in our information brochures is shown below:

- Availability of firewood.
- Maintaining or increasing timber production.
- Capacity of State highways and Forest roads in relation to major developed recreation areas.
- Number and distribution of Forest roads within the general Forest Zone i.e. timber harvesting areas.
- Maintaining diversity of existing native plant and animal communities at self-sustaining population levels.
- Maintaining old growth ecosystems.
- Protection of threatened, endangered and rare plants and animals.
- Maintaining State standards for water quality in domestic watershed.
- Maintaining and enhancing anadromous fish habitat.
- Recreational use conflicts.
- Continuance of a land base for unroaded recreation experience.
- Level of development at ski areas.
- Location and objectives for managed fire areas on the Forest.
- Maintaining clean air standards during periods of slash burning.
- Use of chemicals on the Forest.
- Reforestation of high elevation harvest units.
- Effects of Forest management activities on community stability.
- Development of a geothermal resource within a Forest environment.

This preliminary list of Public Issues and management concerns was included in informational brochures, distributed at public meetings and mailed to our mailing list of 350 people. The Mt. Hood National Forest held three informal meetings early in the process to help identify additional public issues, discuss management concerns and explore resource opportunities.

The dates and locations of our early public meetings were:

- November 17, 1979, at Mill City High School, Mill City, Oregon.
- November 28, 1977, at the Mt. Hood Supervisor's Office, Gresham,
Oregon.
- November 29, 1977, at the Hood River Inn, Hood River, Oregon.

Other agencies, local government officials, interest groups, Indian tribes and individuals were consulted during this early development phase. We received about 50 responses relating to the development of Public Issues, and management concerns.

B. Screening Process

A screening process was developed to aid in the review of the 50 responses received. The objective was to develop a concise but comprehensive list of Public Issues which would lead to effective analysis and informed decisions. All of the responses and Public Issues identified, along with the Forest's management concerns and identified resource use and development opportunities were reviewed using the following criteria to determine if they could or should be addressed in the Forest Planning Process. The resulting list of Public Issues, management concerns and opportunities became the building blocks of the Mt. Hood Forest Plan.

First Screening Criteria

1. Is the topic within authority of the Forest Service?
2. Is the topic already covered by existing laws, regulations or executive orders?
3. Can the topic affect or be affected by existing programs or management direction?

Second Screening Criteria (Issue Format)

1. Is the topic encompassing enough so that related facets are in one issue but narrow enough so they can be handled as one?
2. Is the topic controversial enough so there is something to resolve but moderate enough so they can be resolved?

Third Screening Criteria

1. Scope: Is the geographical area involved appropriate for consideration.
2. Duration: Is the time required to resolve the issue within the planning horizon.
3. Intensity: Is the issue representative of more than an isolated case.

All of the comments and suggestions were carefully considered using the criteria shown above. Detailed comments concerning the responses received are documented in the planning records. Application of the screens resulted in items being combined, modified, or in some cases eliminated as not appropriate to Forest Planning. Many suggestions were carried forward with little or no modifications. A composite list was formulated and sent to the Regional Forester for review. The list which follows was approved by the Regional Office in June of 1980. It was this list which helped us determine which data would be collected, the depth of analysis needed, and what standards would be used to ensure sound analytical procedures were followed.

C. IC0s-1980

PUBLIC ISSUES-June 1980 List

Timber/Silviculture

- * Availability of firewood for public and commercial cutting.
- * Use of chemicals in the management of Forest vegetation.
- * Level of timber supply on the Mt. Hood National Forest.

Transportation

- * Location, frequency and standards of Forest roads.
- * Forest users (existing and potential) have reached or exceeded the capacity of existing public highways during heavy use periods.

Plant and Animal Communities

- * Maintenance and distribution of old-growth.

Recreation

- * Conflicts between competing recreational activities.
- * Maintenance and enhancement of scenic quality.
- * Level of ski area development.

Fire

- * Location and intensity of managed fire areas.

Social/Economic

- * Community stability and livability.

MANAGEMENT CONCERNS-June 1980 List

Timber/Silviculture

- * Allocations to other resources and constraints on commercial timber harvest may prevent the Mt. Hood National Forest from meeting its share of national needs for wood and wood products, as expressed in RPA targets.

Plant and Animal Communities

- * The procedure to protect threatened and endangered species.
- * The need to provide an adequate spatial and temporal distribution of key habitats including those for indicator wildlife species (i.e., seasonal ranges, dead and defective trees, old growth, wetlands and riparian habitat, and harassment potential), interconnected with dispersion.

Water/Fisheries

- * Maintenance of high quality water for Forest lands for domestic water supplies.
- * Maintenance and enhancement of anadromous and resident fish resources.
- * Maintenance of hydrologic balances and establishing recovery rates following timber harvest activities.

Soil

- * Timber management activities may cause unacceptable soil movement and impacts on soil productivity.

Recreation

- * Managing wilderness in close proximity to an urban area while maintaining consistency with Wilderness Act.

Fire

- * Timing of fuel management projects.

Geology

- * Future availability of an adequate supply of rock for use on and off the Forest.

Land Uses

- * Accelerating demand for nonforest land uses.

Energy

- * Identification of suitable land for geothermal, hydrologic, oil and gas development on the Forest.

RESOURCE USE AND DEVELOPMENT OPPORTUNITIES-June 1980 List

Timber/Silviculture

- * Utilize the demand for energy and other fiber uses (firewood, chips, and power production) to reduce the need for Forest Service residue treatment associated with vegetative management projects. Slight modification of silviculture practices may enhance other values without significant losses to long term fiber yield.
- * Investment Opportunities:
 1. Generic Stocking
 2. Fertilization
 3. Commercial Thinning
 4. Silvicultural manipulation to decrease insect and disease losses.

Transportation

- * Design timber sale roads to accommodate multi-resource use where possible, desirable and reasonable. Example: Closed road junctions may be used for recreational parking after sale is complete.
- * Develop a system of recreation trails interconnected to other agency trails, particularly within the metro area.
- * Develop additional trails for dispersion to even out impacts on existing overused areas.

Plant and Animal Communities

- * Use vegetative management to maintain or improve representative habitats throughout the Forest (utilize Knutson-Vandenberg Act, Right-of-Way Management, etc.).

Recreation

- * Provide additional recreational opportunities within timber production area, (i.e., snowplay, snowmobile, nordic skiing, hunting and dispersed campsites).
- * Provide additional area for dispersed winter recreation, (parking, snowplay, trails, etc.).

- * Investment opportunities in response to shifting recreation use:
 1. Reconstruction and improvement of existing sites and trails.
 2. Construction of facilities at inventoried recreation sites and proposed trailheads.
 3. Provide new and upgrade day use facilities.
 4. Improve trail maintenance.
 5. Consider hazard ratings for disease and insects in determining potential recreation sites.

- * Develop information system for the public concerning recreational opportunities available.

Social/Economic

- * Make areas and service available to users to Urban Outreach Programs.

Fire and Fuels

- * Use prescribed fire to maintain meadows, promoting plant and animal diversity.

- * Use underburn opportunities for wildlife habitat, range and fuel management projects, meeting silvicultural goals.

D. Revisions - to ICOs 1984

Over the past 4 years, the IDT has continued to review and make changes to keep the issues current. Through periodic meetings with groups, individuals, and agencies and as result of changes in policy and procedures, some of the issues have been modified. It is around this revised set of issues that the alternatives contained in the DEIS are designed and analyzed.

In March of 1984, the Regional Office requested that the Forest reformat the lists of Issues, Concerns, and Opportunities. Before submitting the reformatted ICOs, the Forest Planning team reviewed the list approved in 1980. Some modifications were necessary. Some new items were added. The new subjects were concerned with economics of the timber sale program, roadless areas, fisheries, cultural sites, noxious weed control, developed recreation, earthflows and availability of resources traditionally used by Native Americans. One issue which dealt with location and intensity of managed fire areas was removed from the list as it was no longer considered valid due to improved understanding of current fire management. The revised list which follows was sent to the Regional Forester in September of 1984.

E. ICOs-1984

PUBLIC ISSUES-1984

Timber/Silviculture

1. Use of Chemicals in the Management of Forest Vegetation.
2. Level of Timber Supply on the Mt. Hood National Forest.
3. Economics of the Timber Sale Program.

Transportation

4. Location, Density, Design, and Standards of Forest Roads.
5. Forest users have reached or exceeded the capacity of existing public highways in or near the Mt. Hood Forest during heavy use periods.

Plant and Animal Communities

6. Maintenance and Distribution of Old Growth.

Recreation

7. Conflicts Between Management Activities and Competing Recreational Activities.
8. Maintenance and Enhancement of Scenic Quality.
9. Level of Ski Area Development.
10. Allocation of the Remaining Roadless Areas.

Social/Economic

11. Community stability and livability.

Fisheries

12. Maintenance and Enhancement of Anadromous and Resident Fish Habitat.
13. Rehabilitation and Enhancement of Fish Habitat, particularly for Anadromous Species.

MANAGEMENT CONCERNS-1984

Timber/Silviculture

1. Allocations to other resources and constraints on commercial timber harvest may prevent Mt. Hood National Forest from meeting its' share of national needs for wood and wood products, as expressed in RPA targets.
2. Availability of Firewood for Public and Commercial Cutting.

Cultural Resources

3. Protection of the cultural resource values of National Register properties may constrain management activities (including Commercial Timber Harvest) involving the land within or adjacent to National Register property boundaries.

Plant and Animal Communities

4. Procedures to Protect Threatened and Endangered Species.
5. The need to provide an adequate spatial and temporal distribution of key habitats including those for indicator wildlife and plant species (i.e., seasonal ranges, dead and defective trees, old growth, wetlands and riparian habitat, and harassment potential), interconnected with dispersion corridors.

Range

6. Noxious Weed Control.

Water

7. Maintenance of High Quality Water from Forest Lands for Domestic Water Supplies.
8. Maintenance of Minimum Flows and Hydrologic Balances and the Re-establishment of Recovery Rates Following Timber Harvest Activities.

Soils

9. Timber harvest and other management activities may cause unacceptable soil movement and impact soil productivity.

Recreation

10. Managing Wilderness in Proximity to Urban Area while Maintaining consistency with the Wilderness Act.
11. The Ability to Meet Existing and Future Demand for Developed Recreation, especially near Urban Areas.

Fire

12. Timing of Fuel Management Projects.

Geology

13. Future Availability of an Adequate Supply of Rock for Use On and Off the Forest.
14. Accumulated impacts of timber harvest and other management activities on land stability within large slow moving earth flows.

Land Uses

15. Accelerating Demand for Nonforest Land Uses.

Energy & Minerals

16. Development of Management Direction that Allows for Exploration and Possible Development of All Existing and Potential Mineral and Energy Mineral Resources, while Protecting Land Productivity and Other Resources.
17. Development of Management Direction that allows for Small Hydroelectric Development and Other Sources of Energy (Wind, Biomass, etc.), while Protecting Land Productivity and Other Resources.

Utility & Transportation Corridors

18. There is a need to consolidate the Use of Utility and Transportation Corridors on the Forest.

Social/Economic

19. Diminishing supply, or availability, of resources traditionally used in Indian Religious and Cultural Life.

RESOURCE USE AND DEVELOPMENT OPPORTUNITIES-1984

The opportunity to preserve or develop and use the resources of the National Forest is the focus of many of the agency's programs and is the principal focus of the alternatives developed in Chapter II. Other opportunities can be responded to on a much smaller scale incorporating site specific activities.

Timber/Silviculture

1. Make the residue from timber harvest operations available for firewood and other wood fiber uses whenever possible.
2. Take advantage of opportunities to offset losses or increase yields in timber supply:
 1. Genetically improved stocking.
 2. Fertilization.
 3. Commercial and precommercial thinning.
 4. Silvicultural practices to decrease insect and disease losses.
 5. Stocking level control, cleaning, weeding, and other early stand manipulation.

Transportation

3. Incorporate consideration for all other resources into the design of all new Forest Transportation Roads, and accommodate other resource needs in the re-design and reconstruction and/or maintenance of Forest roads.
4. Develop a system of recreational trails that interconnect with other agency, private (State, BLM) and particularly metro-area trails. Incorporate trails such as the Clackamas River Trail and historic travel routes such as the Barlow Road and the historic "Indian Ridge" Route (from Silver Falls to the Pacific Crest Trail).
5. Develop additional recreation trails within the Forest by incorporating remaining segments of older, abandoned, historic and non-maintained trails.
6. Revise and complete the 1966 Barlow Road Management Plan and develop the Barlow Road as a hiking and horse trail from Barlow Pass west to Tollgate Campground in accordance with the Oregon Trail Comprehensive Management and Use Plan.
7. Develop and implement a Substantial & Comprehensive Long-Term Capital Investment Program to Correct Fish Passage Blockages and Offset Decline or Losses in Fish Habitat due to Road Construction and/or Location.

Plant and Animal Communities

8. Use vegetative management to maintain or improve representative habitat throughout the Forest.

Recreation

9. Provide additional recreational opportunities within timber production areas such as dispersed campsites, trail heads and parking, fishing access, quality hunting areas, wildlife viewing, scenic viewpoints and other dispersed recreation activities.
10. Provide additional opportunities within timber production areas for dispersed winter recreation such as development of winter parking and snowplay areas, and designation and marking of winter road and trail routes for snowmobiling and nordic skiing.
11. Utilize investment opportunities in response to shifting recreation uses:
 1. Reconstruction and improvement of existing sites and trails,
 2. Construction of inventoried sites and trails,
 3. Provide new and upgrade day use facilities,
 4. Improve trail maintenance, and
 5. Consider hazard ratings for disease and insects in determining potential recreation sites.
12. Develop more interpretive sites, particularly historic sites, and expand informational systems used to convey recreational opportunity information to the public.

Fire & Fuels

13. Develop programs using prescribed fire to maintain existing meadows within the Forest.
14. Use underburn opportunities, where applicable, to achieve long term fire and fuels management goals, meet silvicultural goals and to benefit wildlife and range habitat.

Soils

15. Rehabilitation of heavily impacted lands and damaged sites.

Social/Economic

16. Make areas and services available to users of urban outreach programs.

Fisheries

17. Implementation of a Comprehensive, Long-Term Program to Rehabilitate and Enhance Anadromous and Resident Fish Habitat.

II. CURRENT PUBLIC ISSUES

D. Rationale for new Public Issues Added or Deleted from Previous Lists

1. Contacts with other agencies and groups.

Contacts have been on-going with a number of Federal, State and local groups throughout our planning process. Federal agencies have included personal visits with representatives of the Environmental Protection Agency, Department of Energy-Bonneville Power Administration, and the Bureau of Land Management. State agency involvement has included Oregon State Department of Forestry, and Department of Fish and Wildlife. Several contacts have been made with local counties. See Appendix H for a detailed review of these county plans. In addition, on-going consultation with local interest groups has been maintained throughout the planning process. Representatives have included members of the Mt. Hood Study Group, Oregon Environmental Council, Sierra Club, Industrial Forestry Association, and the Columbia River Inter-Tribal Fish Commission.

In addition, several evening programs were held during the summer of 1985. These programs dealt with key issues of the planning process. These meetings were intended to be informational and were offered as an aid to help prepare those who will review the plans and DEIS.

2. On-going changes

As Forest Planning proceeds, new situations develop based on changes in technology, the economy, trends, and public interest. As a result, some Public Issues and concerns were added to the 1980 list, some deleted, and new opportunities identified. A Public Issue revolving around the economics of the timber sale program was added since there is now considerable attention being given to subjects such as present net value, "below cost sales," "deficit sales," and net public benefits.

The passage of the 1984 Oregon Wilderness Act did not resolve the high level of concern held by many people for roadless areas not designated Wilderness. This Forest still has about 158,000 acres of unroaded land. Therefore, a Public Issue revolving around how this land will be managed has been added.

It was recognized that the public is concerned over the many species of resident fish and the level of habitat maintenance, enhancement and/or rehabilitation provided by the Forest to benefit these species. Therefore, the fisheries Public Issue was expanded to include resident as well as anadromous species.

The Interagency Committee for spotted owls was formed and brought the issue of spotted owls to public notice. An interim spotted owl management plan was developed. The Oregon Department of Fish and Wildlife is concerned that the Forest protect habitat in compliance with the Interagency Spotted Owl Management Plan and insure adequate monitoring of owl habitat.

B. Current List of Public Issues

Chapter I of the accompanying DEIS presents the public statements that generated these Public Issues.

1. Use of Chemicals in the Management of Forest Vegetation.
Refer to Section J. at the end of this Appendix for a discussion of the current situation on use of chemicals in the management of vegetation on National Forests.
2. Level of Timber Supply on the Mt. Hood National Forest.
3. Economics of the Timber Sale Program.
4. Location, Density, Design, and Standards of Forest Roads.
5. Forest users have reached or exceeded the capacity of existing public highways in or near the Mt. Hood Forest during heavy use periods.
6. Maintenance and Distribution of Old Growth.
7. Conflicts Between Management Activities and Competing Recreational Activities.
8. Maintenance and Enhancement of Scenic Quality.
9. Level of Ski Area Development.
10. Allocation of the Remaining Roadless Areas.
11. Community stability and livability.
12. Maintenance and Enhancement of Anadromous and Resident Fish Habitat.
13. Rehabilitation and Enhancement of Fish Habitat, particularly for Anadromous Species.

C. Grouping the Public Issues

Most of the fifteen Public Issues listed are related to some degree, so we have grouped those most closely related Public Issues. These groups of Public Issues are arranged so they can be logically addressed by the alternatives. As the emphasis of an alternative developed in Chapter II of the accompanying DEIS differs, a given group of Public Issues are addressed in different ways.

The groups of Public Issues are:

1. Level of Timber Supply and Wood Fiber
2. Maintenance and Enhancement of Fish Habitat and Water Quality
3. Maintenance and Enhancement of the Quality and Quantity of Old Growth and Other Suitable Wildlife Habitat
4. Maintenance and Enhancement of Wilderness, Outdoor Recreation Resources and Scenic Quality of the Forest in Response to the needs of an Increasing Nearby Metropolitan Population
5. Disposition of the Remaining Unroaded Areas
6. Community Dependence on Forest Resources

III. CURRENT MANAGEMENT CONCERNS

A. Rationale for new Management Concerns Added or Deleted from Previous Lists

While protection of historic and cultural sites has always been a high priority, unexpected conflicts may be developing. It is not just the cultural sites themselves which may be affected, but also the lands adjacent to them. This Forest currently has over 1,380 acres of land located within National Register Properties. An additional 5,000 acres are in the process of nomination to the National Register. To be confident these areas will receive appropriate attention, this management concern was added.

Controlling the eastward spread of Tansy Ragwort and other noxious weeds has become a concern to forest managers as well as stockmen, state, and local agencies. We are committed to cooperating with state and county weed control agencies and with the Confederated Tribes of the Warm Springs in controlling noxious farm weeds.

As better mapping and more complete inventories of earthflows were gathered it became apparent that management activities affect not only the immediate project area, but the entire earthflow area. Some earthflow areas are thousands of acres in size. Special management practices will be required if we are to reduce the risk of reactivation or acceleration of the earthflow areas.

In working with Native American tribal representatives, it has been emphasized that the Forest is the source of many traditional religious foods and craft resources. The tribes have voiced a concern about a possible decrease in the supply or availability of forest products traditionally used in religious or cultural ceremonies. Supplies of some of these items has decreased in recent decades so managers must develop strategies to deal with both supply of these traditional resources and must continue to provide access to the areas traditionally used.

There has been a new philosophy which has developed over the last 5 years relating to fire management. Fire control efforts are now conducted according to prearranged plans which reflect existing values and adjacent land uses. Fire control plans are developed in recognition of other land management objectives and because of this integration it is not considered necessary to identify managed fire areas as a separate issue. It was therefore removed from the previous list.

B. Current Management Concerns and Rationale

1. Allocations to other resources and constraints on commercial timber harvest may prevent Mt. Hood National Forest from meeting its' share of national needs for wood and wood products, as expressed in RPA targets.

Rationale: This concern involves how much commercial timber land is allocated to recreation and amenity resources, since the combination of importance placed upon community stability and timber production translates into a request by the timber industry and some communities for the highest level of timber production possible that also provides for long term community stability. The timber that can be produced from lands allocated to purposes other than timber production is a factor. Another area of dispute that affects the allocations to amenity resources is the amount of old growth that must be retained to accommodate wildlife indigenous to old growth stand conditions. Other aspects of this concern are the treatment of scenery (Visual Quality) in certain travel corridors and the harvest levels and practices in riparian areas.

2. Availability of Firewood for Public and Commercial Cutting.

Rationale: Rising energy costs are creating rapidly increasing demands for wood residue for home heating. This sale material may become more in demand for commercial heating and power production. The demand for home heating firewood is already established on the Forest. Several Districts are heavily impacted by the demand for home heating firewood.

3. Protection of the cultural resource values of National Register properties may constrain management activities (including Commercial Timber Harvest) involving the land within or adjacent to National Register property boundaries.

Rationale: While protection of historic and cultural sites has always been a high priority, unexpected conflicts may be developing. It is not just the cultural sites themselves which may be affected, but also the lands adjacent to them. This Forest currently has over 1,380 acres of land located within National Register Properities. An additional 5,000 acres are in the process of nomination to the National Register. To be confident these areas will receive appropriate attention, this management concern was added.

4. Procedures to Protect Threatened and Endangered Species.

Rationale: A policy for handling protection of plants and allocations for threatened and endangered wildlife species (spotted owls, etc.) is needed. Protection may be obtained through such options as land allocations, management direction, and program coordination.

5. The need to provide an adequate spatial and temporal distribution of key habitats including those for indicator wildlife and plant species (i.e., seasonal ranges, dead and defective trees, old growth, wetlands and riparian habitat, and harassment potential), interconnected with dispersion corridors.

Rationale: There is a concern for maintaining a balanced habitat condition that can accommodate continuation of existing native wildlife species over the long run. There is also legal direction to provide species and habitat diversity over time and space. Providing these habitat needs will require scheduling and coordination with timber management.

6. Noxious Weed Control.

Rationale: Controlling the eastward spread of Tansy Ragwort and other noxious weeds has become a concern to forest managers as well as stockmen, state, and local agencies. We are committed to cooperating with state and county weed control agencies and with the Confederated Tribes of the Warm Springs in controlling noxious farm weeds.

7. Maintenance of High Quality Water from Forest Lands for Domestic Water Supplies.

Rationale: There is a demand for high quality water for domestic use as well as a concern for water quality in unprotected and protected watersheds.

8. Maintenance of Minimum Flows and Hydrologic Balances and the Re-establishment of Recovery Rates Following Timber Harvest Activities.

Rationale: The timing and scheduling of timber harvest activities may have major effects on water yields and sediment loads due to soil mantle failures.

9. Timber harvest and other management activities may cause unacceptable soil movement and impact soil productivity.

Rationale: There is a concern about ability of the land to maintain its long term productivity due to the cumulative effects of management activities on soil and other resources, particularly the effects on streams from resultant soil movement.

10. Managing Wilderness in Proximity to Urban Area while Maintaining consistency with the Wilderness Act.

Rationale: Many of the urban population who use Wilderness on the Mt. Hood Forest are not familiar with the intent of the Wilderness designation. Their demands for access points, facilities, and structures are inconsistent with the Wilderness Act. The intense heavy use of Wilderness on the Forest is causing resource damage and creating recreation experiences that are inconsistent with the intent of Wilderness.

11. The Ability to Meet Existing and Future Demand for Developed Recreation, and Dispersed Recreation (especially the demand for roadless, or back country, non-motorized dispersed recreation including trail hiking), especially near Urban Areas.

Rationale: Facilities, and vegetation, in campgrounds and high use developed recreation sites are deteriorating and many facilities are already in poor condition.

Inadequate funding for the recreation program has led to the diverting of available funding into the management and maintenance of only the most cost-effective fee campgrounds and high use developed sites.

This shift of the limited funds available has severely reduced or eliminated maintenance, capital investment, and compliance work for most sites. Continued unavailability of adequate recreation funding is requiring the closure of some campgrounds and the conversion of others into unmaintained dispersed sites.

The Mt. Hood is a Forest that is in near proximity to a large metropolitan center within easy driving distance of several large college and university cities. More and more people in these areas are turning to outdoor dispersed recreation activities, such as trail hiking.

Dispersed recreation activities, trail hiking in particular, is predicted to continue to increase. With the shift away from developed recreation facilities management, for state and county facilities as well as Federal Government facilities, more people will shift to dispersed recreation activities.

Also as the population of the urban areas continue to increase; dispersed recreation activities will increase because of the additional crowding in the developed facilities.

These shifts are occurring at the same time that increasing recreation use is placing greater demands on developed sites and developed recreation facilities.

2. Timing of Fuel Management Projects.

Rationale: Smoke management restrictions often prevent burning of residue when planned and limit the number of units burned in a season. Delaying burning projects until usable firewood is removed also complicates the timing problem. Often these factors prevent all planned projects from being completed within two seasons of harvest. Often when projects are delayed, five year regeneration targets cannot be met.

13. Future Availability of an Adequate Supply of Rock for Use On and Off the Forest.

Rationale: Rock is a limited, nonrenewable resource in short supply. There is an increasing demand for rock by Forest and non-Forest uses. This concern is addressed in a Rock Resource Plan. However, it should be strengthened in the Forest Plan, especially in areas where the rock resource may run out.

14. Accumulated impacts of timber harvest and other management activities on land stability within large slow moving earthflows.

Rationale: As better mapping and more complete inventories of earthflows were gathered it became apparent that management activities affect not only the immediate project area, but the entire earthflow area. Some earthflow areas are thousands of acres in size. Special management practices will be required if we are to reduce the risk of reactivation or acceleration of the earthflow areas.

15. Accelerating Demand for Nonforest Land Uses.

Rationale: Continued urbanization of the Mt. Hood corridor and urban development near Forest boundaries will increase requests for support services on National Forest lands and create intense public scrutiny of management programs.

16. Development of Management Direction that Allows for Exploration and Possible Development of All Existing and Potential Mineral and Energy Mineral Resources, while Protecting Land Productivity and Other Resources.

Rationale: The value of minerals to the United States and the potential of their existence on the National Forests cannot be underestimated. Minerals are an important and valuable resource that must be managed for on National Forest lands.

17. Development of Management Direction that allows for Small Hydroelectric Development and Other Sources of Energy (Wind, Biomass, etc.), while Protecting Land Productivity and Other Resources.

Rationale: Electric power production is a need that the American public depends on and will depend on long into the future. The Forest Service is in a position to respond to this need while still maintaining the balance of protecting or minimizing the impacts on other forest resources.

18. There is a need to consolidate the Use of Utility and Transportation Corridors on the Forest.

Rationale: The Mt. Hood National Forest has over 3,000 acres of powerline right-of-way and three major transportation systems (Highways 26, 35, and I-84) within its boundaries.

19. Diminishing supply, or availability, of resources traditionally used in Indian Religious and Cultural Life.

Rationale: In working with Native American tribal representatives, it has been emphasized that the Forest is the source of many traditional religious foods and craft resources. The tribes have voiced a concern about a possible decrease in the supply or availability of forest products traditionally used in religious or cultural ceremonies. Supplies of some of these items has decreased in recent decades so managers must develop strategies to deal with both supply of these traditional resources and must continue to provide access to the areas traditionally used.

IV. INTERRELATIONSHIPS OF PUBLIC ISSUE GROUPS AND MANAGEMENT CONCERNS

Chapter I of the DEIS discusses the Public Issue groups. Chapter II depicts how the alternatives respond to the Public Issues and the Management Concerns, and Chapter IV presents the environmental effects associated with the specific responses of each alternative to the Public Issues and the Management Concerns. The following chart indicates the inter-relationships of the Public Issues and Management Concerns and how they are resolved in the development of Alternatives in the Draft Environmental Impact Statement (DEIS).

A. Table A-1 PUBLIC ISSUE GROUPS & MANAGEMENT CONCERNS RESOLUTION

	Issue Groups & Mgmt Concerns						Resolutions		
	1	2	3	4	5	6	Land Allocation	Standards	Forest Policy
PUBLIC ISSUES									
Chemicals								X	X
Timber Supply	X				X	X	X	X	X
Timber Economics	X						X		X
Rd. Density	X	X	X	X	X	X	X	X	X
Hwy. capacity									
Old Growth		X	X	X			X	X	X
Rec. conflicts				X			X	X	X
Scenic Quality				X			X	X	
Ski Area Dev.							X	X	X
Unroaded Areas					X		X		
Com. Stability	X					X			X
Fish Habitat		X	X				X	X	X
MANAGEMENT CONCERNS									
Timber Target	X						X	X	
Firewood	X							X	X
Cultural Res.								X	X
T&E Species		X	X					X	X
Key Habitats		X	X				X	X	
Noxious Weeds								X	X
Water supply		X				X	X	X	
Hydrologic Bal.		X				X	X	X	
Soil Prod.							X	X	
Wilderness				X			X	X	
Recreation				X			X	X	X
Fuel Mgmt/Air Quality	X							X	X
Rock Supply	X				X			X	X
Earthflows	X						X	X	
Non Forest Land Uses								X	X
Minerals & Energy						X		X	X
Hydroelectric Development								X	X
Utility Corridors							X	X	
Native Americans						X		X	X

V. PLANNING QUESTIONS

As shown, most of the Public Issues, management concerns and resource use and development opportunities (ICOs) are all interrelated to some degree. They were also arranged into planning questions so they could be logically addressed by management. As the emphasis of the alternatives vary, a given planning question is addressed in different ways.

The discussion of the planning questions includes an exploration of interactions with other resources and the potential for resolution of the Public Issues. These planning questions are part of the basis for development of the Forest Plan. Refer to Chapter Three of the Forest Land and Resource Management Plan for a discussion of how the Plan responded to these Planning Questions.

Question 1: How much wood fiber should the Mt. Hood National Forest produce?

One response to this question is that the Forest might be developed with heavy emphasis for timber values. The other side of this question is that too much area might be tied up for uses other than timber production, thus diminishing the base for the forest products industry. The schedule of timber harvesting is also a factor. The question of how fast and to what extent the remaining mature and old growth forests are harvested and converted to younger managed stands must be resolved.

This Forest has some of the most productive lands for growing conifer found in the Region. It has a high potential to grow wood and has proposed, in the past, to contribute about 8 percent of the Regional timber supply (1977 Ten Year Timber Management Plan for Mt. Hood NF). The expectation from timber interests nationally, regionally, and locally is that the Forest should continue to supply a significant amount of National Forest Timber.

The current timber volume to be sold annually, as identified by the Regional Office is 376 million board feet. This includes both scheduled and unscheduled (salvage) volume harvested. Volume which is obtained due to damage from storm, insects, disease, fire, etc. is called salvage volume. As indicated in the analysis of resource potentials completed on the Forest in April of 1985 (Analysis of the Management Situation), the Forest can schedule for harvest, using the same allocations that exist in current land management plans plus incorporating legally required adjustments, approximately 222 million board feet of timber per year.

About 20-25 percent of the total volume cut per year on the Forest is a result of salvage logging. When considering both scheduled and salvage volume, the total volume which can be consistently produced under current land allocations is approximately 307 million board feet per year. The yearly volume sold based on an average of the last 10 years, is 397 million board feet. This number includes scheduled and salvage volume. The ability of the Forest to supply timber, over the long run, is considerably less than past projections have indicated.

Perhaps more than any other planning question, this one affects and is affected by the resolution of other resource issues. For example, timber harvesting may enhance elk habitat (through forage production in clearcuts), but reduces the amount of wildlife habitat available for species dependent on mature conifer forest. The most significant effect of other resources uses on timber is the classification of land as nonsuitable for timber management. Managing for fish habitat, older forest wildlife habitat, soil protection, water quality, wilderness, unroaded recreation, undeveloped areas, and natural research areas all reduce the number of acres available for intensive timber management.

Although timber harvest may be reduced, it is not necessarily excluded entirely from such lands. Depending on the use and the circumstances, timber harvest may be prohibited, may be allowed in special circumstances such as salvage, may be permitted if trees are left to grow longer than usual, or may be permitted if particular precautions necessary to protect the resource are met.

Harvest rotation lengths, fertilization, thinning, and species mixture all are sub-components of this issue. Shorter rotations can be more economically efficient, but can have adverse effects on other resources such as fish and wildlife. Fertilization can improve yields per acre, but effects on fish habitat and watersheds may not be acceptable. Thinning of timber stands, which is necessary to obtain optimum timber growth, may not be cost efficient. The species mixture that is produced has direct effects on other resources including wildlife habitats.

Not all resources are harmed by timber harvesting. Some, in fact, are improved. Huckleberries, a resource important to Native Americans, are more apt to thrive where timber is harvested. Roads necessary to harvest timber become available for use by recreational visitors. Debris left from logging becomes firewood. Overall health of the Forest may be improved by removal of diseased or insect infested stands.

Other factors involved with this timber question include the location, density and design of forest roads. Roads provide the transportation system over which most of the timber is removed. They also provide access for the public and forest managers. However many people feel increased roading will increase harassment of wildlife, reduce hunting quality and wildlife movement. While roads do provide recreational access, they also decrease the availability of backcountry for hiking and may diminish the quality of the experience.

Producing timber in an economically efficient manner is a major objective. Forest planning attempts to incorporate all costs and benefits into the analysis. Specific values are often difficult to determine and are not always agreed to by all concerned.

Other issues connected to timber management include use of chemicals, timing of fuel management projects and availability of rock for road building. Protecting soil productivity and assessing cumulative impacts to maintain land stability are important considerations.

Maintenance of long term soil productivity is a management concern which is related to harvest and fuel treatment methods that use track or wheel mounted equipment. Productivity losses associated with surface soil compaction produced by these ground skidding and machine piling activities are the primary concern.

Research has found losses of site quality in areas where the soil surface has been compacted by ground equipment. 1/ Seedlings grown in such compacted soils demonstrate lower growth rates in comparison with individuals occupying undisturbed sites. Research also indicates growth rates are reduced in pole sized trees which have been left after thinning.

All soils are subject to compaction. The extent of compaction is dependent on clay content, rock content, organic matter content, structure, soil moisture content and pressure on the ground from machinery.

Current regional guidelines state that compaction on harvest sites must be limited to 20 percent of the harvest area. However, this goal is not always met if both tractor harvest and machine piling of debris are used. 2/ The cumulative impact from the combined activities increases compaction. The effects of soil compaction are known to last at least 40 years. The length of time that soil damage lasts has serious implications for intensive timber management.

1/ Frochlich, Henery A, 1979, Soil Compaction from Logging Equipment, Effects on Growth of Young Ponderosa Pine. Journal of Soil and Water Conservation. PP 276-278.

2/ Annual compaction monitoring results.

It should be recognized that a loss in soil productivity is risked whenever timber is harvested. Compaction and soil movement resulting from management activities has resulted in the reduction of site productivity of approximately 30,000 ^{3/} acres of the Forest.

Brush control is not a significant problem on this forest as only about 200-500 acres a year need treatment. Brush is currently removed by hand cutting or burning. The Forest has stopped using herbicides for removal of brush. Fertilizers are expected to be used on selected soil types to increase wood fiber production.

Timing of fuel management projects has become a problem. It is becoming more and more difficult to schedule burning of logging debris and stay within air quality standards. Firewood is high demand and is made available to the public where practical. Efforts are continuing to improve availability and accessibility of firewood. Timing for removal of logging debris is critical if we are to maintain a highly productive forest.

The current supply of firewood is primarily from residue left from logging old growth forests. The amount of such residue is directly tied to the amount of old growth available for harvest. As less old growth is cut, less residue will be available for firewood. Stiff competition between private and commercial firewood cutters could develop. It is also recognized that it is necessary to leave some logging debris as habitat for the wildlife species of the area.

The current situation on use of chemicals in the management of vegetation in the National Forests has a major effect on the timber planning question. An Environmental Impact Statement is being prepared by the Pacific Northwest Region of the USDA-Forest Service for a proposed vegetative management program within the Pacific Northwest Region for the entire states of Oregon and Washington. The Environmental Impact Statement is a result of a lawsuit filed against the USDA-Forest Service by Northwest Coalition for Alternative to Pesticides, Oregon Environmental Council, and Audubon Society. District Court Judge Burns issued an injunction in 1984 banning the use of herbicides in the Pacific Northwest Region of the Forest Service and Bureau of Land Management in Oregon until a "worst case analysis" was completed and properly considered by decision makers. The Forest Service and BLM completed a Human Health Risk Assessment for Herbicides which included a "worst case analysis." Both agencies are now incorporating the Risk Assessment into their programs for managing competing and unwanted vegetation.

^{3/} Jack Parcell - Forest Soil Scientist.

In June 1981, the Pacific Northwest Region of the USDA-Forest Service issued a Programmatic Final Environmental Impact Statement (FEIS) for Methods of Managing Competing Vegetation. This statement included detailed discussions and analyses of: a preferred alternative (full use of all methods; chemical use critically examined); alternatives to the preferred alternative (including no vegetation management, and no application of herbicides); and the consequences of the alternatives on the environment.

Based on the current preferred alternative in the Methods of Managing Competing Vegetation Environmental Impact Statement (EIS), all alternatives in this draft EIS are predicted on the continued use of the full range of alternative treatment methods. These include manual, mechanical, prescribed fire, biological, and chemical. The proposed Mt. Hood Forest Plan directs:

- The selection of any particular treatment method will be made at the project level based on a site-specific analysis of the relative effectiveness, environmental effects (including human health), and costs of the feasible alternatives, and that herbicides will be selected only if their use is essential and to meet management objectives.
- Monitoring and enforcement plans to implement specific measures will be developed for site-specific projects and described in the environmental analysis for those projects.
- If herbicides were to remain banned into the future, the effects on timber yield on the west and east side of the Forest would most likely be none to very minimal. Presently only 10% of the acres are planned for release, so the only impact would be on those acres.

-SUMMARY-

Key factors include the number of acres considered suitable for full timber harvest, the long-run sustained harvest level, the amount of total timber available for sale (allowable sale quantity), the number of acres which have extended cutting cycles assigned, (such as sensitive visual areas), and first decade harvest volumes.

Question 2: To what extent should fish habitat and water quality be maintained or enhanced?

The Forest provides a diversity of aquatic resources. Fish habitat and water are of primary concern. Approximately 48 fish species are supported by a variety of aquatic habitats. There are more than 1,000 miles of streams and over 3,800 acres of lakes and reservoirs supporting fish populations. Habitat conditions for game species in the "Salmon" family such as trout, salmon and steelhead are of high concern. The Forest has over 300 miles of streams which support runs of coho, spring and summer chinook salmon, winter and summer steelhead trout and sea run cutthroat trout. These fish, especially salmon and steelhead are a major cultural, recreational and economic resource to the local area and the Pacific Northwest. There are on-going multi-agency efforts to increase salmon and steelhead production in the Columbia River basin. This Forest's current and potentially available salmon and steelhead habitat is an important part of the basin total.

Over the past century, a number of activities, including development of natural resources in combination with over harvesting of fish, has greatly altered the habitat of anadromous fish and resident trout, thereby severely reducing their populations. Maintaining the fish production capability of the Forest requires its lakes and streams to be kept cool, unpolluted and relatively free from silt. Trout and salmon, in particular, have strict requirements for reproduction and survival. Numerous resource management activities including timber harvest, road construction, developed and dispersed recreation, energy development and grazing can reduce the capability of the habitat to produce fish.

Regional demand for anadromous fish far exceeds the current supply. There is a high interest within the Northwest concerning methods of increasing anadromous fish production. This is especially true for the anadromous stocks of the Columbia River Basin. Recent legislation providing for restoration of the anadromous runs is concerned with, among other things, the effort to achieve substantial increases in natural production of wild fish. The public and other agencies have asked the National Forests, including the Mt. Hood National Forest, to develop programs to increase fish habitat.

Production of high quality water closely parallels that of fish habitat. The Forests annual production of 5.4 million acre feet of high quality water provides for a variety of uses. The Forest provides municipal water for nearly 50 percent of the state population. In addition, water for seven fish hatcheries and irrigation projects comes from the forest. A variety of other uses such as developed recreation sites are closely linked to the water resource.

The productive capability of fish habitat and the quality of water are closely linked. Both are heavily influenced by the overall condition of the watershed and are specifically effected by conditions in a narrow transitional zone adjacent to water bodies. This zone is known as the "Riparian Area." Because of this relationship, fish habitat and water are referred to as "Riparian Dependent Resources."

Demands for maintenance and enhancement of fish habitat and water have steadily increased in the last decade. Recent Federal legislation such as the Northwest Power Planning and Conservation Act, in addition to a variety of state legislation, has focused on increasing protection for water from competing uses such as hydropower development, forest management activities, agriculture practices, etc.

To meet this increasing demand, special management considerations are necessary. Due to the generally even distribution of riparian and aquatic habitats across the Forest, the management of fish and water resources frequently involves interactions with a variety of other resources. Those activities or resource programs which do not significantly disturb the ground, such as wilderness management, visual and wildlife management, are compatible or complementary with fish and water management. Those activities which can and sometimes do affect the riparian zone, such as timber management activities, road construction, range management, energy development, irrigation, etc., are to varying degrees competitive. For these activities, special precautions are often necessary to reduce or eliminate detrimental effects to riparian dependent resources. Opportunities for improvement include rehabilitation of habitat degraded by man or natural causes and enhancement of natural habitat.

The degree to which riparian dependent resources are emphasized is a large factor in riparian quality. This is reflected by the amount and distribution of areas selected for riparian management, levels of habitat rehabilitation or enhancement work, and total acres of riparian management. Success of the riparian program is reflected in fish habitat capability and sediment indices, and additional fish production due to habitat improvement.

Question 3: How much and what kind of wildlife habitat should the Mt. Hood National Forest provide?

This question deals with the management of habitat for sensitive animals and plants. It is related to the question concerning riparian dependent resources.

While there are no federally listed threatened or endangered wildlife species on the Forest at this time, sensitive species are present. Sensitive species are those that could become threatened or endangered if adequate habitat is not provided for them to reproduce. Sensitive species of animals occurring on the Forest include the northern spotted owl and the Larch Mountain Salamander. The home of the spotted owl is mature old forest (old growth) and that of the Larch Mountain Salamander is loose rocky (talus) slopes in old growth.

A large number of sensitive plants are found on the Forest. Sensitive plant species are located in many different habitats. Those habitats which may be most subject to damage are old growth and riparian areas. At present, about 350,000 acres or one third of the Forest is old growth. Old growth forests provide habitat for 159 species of wildlife, anadromous and resident trout and many sensitive plants. Eight species of wildlife are entirely dependent on old growth and/or mature forest. Many plant species also require old growth stands. Many visitors to the Forest desire old growth areas for recreational sites and for scenic and aesthetic values. Because of the many conflicts which could develop in the use of this type of area, careful planning is essential.

Recreational visitors to the Forest, whether they hunt, fish, picnic, hike or are involved in nature study, all enjoy the presence of wildlife. Some species of wildlife are very tolerant of human presence, some are very intolerant and a small amount of human activity will cause them to leave the area.

Managing the wildlife resource is heavily intertwined with managing the timber resource. Depending on the manner, location, and intensity of harvest, logging can have a detrimental effect on wildlife habitat. Harvesting of old growth timber may threaten the species of animals and plants dependent on it. However, timber harvesting can be beneficial to some species of wildlife, especially if it is done in such a way as to increase or maintain diversity of habitat. While it is not always necessary to eliminate timber harvest in areas protected for wildlife, it is often severely restricted.

While fish, wildlife and water are an attraction and benefit to recreational use of the Forest, too much recreational use can be detrimental. Water pollution and harassment of animals can occur. These harmful effects are more apt to happen in heavily used or developed areas.

Forest managers are concerned about maintaining a balanced and diverse range of habitats in order to provide for the continued existence of native species of plants and animals as well as desired introduced species of wildlife. Legal direction also requires the provision of species and habitat diversity over time and space.

In order to maintain viable populations of wildlife species over their present range of distribution, habitat suitable to support them must be available. This habitat must be available in sufficient quality and quantity to support at least a minimum population. The distribution of this habitat must be extensive, yet sufficiently close enough together so that animals can find breeding partners. Distribution of the various habitats is just as important as total amounts. Wildlife thrives where there is a diversity of habitats.

Wildlife habitat management affects a number of other resources and issues, but is most closely related to timber production and harvest, firewood collection and recreation. Different species of wildlife have various requirements. Each stage of growth of trees offers habitat for some species of wildlife. Examples are pileated woodpeckers and pine marten, which require old growth, and deer and elk, which require open spaces such as is available after a clear-cut. However, large expanses of any one age-class of timber are also detrimental to wildlife.

The resolution of this planning question involves management direction, and land use designation. Management direction which sets standards for timber harvesting and other resource management activities will often protect sensitive areas while permitting logging or road construction. Programs aimed at habitat rehabilitation can often help improve the wildlife resource.

Where different uses are not compatible, land use designation is necessary. Designating a certain amount of acres of old growth for protection and another amount for harvest will be a necessary decision. The amount of old growth and riparian habitat receiving special management emphasis will depend on the alternative chosen.

Question 4: How should the Mt. Hood National Forest manage its outdoor recreation resources to meet the increasing demand of a nearby urban population?

There is a continuing demand for a wide variety of recreational opportunities, especially for dispersed recreation outside of wilderness areas and in low elevation areas near urban centers. Conflicts arise between recreational uses and other management activities, as well as between different types of recreation uses. Management activities, such as harvest of timber, which disturbs the natural features, conflict with many recreational uses. Cross-country skiers and snowmobilers are not compatible on the same trail at the same time. Backpackers looking for solitude and off-road vehicle users may want to use the same areas at the same time. Conflicts need to be reduced between such activities without seriously affecting the quality of the recreational experiences or seriously curtailing other management activities.

The various aspects of this planning question include providing a wide range of recreational experiences which include highly developed areas with concentrated use such as ski resorts and isolated trails or picnic sites.

Many of the recreational visitors to the Forest have expressed considerable concern for its visual appearance. The presence of a visually pleasing setting for the Forest visitor is a part of this planning question. Most urban visitors expect a wooded travel corridor along the roads. For those who enjoy canoeing or floating the rivers and streams of the Forest, a beautiful landscape might be an essential part of the experience. The high recreational values of the forest are directly linked to its beautiful scenery. However, providing a pleasing appearance may be in conflict with the management of other resources.

Facilities and vegetation in some developed sites, such as campgrounds, which receive a high use are deteriorating. Some sites have been closed and many facilities are in poor condition. This is occurring at the same time that increasing recreational use is placing a greater demand on recreation facilities. Areas subject to extremely heavy use, such as Timberline Lodge and Multnomah Falls often are subject to congestion and vandalism. A few popular campgrounds, such as Timothy Lake and Indian Henry are heavily used, especially on summer weekends. Other campgrounds are small and inadequately maintained, being served by roads which are barely passable by passenger car.

The trail system on the Forest provides a variety of hiking experiences from family day hikes to solitary back country hiking in natural surroundings. However, most of these trails are within existing wilderness or scenic areas. The trail system is deteriorating in many places from heavy use and lack of maintenance. Some trails have been closed. Many have not been replaced. The Forest needs more trails to accommodate the demand and to disperse use. If present trends continue, the Forest will be unable to meet the future needs for people who prefer primitive type hiking experiences.

Even if all the remaining roadless areas on the Forest were designated for roadless recreation, the projected demand for non-motorized dispersed recreation will not be met. Demand will exceed supply in the near future, if it hasn't done so already.

Conflicts exist between recreation and other uses of resources. Where recreation pursuits require a natural setting, activities, such as logging and road construction, often appear to be inappropriate.

The potential for conflict also exists between different types of recreational uses. Along with the increase in hiking, use of off-road vehicles is increasing. Where solitude is needed to fulfill recreational needs, large numbers of people or the use of machines by others is incompatible.

Many of the urban population who use Wilderness on Mt. Hood Forest are not familiar with the intent of the Wilderness designation. Their demands for access points, facilities and structures are inconsistent with the purpose of the Wilderness Act.

Demand for wilderness hiking is expected to exceed the supply. At present, use of Wilderness is uneven; with overcrowding of popular Wilderness locations occurring already. Other locations are little used. Demand for Wilderness is expected to exceed supply, overall, in the first decade after the plan is completed. Heavy use, if continued, will damage the values people come to experience in Wilderness. Solitude, vegetation, water quality and wildlife are at risk from over-use by recreational visitors.

To answer this planning question, the Forest must develop management plans for each Wilderness that will address problems and set standards, including possible use limits based on carrying capacity. The Forest must use all available means to educate the public on the intent of the wilderness designation and what they can expect in a Wilderness setting.

The public is also concerned that skiing facilities will be developed beyond the capacity of the area to accommodate the use. This is related to the traffic congestion on Highway 26. The demand for downhill skiing opportunities is expected to increase, however, there are no other sites on Mt. Hood which are suitable for development as ski areas. To accommodate future use, expansion will need to take place at existing sites. To prevent damage to the sites, use may need to be limited.

Periodic congestion of Highway 26 is especially severe in the winter during the skiing season. Expansion of the ski resorts would aggravate the situation. According to a joint study by the Oregon Department of Transportation and the Forest, the further development of ski resorts may need to be controlled if the traffic congestion becomes unacceptable.

Resolution of the problems involved with this question revolve around the number of acres identified as being managed for visual and unroaded values. Also, specific management direction may be incorporated into the other resource operations where activities overlap. Improvements to facilities depend on annual budgets and they cannot be predicted at this time.

Question 5: How should the remaining roadless areas be managed?

The passage of the Oregon Wilderness Act in 1984 left the Forest with approximately 158,000 roadless acres located in 13 different areas. The Act released these areas for multiple use management. The thrust of this question is whether these acres should remain roadless. Public comments on individual roadless areas show a high level of concern for keeping some areas in a roadless condition because of the values associated with them.

There are many resource interactions involved. Developing some roadless areas could increase wood production, as well as opportunities for development of other resources. Retaining some roadless areas in an undeveloped condition protects habitat for some sensitive wildlife species, provides opportunities for primitive recreation and retains options for future land use decisions.

Except for the Olallie Roadless Area, these areas will not be recommended as Wilderness through this cycle of the planning process. They may however, be managed for the benefits that result from being undeveloped. The option for future wilderness designation would be preserved, as well as the option for the development of the areas natural resources. In the various alternatives, a range of management activities from complete development to complete protection has been explored.

The Olallie Roadless Area requires special attention. When the Oregon Wilderness Act was passed, the Olallie Roadless Area was assigned to a Further Planning Category by Congress. There are supporters and opponents for wilderness consideration for the area.

The crux of the problem is land use designation. The possibilities range from maintaining all of the roadless areas as roadless to maintaining none roadless. The alternative finally chosen could have any combination in between.

Question 6: How should the Forest address the social and economic concerns of local communities depending on the Forest?

A number of small communities near the Forest have had a high proportion of their work-force employed in the woods product industry. The major source of logs for the sawmills in these towns has been the Mt. Hood National Forest. Further, the counties depend on timber receipts for a large portion of their road and school budgets. Should the need to protect other resources result in a lesser amount of timber being offered for sale, these communities may have a problem adjusting to a lower volume of logs and dollars available.

Small towns with only one or two major industries, such as those found on the east side of the Forest, are highly dependent on a stable supply of logs. Assuming an adequate demand for wood products, the supply of logs can be critical. Recent trends indicate a period of difficulty for the wood products industry in Oregon. Demand has been low and production costs are high. Being dependent on the timber industry makes these communities especially sensitive to fluctuations in both timber supply and demand.

A stable supply of logs available may be less important to employment in the wood products industry today than other factors however. The local demand for the product and modernization of sawmills has taken a heavy toll on employment. During the last recession, timber that has been sold by the Forest remained uncut. These factors indicate that change in the employment patterns of the Pacific Northwest may occur, regardless of the availability of logs.

Not all communities are equally dependent on logs from the Forest. Some communities, such as those in the Mt. Hood Corridor and the Hood River Valley, depend on the Forest for other products and services. Water for drinking, agriculture and recreational opportunities, including hunting and fishing, are important to many communities near the Forest. In many cases, employment is based on recreational visits to the Forest. Agriculture in the Hood River Valley is a large source of jobs and is almost totally dependent on water from the Forest. Failure to protect these resources would be detrimental to those financially dependent on them.

There is considerable concern about forest management along the Highway 26 corridor. Many people feel that timber harvesting will hurt their recreation oriented businesses as well as the property and scenic values of the area. Because of the private land ownerships in the area, conflicts associated with the interactions between public and private lands are expected to continue as the corridor population increases.

The Community of Native Americans on the Warm Springs Indian Reservation have voiced concerns about a possible decrease in the supply or availability of forest products traditionally used in Native Americans religious or cultural ceremonies. The Forest is the source of many of these traditional religious food and craft products necessary to the cultural practices of Native Americans. These resources include fish, wildlife and plants.

Supplies of some of these traditional and ceremonial foods have decreased in recent decades. In recent years huckleberries have been diminishing in numbers because of trees crowding out the huckleberry bushes. Concern about the huckleberries is most closely related to timber management and fire. Huckleberries grow best where the Forest is open and sunlight can reach them. Salmon are in critically short supply all over the Pacific Northwest, including the Columbia system.

The Forest has cooperated with the leadership of the Confederated Warm Springs Tribes in order to ensure access to resource areas is not denied. The cooperation will continue. An important aspect of the coordination of the Forest with the Warm Springs Tribes concerns the management of fish and wildlife habitat, especially that for anadromous fish. Salmon are particularly important to the Tribes, both for subsistence and ceremonial purposes. The Native American Religious Freedom Act insures that Native Americans will have access to sites which will allow them to carry on their traditional religion.

The resolution of this question is related to the amount of land designated to timber production. The complete solution to the problems of community stability is not entirely under the control of the Forest. Those communities which have a diverse employment base instead of relying on one industry will do better in the long run. Cooperation among the State of Oregon, the private business sector, the communities themselves, and Federal agencies, including the Forest Service will be needed to withstand the changing times ahead.

In addition to management direction, land use designation will affect the supply of ceremonial foods. The amount of land designated for fish and wildlife habitat management, especially that for salmon, will affect the amount of salmon and other species available to Native Americans. The amount of land designated for timber harvest will indirectly affect the amount of huckleberries available in some areas.

APPENDIX B

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

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I. INTRODUCTION

A. The General Planning Problem

The Forest Service is responsible for determining how to best manage National Forest System lands based on public desires and land capabilities. The Mount Hood National Forest is a highly diverse area with an equally diverse mix of users.

The Forest is located 50 miles east of Portland, Oregon, and stretches about 60 miles from the Columbia River on the north to Mount Jefferson on the south. The Forest takes its name from the mountain which it surrounds, Mount Hood. The east-to-west width of the Forest varies from 10 to 50 miles, with 1,100,713 acres of land within its boundaries. Of this, 1,059,439 acres are National Forest System lands; the remainder are private, State, or other Federal lands.

Vegetation varies from ponderosa pine and sagebrush along the east side to hemlock and devils club on the west side. True firs, Douglas-fir, hemlock, and western red cedar are predominant in the Forest as a whole. A total of 647,118 acres were found to be tentatively suitable for timber production.

The Mount Hood's variety of recreation opportunities and proximity to large population centers accounts for its recreational popularity. It is one of the most heavily visited National Forests in the Nation with almost seven million visits recorded in 1985. The year round skiing at Mount Hood and unparalleled vistas afforded by the Columbia Gorge are but two examples of the contributions of the Forest to the recreating public.

Major east-west highways on the Forest include I-84 through the Columbia Gorge and U.S. 26 across the heart of the Forest via Mount Hood. Much of the Forest is less than a three hour drive, or a tank of gasoline for a round trip, from the large population centers comprising the Willamette Valley.

Major sources of employment and income in the local area (Clackamas, Hood River, Multnomah, and Wasco Counties) are manufacturing, service, and trade industries. Recreational use of the Forest and timber harvesting make important contributions to the local economy. Some of the smaller communities are particularly dependent on the Forest.

Public interest includes divergent viewpoints about the use of market commodities such as timber, grazing, energy, and nonmarket commodities such as wilderness, unroaded recreation, scenery, wildlife, old-growth, and habitat diversity. The Forest's major planning goal is to provide information to help decision makers determine which combination of goods, services, and land uses will maximize net public benefit. (This concept is further discussed in Section IV of this Appendix.)

Obtaining enough information about the production of the many goods and services from the Mt. Hood National Forest to produce an informed choice from among competing demands is a formidable task. There are innumerable relationships, factors, and possibilities to consider. Quantitative analytical techniques offer an opportunity to reduce the complexity and magnitude of the problem to manageable proportions.

This Appendix focuses on the analytical processes employed in evaluating management alternatives for the Forest. While the results of this analysis will contribute significantly to a final decision, it should be recognized from the outset that not all factors relevant to the decision have been explicitly recognized in the quantitative analysis or precisely described in this Appendix.

B. Planning Process

The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework to address this objective. They also state that the requirements of the National Environmental Policy Act (NEPA) and its regulations (40 CFR 1500-1508) must be applied in this analysis process.

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management. Principally, processes formerly used to make individual resource decisions are now combined to help make integrated resource management decisions; and new mathematical modeling techniques are used to analyze alternative land management scenarios, including identifying the most efficient pattern of land management. The 10-step planning process is discussed in the NFMA regulations and in Chapter I of this document. The steps are briefly summarized below:

Step 1: Identification of issues, concerns, and opportunities (ICO'S)

In any systematic approach to problem solving, the first step is to identify the problem. In this step, the Interdisciplinary Team (ID Team) identifies and evaluates public issues, management concerns, and resource use and development opportunities. What does the public want? What does the Forest Service want? What needs to be done?

Step 2: Planning criteria

Criteria are designed to guide collection and use of inventory data and information, analysis of the management situation and the design, formulation, and evaluation of alternatives. This step sets the guidelines for accomplishing the next 5 steps.

Step 3: Inventory data and information collection

The type of data and information needed is determined in Step 2 based on the ICOs. The data is then collected and assembled in a manner meaningful for answering planning problems.

Step 4: Analysis of the management situation

This step is a determination of the ability of the planning area to supply goods and services in response to society's demands. This provides a basis for formulating a broad range of reasonable alternatives.

Step 5: Formulation of alternatives

A broad range of reasonable alternatives is formulated according to NEPA procedures. Alternatives are formulated in a manner which provides an adequate basis for identifying the one that comes nearest to maximizing net public benefits.

Step 6: Estimated effects of alternatives

The physical, biological, economic, and social effects of implementing each alternative considered in detail are estimated and compared according to NEPA procedures.

Step 7: Evaluation of alternatives

Significant physical, biological, economic, and social effects of implementing alternatives are evaluated with respect to the planning criteria.

Step 8: Preferred alternative recommendation

The Forest Supervisor reviews the Interdisciplinary Team's evaluation and recommends a preferred alternative to the Regional Forester. This is identified in the Draft Environmental Impact Statement and displayed as the proposed Plan.

Step 9: Plan approval

The Regional Forester reviews the proposed plan and Final Environmental Impact Statement and either approves or disapproves the Plan.

Step 10: Monitoring and evaluation

The plan establishes a system of monitoring at established intervals to determine how well objectives have been met and how closely management standards and guidelines have been followed. Based on these evaluations, the plan will be revised or amended as necessary.

Appendix B describes the analysis phase of the planning process, covering steps 3, 4, 5, and 6.

II. INVENTORY DATA FOR INFORMATION COLLECTION

Planning Step 3 is the collection of information. An overview of how data has been obtained and arranged for use in the analysis is included in this Section.

Inventory items and information used in this planning process are the most current and reliable that were available at the time the planning data base was being compiled. The primary objective was to use available sources. New field data was collected only if such information was specifically lacking in existing sources and the data was required to address issues. The age, condition, and quality of the individual pieces of information varies.

The possibility of unreliable data introduces uncertainty into the planning process. Gaps in information have been bridged with assumptions. Interpretation of results of analysis requires a recognition of uncertainty. Throughout this Appendix, known inadequacies of information have been discussed and assumptions explained. An expected result of this planning effort is the recognition of needs for improved data in many areas of national forest resource management.

A. Use of Data

Inventory data was assembled for many resources so that issues could be addressed, resource capabilities determined and limitations defined. A portion of this data was necessary to develop the Forest Planning Model (FORPLAN). This use of data is described fully in Section III. The overall role of data in the analysis process is summarized here.

1. Delineation of Capability Areas

The Mount Hood National Forest uses a computer mapping system known as the Grid Mapping System (GMS). This system uses basic data layers as initial input. These were obtained from the TRI (Total Resource Inventory) System 2000 database. The TRI database comprised an inventory of site specific data, kept current with respect to the effects of recent fires and harvesting.

Once the basic inventory layers are available in GMS, numerous combinations of machine generated layers can be developed. Data summaries and/or maps can be created from either the primary or "generated" layers. GMS can provide site specific data from various inventories such as timber size classes, slope and soil data, ownership, political boundaries, watersheds, livestock allotments, recreation sites, scenic viewsheds, and many other inventory and computer generated items.

GMS uses a base map scale of 1 inch = 1 mile. Twenty-one acres is the smallest size area represented by GMS. Each cell, as described by its unique characteristics, is a capability area. Capability areas are specific, contiguous areas of land which possess the same attributes affecting management decisions.

2. Stratification of the Forest into Analysis Areas

GMS was used to aggregate similar, individual, capability areas into noncontiguous units called analysis areas. These analysis areas formed the basic land stratification for analysis within FORPLAN.

Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model. They serve as the basic unit of land in the model for which a range of prescriptions are developed to achieve various multiple use objectives. Their delineations were intended to capture the significant physical, biological, and economic differences in the way the land responds to alternative management strategies. The focus of delineating analysis areas was upon addressing certain issues, concerns, and opportunities identified at the outset of the planning process.

The process for stratifying the land into analysis areas involved the successive overlaying of 7 different layers of data. Each layer represented a different inventory of the entire forest, and represented combinations of basic data layers.

3. Determination of Production Coefficients

Production coefficients describe relationships between inputs to and outputs from management of the Forest. Inputs consist of management activities and their costs; outputs consist of measurable desired and undesired results, and their benefits. Estimated results of conducting certain management activities or prescriptions on specific analysis areas are based on research data. Coefficients have been applied in FORPLAN on a per acre basis. Other coefficients have also been used for supplemental analysis.

4. Determination of Suitability for Management Practices

Suitability for different types of management is dependent on production relationships, which are in turn dependent on the inherent capability of the land. Analysis areas based on GMS data provide much of this information, and additional map layers were used in determining where particular types of uses were most appropriate (see Section VII).

The NFMA Regulations require the identification of lands which are not suited for timber production (36 CFR 219.14). A three stage evaluation process is employed. The last two stages are determinations of economic efficiency and interactions with other resource objectives. The first stage is a determination of tentative suitability. The results of this first stage determination are summarized below.

Table B-II-1 SCREENING PROCESS

<u>Unsuitable Land</u>	<u>Acres</u>
Land not managed by Forest	41,274
Non-forested lands	227,198
Administratively withdrawn from Timber production	127,340
Sound management not feasible with existing technology	57,783
Tentatively suitable forest land	647,118
Total Mt. Hood National Forest	1,100,713

Non-forested lands are those capable of supporting less than 10% tree cover. These include rock, glaciers, water, or areas allocated for administrative or other uses. Almost all of the lands administratively withdrawn were done through the designation of wilderness areas. In addition, lands were identified on which the technology may have been insufficient to prevent damage to the site during timber harvest or to successfully regenerate a new timber stand. These lands were removed from timber production.

Data sources for this suitability analysis included geology, soils, and vegetation in-place data (Geology Inventory, SRI, TRI, aerial photos) and the professional expertise of the Forest Silviculturist, Soil Scientist, Geologist, Area Ecologist, and district specialists.

The result of this process is that 453,595 acres have been identified as unsuitable for timber production. This constitutes 41% of the total Forest acreage. Additional information may be obtained from the paper entitled "Determination of Land Not Suitable for Timber Production". Mt. Hood N.F., July, 1984.

5. Development of Allocation and Scheduling Alternatives

Land use designation and scheduling are determined by GMS inventories and the FORPLAN model for any set of management objectives. The model uses production coefficients derived from inventory data in determining the most efficient land use and implementation schedule. This process is detailed in Section III.B., and alternative development is discussed in Section VII.

6. Monitoring of Implementation

A Monitoring Plan is included in the Forest Plan. It addresses monitoring of specific management practices and their outputs and costs. Information obtained from monitoring is expected to be used in improving the forest data for future planning activities.

7. Development of Subsequent Programs for Plan Implementation

Much of the data used to develop alternatives can be used to prepare programs and projects for implementing the plan. Some projects may need a higher degree of resolution than the 21 acre minimum size of much of the Forest planning data, however. Other inventory data is available for project purposes, particularly in the Total Resource Inventory (TRI) system.

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III. THE FOREST PLANNING MODEL

A. Overview

Forest Planning is a very complex process in which an enormous amount of information and interdependent decisions must be considered before an alternative management plan can be recommended. Because of this, forest management models and other analytical tools have been developed and utilized to help determine the decision space within which alternatives can be developed, and to evaluate their associated outputs and effects.

The primary model which produces schedules for alternative land allocations is called FORPLAN (an acronym for FOREst PLANning model). FORPLAN is a linear programming based computer modeling system. It has its roots in earlier systems such as RAM (Resource Allocation Model) and MUSYC, (Multiple-Use Sustained Yield Calculations).

Several releases of two different versions of the model have been developed. The Mount Hood National Forest has used Version I, Model 2, Release 14 since October 1984 to perform all of the FORPLAN analyses represented in the present DEIS. This version and release has been maintained and operated on the UNIVAC computer at Fort Collins, Colorado.

FORPLAN consists of three components:

- 1) a matrix generator to translate the Interdisciplinary Team's input into the proper format for the linear programming component to use,
- 2) a linear programming system (FMPS, Functional Mathematical Programming System), which produces an optimal solution, and
- 3) a report writer to translate the linear programming solution into outputs and effects that are useful for decision making.

Linear programming is a mathematical modeling technique used to solve a series of simultaneous linear equations, such that one criterion (the objective function) is maximized or minimized, subject to meeting all other specified criteria (constraints). Pertinent information about the Forest and management activities must be translated into linear equations in order to apply linear programming to the planning problem. This task was performed by the Interdisciplinary Team.

One key step in the development of the FORPLAN Model was to divide the Forest into "analysis areas." Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN Model. They are not contiguous, but include parcels from within large areas of the Forest. Their delineations were intended to capture the significant physical, biological, and economic differences in the way the land responds to alternative management activities. The delineations were based upon public issues, and were limited by data availability and model capability.

In the FORPLAN model, management prescription options were provided for each analysis area. These management prescriptions are combinations of scheduled activities and practices, and their associated outputs and effects. The outputs and effects associated with the application of prescription choices to analysis areas are represented as mathematical coefficients, upon which the model performs its calculations.

Prescriptions are composed of management emphases and intensities. The emphasis of a prescription is directly related to the management area categories delineated for each alternative. Each emphasis designed to yield sustainable timber volume also provided for a choice of from two to five intensities of timber management. These timber options included those that were the most economically efficient, as well as those that produced the greatest volume. This range of options permitted the model to provide efficient means of achieving the objectives of the alternatives.

Alternatives are generated by applying constraints to require FORPLAN to produce 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 that will meet the overall goal of the alternative. [The conditions set by the constraints are satisfied before the objective function is optimized.]

FORPLAN was used to determine the contribution of management prescriptions on analysis areas toward the production of measurable goods and services and outputs and effects. These contributions were evaluated by the model in terms of how well a specified goal was reached. This goal is termed an objective function. Two objective functions were used in benchmarks and alternatives: maximize timber volume, and maximize present net value (PNV). All alternatives were run with maximum PNV as the final objective function.

After meeting all constraints, the FORPLAN model selected timber options and schedules which provided the most economically efficient means of achieving the objectives of the alternative. High levels of outputs other than timber were achieved by using constraints rather than an objective function.

B. The Analysis Process and Analytical Tools

FORPLAN is the cornerstone of the analysis process. It is used primarily for the formulation of benchmarks and alternatives. It is also used, along with other tools and techniques, to evaluate the benchmarks and alternatives. The analysis process may be subdivided into the following three phases:

- 1) Analysis prior to FORPLAN
- 2) How FORPLAN was used in the analysis
- 3) Any analysis done in addition to FORPLAN model analysis

1. Analysis prior to FORPLAN

Public issues, management concerns, and resource use and development opportunities (ICOs) were identified in accordance with 36 CFR 219.12(b), as described in Appendix A. Most of the ensuing analysis was driven by these issues, concerns, and opportunities.

Much of the analysis prior to using the FORPLAN model involved determining how to build the model to address the identified ICOs. It involved the application and interpretation of the data compiled pursuant to 36 CFR 219.12(d). The Forest was stratified according to its tentative suitability for timber harvest as described in Section II.A of this appendix. Analysis areas were delineated, management prescriptions were developed, timing options were analyzed for prescriptions that harvested timber, and yield coefficients were developed. These processes are detailed in Subsections C, D, E, and F, respectively, of this section of Appendix B.

Costs, benefit values, and demands for various outputs were developed as described in Section IV. Minimum management requirements were developed as described in Section VI.B. Resource inventories were prioritized by the ID Team for use in constraining alternatives. This process is described in Section VII.

2. Use of FORPLAN in the Analysis

Non-timber resources are considered in two ways. First, considerable spatial reference is provided by locating all modeled management activities in one of 15 major watersheds on the Forest. This allows area-specific analysis of the effects of timber management. Second, other resource uses of the Forest are modeled as reduced levels of timber management emphasis on selected areas with high values for those other uses.

FORPLAN was used to analyze the production of outputs and physical tradeoffs between the recreation, water, timber, visual, unroaded, range and wildlife resources on the Forest in the analysis of the management situation. The model was then utilized to identify the most efficient timber management regimes, consistent with meeting goals for other resources.

FORPLAN was used during the analysis of the management situation to determine the maximum production potentials of various Forest resources, the most cost-efficient ways of managing the Forest, and the effects of certain laws, policies, and economic assumptions. This information was then used in the development of alternatives. FORPLAN was used to determine the most cost-efficient mix and timing of timber management activities associated with the achievement of multiple-use objectives of alternatives.

The Mt. Hood FORPLAN model is therefore designed to provide a thorough analysis of timber production potential by identifying analysis areas based on timber species, potential productivity classes, and existing size and age. The economic value of timber harvested is included, and slope and presence of a road system are incorporated into cost of timber harvest. No other resources contribute directly to the model's objective functions.

Preliminary work with the FORPLAN model indicated that characteristics of the model and absence of necessary data concerning forest production interrelationships tended to prevent meaningful land allocation decisions. Many of the factors important to allocation decisions could not be meaningfully specified as linear equations for FORPLAN.

The model optimizes based upon an economic objective function. Economic benefits of non-market resources can not be placed upon an equal footing with timber values in the model formulation for the Mt. Hood. Many of the values provided by the Forest are derived from such resources as scenery, unroaded areas, and fish and wildlife. The resources themselves have no assignable value, although to a small degree such values have been represented as changes in either the number of recreation visitors or the quality of the recreation experience.

Where the attainment of specified levels of non-market outputs is to be required by a model constraint, the model must be provided with some basis for identifying which areas can provide such outputs. While analysis areas could be stratified based upon the relative capability to provide non-market values, doing so for all resources would exceed the capacity of the model. Even so, the model would tend to produce impractical results because of its ignorance of spatial relationships.

Because of these reasons, the decisions regarding which portions of the Forest should be managed under each management emphasis in each alternative were made by the Forest Interdisciplinary Team. The team used inventory maps for each resource use considered, assisted by a computer overlay process. Resource capabilities were prioritized using a process described in Section VII of this appendix. This information was used to constrain FORPLAN to management emphases corresponding to land management appropriate for the alternative.

This technique ensured spatial feasibility and management area boundaries which made sense to the land managers who would have to implement them. At the same time it promoted economic efficiency by favoring management for non-market resources on those portions of the Forest where the benefits achieved would be perceived as the greatest.

Choices of timber management intensity and timing of management practices were available to FORPLAN within the selected management emphasis. Management intensity and scheduling choices involved information which could be more accurately portrayed in FORPLAN. Therefore FORPLAN was used to optimize management intensity and scheduling for each alternative.

A number of outputs and effects were directly estimated using FORPLAN's reporting capabilities. These include:

- allowable sale quantity (ASQ) by timber species
- miles of roads built and maintained (by standard of road)
- miles of local roads upgraded to collector status
- age class distribution of vegetation

The use of FORPLAN in benchmarks and alternatives is described in detail in parts VI, VII and VIII of this appendix.

3. Analysis in Addition to FORPLAN Analysis

FORPLAN outputs were used as inputs for other analysis processes in some cases. Other analysis was also done totally independent from FORPLAN.

Changes in timber harvests and the road system were developed with FORPLAN. These changes were then translated, outside of FORPLAN, into effects on wildlife, riparian areas, recreation, visual, roadless, forage for grazing, firewood gathering, and other outputs. Changes in these physical outputs were translated into changes in employment and income using coefficients generated with IMPLAN. The Forest's IMPLAN model is discussed in Section V of this appendix.

The variable costs and benefits which influenced intensity and scheduling decisions were included in FORPLAN. The discounted costs and benefits of activities other than timber harvest and road construction and maintenance and the present net value of the aggregation of all goods and services were estimated outside of FORPLAN. Economic efficiency analysis is detailed in Section IV of this appendix.

Budgets, returns to the U.S. Treasury, and payments to local governments were estimated outside of FORPLAN. Some of the inputs to these calculations were taken directly from FORPLAN; others were estimated by hand. More detail can be found in Sections IV and V of this appendix.

FORPLAN determined the harvest schedules within the aggregation of all roadless areas. Analysts then disaggregated this overall solution into individual roadless areas. This disaggregation was governed by the goal of entering as few roadless areas as possible. This process overrode the tendency of FORPLAN to "nibble" at all the available roadless areas. Such a result would have ignored the spatial nature of road and logging systems, and would have unnecessarily reduced short term contributions of unroaded recreational value to overall net public benefits. This analysis is fully described in Section VIII.

Other outputs and effects estimated outside of FORPLAN are described in Part F of this Section. Where cost efficiency was a consideration it is included in those discussions.

C. Identification of Analysis Areas

One of the first steps in the development of FORPLAN was to divide the Forest into analysis areas. Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs, effects, cost and benefits that are being analyzed within the FORPLAN model. Analysis areas serve as the basic unit of land in the model for which a range of management prescriptions were developed to achieve various multiple use objectives.

The delineation of analysis areas was based upon selected issues, concerns, and opportunities identified at the outset of the planning process. They were intended to capture the significant physical, biological, and economic variations in the way the land responds to alternative management prescriptions. For this task, the TRI (Total Resource Inventory) System, as translated into GMS map overlays, was used extensively.

The following discussion presents the rationale behind the identification and delineation of the analysis areas according to the six FORPLAN levels of analysis area identifiers (plus age). Factors considered, such as production costs, data reliability, geographic reporting or control needs are described where appropriate. The organization of identifiers within each level is designed to generate the least number of analysis areas consistent with the complexity of the Forest and the planning problem, and with the availability of data to identify and describe resource production parameters.

Model size limitation was a significant factor in analysis area delineation. The first attempt at delineation produced over 1500 analysis areas. The model is physically limited to 800 areas, and a considerably smaller number is desirable to obtain reasonable costs for FORPLAN runs. The Mt. Hood FORPLAN model was designed to operate quickly and cheaply so that it could answer a greater number of questions reasonably well. In so doing, the opportunity was lost to analyze some questions in greater detail.

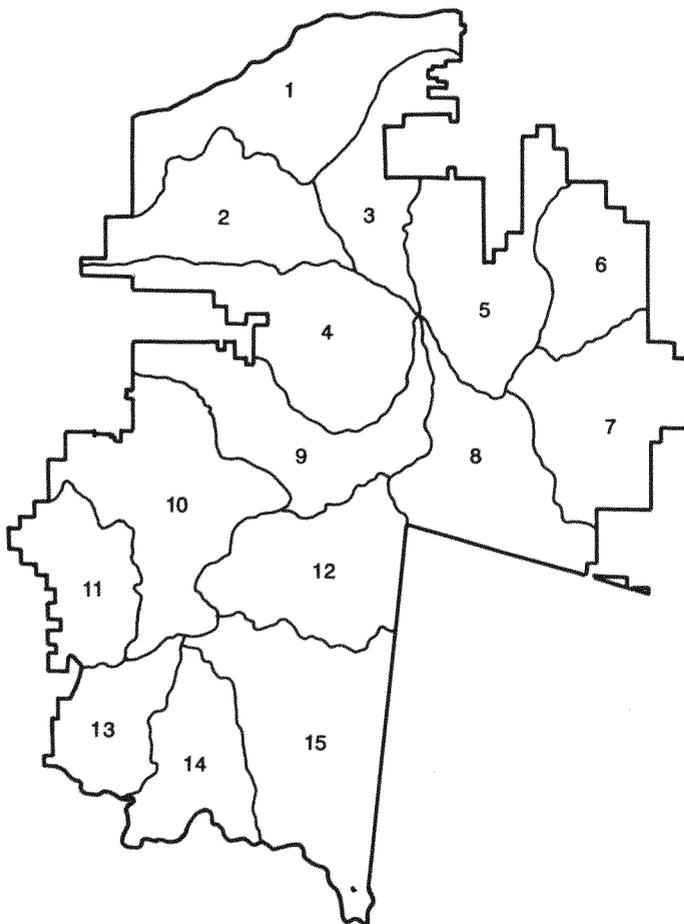
Various criteria were established for aggregation of analysis areas, including a 640 acre minimum size limit. The model used in alternative analysis contained 365 analysis areas, of which 289 were tentatively suitable for timber management. Merging of analysis area categories necessarily resulted in the use of averaged coefficients. However, the inherent imprecision of most of these coefficients may not have justified a more precise delineation of analysis areas, and the accuracy of the model should not have been unnecessarily impaired.

Level One

Level one of the FORPLAN analysis area identifiers described physical location by drainage (see Figure B-1, on following page) for the boundaries of the drainages). The primary reason for choosing to include this degree of geographic specificity in the model was for possible future linkage to a transportation planning model which could disaggregate the FORPLAN timber harvest schedule.

Figure B-1

DRAINAGES



Drainage

- 1 Columbia River
- 2 Bull Run River
- 3 West Fork Hood River
- 4 Sandy River
- 5 East Fork Hood River
- 6 Miles Creeks
- 7 Badger/Jordan Creeks
- 8 White River
- 9 Salmon River
- 10 Lower Clackamas River
- 11 Fish Creek, Molalla River
- 12 Oak Grove Fork Clackamas River
- 13 Hot Springs Fork Collawash River
- 14 Collawash River
- 15 Upper Clackamas River, Warm Springs River, Breitenbush River, Olallie Lake

The geographic specification has been useful for other purposes. This identifier permitted harvest scheduling constraints to be applied to specific areas on the Forest. This provided a much more reasonable solution in terms of spatial feasibility of timber harvest than allowing the model to concentrate harvests, which is possible when forestwide constraints are used. Constraints used to meet the minimum management requirement of harvest dispersion (see Section VI) and area-specific prescription constraints (see next subsection) utilized the Level One drainage stratification.

Road construction and reconstruction costs in FORPLAN vary in accordance with the amount of roads presently existing in a drainage. Timber haul costs (a component of logging costs) differ depending on the distance of the drainage from processing points. The FORPLAN solution by drainage has also been used as basis for preliminary allocation of timber volume objectives to districts.

This degree of geographic specification has also permitted more site specific analysis of environmental effects of alternatives. In particular, distribution of old-growth and water quality require some knowledge of the location of management activities.

<u>LEVEL ONE IDENTIFIERS</u>	<u>Thousands of Acres</u>
Columbia River Drainage	78
Bull Run River Drainage	66
West Fork of the Hood River Drainage	46
Sandy River Drainage	89
East Fork of the Hood River Drainage	75
Mile Creeks Drainages	45
Badger and Jordan Drainages	74
White River Drainage	76
Salmon River Drainage	73
Lower Clackamas River Drainage	97
Fish Creek, Memaloose, Molalla River Drainages	46
Oak Grove Fork of the Clackamas River Drainage	84
Hot Springs Fork of the Collawash River Drainage	42
Collawash River Drainage	55
Upper Clackamas, Warm Springs, Breitenbush, Olallie Drainages	116
Other Ownership (not differentiated by drainage)	41

Level Two

Level Two subdivided drainages into their Wilderness, unroaded, and roaded components. The roaded/unroaded distinction permitted FORPLAN to consider the differential development costs in its choice of where and when to harvest timber. It also resulted in the ability to evaluate outputs from and environmental effects in unroaded areas. This helped in addressing the unroaded resource planning question.

LEVEL TWO IDENTIFIERS

Wilderness, unsuitable for timber management
Non-Wilderness, unsuitable for timber management (both roaded and unroaded)
Unroaded, tentatively suitable for timber management (except Roaring River)
Roaded, tentatively suitable for timber management
Roaring River unroaded area
Areas under private ownership

Level Three

Level Three is a shorthand method of specifying the combination of working group (species), land class (slope) and timber site class (part of existing condition class). It assisted in interpreting and analyzing FORPLAN reports. This identifier did not add any information to the description of analysis areas, and thus did not increase the number of analysis areas.

Working Group

Working groups are aggregations of timber species associations on lands tentatively suitable for timber production. The species present in each working group determine volume and value of timber yielded, and what management activities and associated costs are necessary to achieve this yield. A map of these areas is provided in Chapter III of the DEIS.

WORKING GROUP IDENTIFIERS

Douglas-fir (primarily west slope, lower elevation)
True fir (primarily higher elevation)
Pine/Oak (east slope at lower timberline)
Associated Species (primarily east slope, lower elevation)

Land Class

Degree of slope and stability combine to determine costs of management activities, especially logging costs and roading costs and affect sediment yield. These are represented as three land classes in FORPLAN for tentatively suitable timber acres.

LAND CLASS IDENTIFIERS

0-29% Slope, No Active Slides
30-59% Slope, No Active Slides
> 60% Slope and No Active Slides or 0-59% Slope and Active Slides

Condition Class for Existing Vegetation

The final stratification addressed the size, age, and site of existing timber. All of these variables affect timber yield. Site class determines long-term sustained yield capacity and yields from managed stands. Existing size class determines yields from existing unmanaged merchantable stands. Stands less than 100 years old are considered managed or manageable, and their yields have been estimated based a growth projection model. Yields from stands greater than 100 years old are based upon empirical data.

EXISTING CONDITON CLASS IDENTIFIERS

Large and medium sawtimber, high and medium sites, >100 years old
Small sawtimber, high and medium sites, >100 years old
High and medium sites, <100 years old
Low sites, >100 years old
Low sites, <100 years old
Unsuitable for timber management

Age of Timber Stands

Potential analysis areas were first grouped according to the characteristics of the first six identifiers. The groups were then stratified by age. The purpose of this was to more closely approximate the actual age distribution of timber stands on the Forest. By thus increasing the number of analysis areas, this improved the accuracy of timber harvest scheduling over what would be achieved by using average ages for analysis areas.

D. Identification of Prescriptions

1. Overview

The development of management prescriptions and their associated standards and guidelines was one of the most important contributions of the Interdisciplinary Team. Management areas coupled with their respective standards provide specific direction for implementation, and serve as a framework for how to use, develop, and protect the Forest's resources in a manner consistent with the goals and objectives of the various alternatives. This subsection describes how management prescriptions were developed and how they became applied to management areas.

The National Forest Management Act 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). Management prescriptions are based upon a goal statement which established the purpose of the prescription, and include a compatible set of management practices designed to achieve the desired goal.

Goal statements for each management prescription were formulated to respond to the planning questions raised by the ICOs. Prescriptions were then developed which would help address those ICOs which could be resolved by land allocation and harvest scheduling decisions - the kinds of decisions for which FORPLAN provides useful information. Appendix A describes the method of resolution chosen for each ICO, including those not analyzed in FORPLAN.

In addition to addressing issues, concerns, and opportunities, the process of designing management prescriptions was also guided by the following criteria: (1) prescriptions should be achievable and contain realistic practices, (2) they are to be general enough to accommodate the variable site specific conditions on the ground, (3) they should be the most cost effective means of achieving the intent of the prescription, and (4) they should be specific enough for the Interdisciplinary Team to develop accurate resource and economic output and effects coefficients (modeling assumptions).

Appropriate management practices and standards were developed and assigned to each goal statement by interdisciplinary work groups. Practices were selected based on feasibility, cost efficiency, and the potential for resource damage, as indicated by current research and professional judgment of resource management specialists. The standards governing such practices needed to accomplish the goals of a prescription include the minimum management requirements of 36 CFR 219.27, mitigation measures and resource coordination required by existing laws, regulations and policy.

Forestwide management standards apply to every prescription. Such standards include those necessary to meet the requirements specified in 36 CFR 219.27, with regard to resource protection, vegetative manipulation, silvicultural practices, even-aged management, riparian areas, soil, water, and diversity.

All practices and standards received intensive review from district resource staffs and from management. The resulting set of prescriptions represents a broad range of resource management emphases, intensities, and capital investment levels. The use of cost efficient prescriptions in combination with maximizing present net value as an objective of FORPLAN, contributes to cost efficient alternatives.

The management prescriptions developed served two distinct but related purposes. First, they provided the basis for assumptions regarding the costs, benefits, outputs, and effects of managing analysis areas in different ways. FORPLAN was then used to evaluate the implications of alternative land allocation and scheduling choices. The purpose of each prescription, and the assumptions made with regard to them for FORPLAN modeling are presented in the subsection below.

Prescriptions were also the basis of the management area direction included in the Forest Plan. The complete set of management direction to be applied forestwide or as part of particular prescriptions is now contained in Chapter 4 of the Forest Plan. A more detailed presentation of the process of developing such direction is included in a process paper entitled "Development of Management Direction for the Mt. Hood National Forest Plan".

2. Modeling Assumptions and FORPLAN Prescriptions

Each description provided in Part 3 of this section includes a general statement of the purpose of the prescription, followed by a translation of its management activities into FORPLAN prescriptions. FORPLAN prescriptions are identified by Management Emphasis and Management Intensity. The approach taken by the Mt. Hood, of providing the model with mostly timber data, resulted in FORPLAN prescriptions that vary primarily by the characteristics of timber management activities. To minimize the number of prescriptions (reducing model size and cost), while at the same time providing the model with enough options to optimize with respect to economic efficiency, the following set of FORPLAN prescriptions was created, and was available in all alternatives.

<u>Management Emphasis</u>	<u>Management Area Category</u>	<u>Major Assumptions</u>
MINLVL	A	No regulated timber harvest, no costs, no economic benefits, no changes in any outputs or effects other than those naturally occurring over time assumed in FORPLAN. Used for lands unsuitable for timber management.
OWLRIP	A	Same FORPLAN assumptions as MINLVL, but used where tentatively suitable lands are managed for resource benefits other than timber harvest. Costs, benefits and effects of such management were calculated separately from FORPLAN analysis.
250ROT	B	Timber stands managed to maintain well-distributed, mature trees over time. While treatment of individual sites will differ in practice according to management objectives for other resources, the model approximates these with a maximum rate of timber harvest of 4% of the area per decade and a rotation length of 250 years.

125ROT	B	Age of trees less important than distribution. Smaller unit sizes, greater distance between units and longer recovery periods than optimum silvicultural regimes. The range of practices that would meet objectives for these areas modeled as a maximum rate of harvest of 8% of the area per decade and a rotation length of 125 years.
GENFOR	C	Timber managed to meet silvicultural and/or economic objectives. Rate of harvest limited only by minimum management requirements (dispersion - see Section VI) and rotation length constrained only by age of culmination of mean annual increment (see Section VI).

Management Area Categories represent broad groupings of management prescriptions according to their objectives, and the role of timber management activities in achieving the objectives. In Category A, timber management is subordinate to other resource uses, and harvest will occur only as needed to benefit other resources. Volume yielded is nonchargeable. In Category B management prescriptions, timber management objectives are roughly coequal with other goals. Timber yield is reduced from the maximum achievable, but is included in ASQ calculations. Category C meets only minimum management requirements for other resources, while producing the highest levels of timber harvest that are economically efficient, and meeting the overall objectives of the alternative.

For both of the management area categories with timber management objectives (B and C), there are several management intensities within each emphasis. They represent different degrees of investment in timber production and are expressed in the model as costs, yields, and effects of cultural practices such as planting, thinning, and fertilization. Their development is detailed in Subsection E of this section.

All management emphases are available for use on each analysis area that is tentatively suitable for timber harvest. As explained in Section VII, however, the model is not permitted to choose the management emphases in alternatives. When the same acre was appropriate to be managed for more than one of the prescriptions in an alternative, this was resolved for the FORPLAN model by choosing the management emphasis which most restricted timber harvests.

Management intensity options are determined by timber working group, site class, and stand age. FORPLAN is free to choose from among these intensities within the chosen emphasis. This includes an opportunity to choose to not manage timber where such management is not economically efficient.

3. Prescription Descriptions

Goal statements were written, practices and associated standards were developed, and modeling assumptions were made. Areas managed under the same prescription were grouped as management areas, and the practices and standards developed for the prescriptions became part of the management area direction.

Objectives, direction, and programs for each of the 22 management areas are summarized in Chapter II (DEIS). Those pertaining to the preferred alternative are detailed in the Forest Plan. Those not pertaining to the preferred alternative are detailed in Appendix D. These details are quite lengthy and are not repeated here. What follows comprises a cross reference of management area to management emphasis.

Prescription: Bull Run Watershed Planning Unit
Assumptions: Management will be designed to reduce long term risks to water quality while making renewable resources available. Management activities will include timber harvest when needed to reduce the potential of catastrophic wild fires and to maintain the area's ability to withstand high intensity rainstorms and runoff. The Bull Run Management Unit portion of the area is closed to public entry.
Mgt. Emphasis: OWLRIP
Management Area: A1

Prescription: Wilderness
Assumptions: This Management Area Designation provides for the management of Wilderness under the requirements of Wilderness legislation and other subsequent regulations and directions. Three management intensities within Wilderness will promote, perpetuate, (and where necessary) restore wilderness character to the land. Each intensity corresponds to a WROS opportunity class and has its own set of management objectives and activities that will make it distinct from other classes. There will be no timber harvesting, road construction or roads permitted in Wilderness.
Mgt. Emphasis: MINLVL
Management Area: A2

Prescription: Research Natural Areas
Assumptions: Management activities will generally be confined to research and/or studies which will comply with needs determined by the Pacific Northwest Research and Experimental Station (PNW). Generally public use, roads, timber harvest and recreation facilities will not be allowed within RNAs. RNAs will be recommended for withdrawal from mineral entry and other inappropriate land uses.
Mgt. Emphasis: OWLRIP
Management Area: A3

Prescription: Special Interest Areas
Assumptions: Public recreation use will be restricted only to the extent necessary to protect the unusual features. Each area will have an approved management plan which will provide direction for specific protection requirements, acceptable development and enhancement programs, and other uses or activities which are appropriate for the area. Chargeable timber harvest will not be allowed within Special Interest Areas.
Mgt. Emphasis: OWLRIP
Management Area: A4

Prescription: Dispersed Unroaded Recreation
Assumptions: The extent and intensity of management for dispersed recreation opportunities managed for will vary depending on their relative suitability to provide a spectrum of recreation experiences. Recreation activities in these areas will be non-motorized in nature. No new roads will be constructed in these areas and existing roads will be closed. There will be no chargeable timber harvest
Mgt. Emphasis: OWLRIP
Management Area: A5

Prescription: Dispersed Roaded Recreation (no timber harvest)
Assumptions: Recreation facilities will be provided to accommodate use and minimize impacts to natural resources. New roads and trails may be constructed in these areas. There will be no chargeable timber harvest.
Mgt. Emphasis: OWLRIP
Management Area: A6

Prescription: Old-Growth
Assumptions: These areas will be managed to preserve mature, or overmature, tree stands having large trees, snags, dead and downed material and, in many cases, two or more canopy levels. Evidence of human activity will be subordinate to the Old Growth characteristics of these areas. There will be no chargeable timber harvest.
Mgt. Emphasis: OWLRIP
Management Area: A7

Prescription: Northern Spotted Owl Habitat
Assumptions: There will be no chargeable timber harvest. No new roads will be constructed and existing road systems will be controlled and subject to seasonal access restrictions. Limited activities such as dispersed recreation and livestock grazing may be allowed.
Mgt. Emphasis: OWLRIP
Management Area: A8

Prescription: Key Site Riparian
Assumptions: Soil, water, fish and wildlife management activities will predominate. Dispersed walk-in recreation and interpretation will be encouraged. Roading and developed recreation will be discouraged. There will be no chargeable timber harvest.
Mgt. Emphasis: OWLRIP
Management Area: A9

Prescription: Developed Recreation Sites
Assumptions: There will be no chargeable timber harvest. The site specific vegetative management plan may indicate needs for removal of timber. The visual quality objective for developed sites is partial retention.
Mgt. Emphasis: OWLRIP
Management Area: A10

Prescription: Winter Recreation Areas
Assumptions: New facilities, roads, vegetation management, and other development activities will be permitted when in compliance with approved site master plans and/or special use permits, and are consistent with other land management objectives of the area. There will be no chargeable timber harvest from these areas.

Mgt. Emphasis: OWLRIP
Management Area: All

Prescription: Outdoor Education Areas
Assumptions: These management areas are specific sites on the forest set aside for outdoor education purposes. In general, management emphasis would be to preserve the majority of these management areas in their natural state. Facilities, such as interpretative trails, picnic and camping sites, shelters and view point facilities will be allowed and provided. There will be no chargeable timber harvest in these areas.

Mgt. Emphasis: OWLRIP
Management Area: A12

Prescription: Wild Rivers
Assumptions: These river segments will be managed essentially free of recreation facilities except when needed to protect a site from physical degradation. Management will perpetuate an essentially unmodified natural environment. There will be no chargeable timber harvest.

Mgt. Emphasis: OWLRIP
Management Area: B1

Prescription: Scenic Rivers
Assumptions: These river segments will be managed to maintain or enhance the high quality scenery and the essentially undeveloped character of its shoreline. Chargeable timber harvest shall be designed to restore, maintain, or enhance the natural appearing landscape and maintain old-growth forest conditions throughout the river corridor.

Mgt. Emphasis: 25OROT
Management Area: B1

Prescription: Recreational Rivers
Assumptions: The areas will be managed to provide opportunities for a wide range of recreation activities which are oriented to the river. Prescriptions for timber harvest, will allow partial cuts in unseen areas provided silvicultural systems maintain general forest cover.

Mgt. Emphasis: 25OROT
Management Area: B1

Prescription: Scenic Viewsheds
Assumptions: There are four visual intensities that represent combinations of two distance zones and two visual quality objectives. Timber harvesting will be permitted at a reduced rate within Scenic Viewsheds in order to maintain or enhance the visual quality of the stands now and in the future. The degree of landscape alteration associated with each visual intensity is determined by the standards established for the Intensity. Visual intensities and FORPLAN emphases are equated below.

Mgt. Emphasis: -Foreground Retention 25OROT
-Middleground Retention 25OROT
-Foreground Partial Retention 25OROT
-Middleground Partial Retention 125ROT

Management Area: B2

Prescription: Dispersed Roaded Recreation (with timber harvest)
Assumptions: From sensitive travel routes and use areas, modifications will appear subordinate to the surrounding area. These Management Areas will be managed to provide for motorized use and timber harvesting. Recreation facilities will be provided to accommodate use and minimize impacts to natural resources. There will be chargeable timber harvest, at a reduced rate.

Mgt. Emphasis: 125ROT

Management Area: B3

Prescription: Pine/Oak Wildlife Habitat
Assumptions: Vegetation will be managed to provide well-distributed mature, or Old-Growth ponderosa pine (minimum of 5 per acre) throughout the Pine/Oak species zone. This will be accomplished by chargeable timber harvest at a reduced rate, which vary in some alternatives. Management activities will maintain the natural oak components of the zone. Facilities such as roads will be designed, or closed, to minimize wildlife harassment and loss of effective habitat.

Mgt. Emphasis: OWLRIP/GENFOR (proportions varied by alternative)

Management Area: B4

Prescription: Pileated Woodpecker/Pine Marten Habitat
Assumptions: Timber management activities within woodpecker/marten areas will be spread over longer rotations than is desirable to meet timber production objectives. Management activities will maintain minimum acreages of mature, or Old-Growth timber within these management areas at all times.

Mgt. Emphasis: 25OROT

Management Area: B5

Prescription: Special Emphasis Watersheds
Assumptions: Most multiple use management activities, including timber harvest at a reduced rate, will occur. Management activities will reflect consideration for watershed needs through location, timing, intensity, extent, frequency and/or duration of the land or vegetation disturbing activities. If the area is a municipal water supply; additional standards and considerations affecting public access, off-road vehicle use, and other recreational use may apply.

Mgt. Emphasis: 125ROT
Management Area: B6

Prescription: General Riparian
Assumptions: Management will attempt to provide a relatively high diversity of vegetation species, multiple canopy layers, frequent small openings, complex aquatic habitats, and a diversity of standing and down woody material. Other multiple use management activities, including timber harvest at a reduced rate, will be designed to complement management of riparian dependent resources. Tree species mix will be maintained or increased. Recreation and other dispersed activities will be generally encouraged.

Mgt. Emphasis: 250ROT
Management Area: B7

Prescription: Earth Flows
Assumptions: Management will maintain the hydrologic and physical balance. Vegetation will be managed to maintain a majority of the earth flows in a forested condition at all times. Openings created by timber harvesting, wildlife habitat improvement projects or other management activities will be limited in size.

Mgt. Emphasis: 250ROT
Management Area: B8

Prescription: Wildlife Habitat/Visual Management
Assumptions: Chargeable timber harvest may occur in these areas. Vegetation management will attempt to maintain a minimum amount of each area in very young timber stands, or forage condition, at all times; and to maintain quality thermal cover in proper size and distribution. Seasonal restrictions may also be applied in these areas to public use and management activities such as timber harvest. Management activities will be required to meet certain visual quality standards where landscapes can be seen from popular routes.

Mgt. Emphasis: (same as B2)
Management Area: B9

Prescription: Timber Production
Assumptions: Stand treatments will include controlling stocking levels, maintaining satisfactory growth rates, protecting stands from insects and disease, controlling species composition and employing several methods of regenerating stands. Extensive road systems may be developed in these management areas to

facilitate management. Forage within these Management areas will be available for use by livestock and wildlife. Recreation activities will focus on use of existing or new transportation systems, including trails, and on dispersed activities.

Mgt. Emphasis: GENFOR
 Management Area: C1

In addition to the assumptions above, each management area has been assigned a visual quality objective. These objectives are assumed to be compatible with the other objectives of the management area. They are summarized in the following table.

Table B-III-1 VQO/PRESCRIPTIONS FOR MANAGEMENT AREAS

The following visual quality objectives are the minimum acceptable level of achievement for each management area. For example, PR is a higher level than M and is an acceptable achievement where M is the objective, but M is not an acceptable achievement where PR is the objective.

	SENSITIVITY LEVEL						
	fg 1	mg 1	bg 1	fg 2	mg 2	bg 2	3
<u>CATEGORY A</u>							
A1 BULL RUN ¹	Manage Drainage In Accordance With FEIS						
A2 WILDERNESS	P	P	P	NA	NA	NA	NA
A3 RNA	P	P	P	P	P	P	P
A4 SPECIAL INTEREST	R	R	R	PR	PR	PR	PR
A5 UNROADED REC.	R	R	R	R	R	R	R
A6 ROADED REC.	PR	PR	PR	PR	PR	PR	PR
A7 OLD GROWTH	P	P	P	P	P	P	P
A8 SPOTTED OWL	R	PR	PR	PR	M	M	M
A9 KEY SITE RIP'N	R	PR	PR	PR	M	M	M
A10 DEV. REC.	R	PR	PR	PR	PR	PR	PR
A11 WINTER REC.	PR	PR	PR	PR	PR	PR	PR
A12 OUTDOOR EDUC.	R	R	R	R	R	R	R
B1 WILD RIVER SEGMENTS	P	P	P	P	P	P	P
<u>CATEGORY B</u>							
B1 SCENIC/REC. RIVERS	R	PR	PR	R	PR	PR	PR
B2 VIEWSHEDS	R	PR	PR	PR	M	M	M
B3 ROADED REC.	PR	M	M	PR	M	M	M
B4 PINE/OAK	R	PR	PR	PR	M	M	M
B5 WOODPECKER	R	PR	PR	PR	M	M	M
B6 WATERSHED	R	PR	PR	PR	M	M	M
B7 GEN. RIPARIAN	R	PR	PR	PR	M	M	M
B8 EARTHFLAWS	R	PR	PR	PR	M	M	M
B9 WILDLIFE/VIEWSHED	R	PR	PR	PR	M	M	M
<u>CATEGORY C</u>							
C1 TIMBER EMPHASIS	M	M	MM	M	M	MM	MM

Distance Zone And Sensitivity Level
 fg 1 = foreground from level 1 travel route
 fg 2 = foreground from level 2 travel route
 mg 1 = middleground from level 1 travel route
 mg 2 = middleground from level 2 travel route
 bg 1 = background from level 1 travel route
 bg 2 = background from level 2 travel route
 3 = any distance zone from a level 3 travel route

Visual Quality Objective
 P = Preservation
 R = Retention
 PR = Partial Retention
 M = Modification
 MM = Max Modification

<u>Visual Quality Objective</u>	<u>Distance Zone, Sensitivity Level</u>	<u>Management Emphasis</u>
Preservation	Any zone or level	OWLRIP
Retention	Any zone or level	250ROT
Partial Retention	Foreground	250ROT
	Middleground, Background	125ROT
Modification	Foreground	125ROT
	Middleground, Background	GENFOR (see note)
Max Modification	Any zone or level	GENFOR (see note)

Note: GENFOR management for visual purposes requires application of techniques contained in National Forest landscape management handbooks. These techniques may affect costs but are not expected to reduce yields.

E. Development of Timber Options

Timber harvest options and management intensities were developed to: (1) portray a range of investment levels and silvicultural treatments that are technologically feasible and biologically sound for each tentatively suitable analysis area; and (2) to evaluate the yield and economic consequences utilizing the FORPLAN model.

As a part of identifying management prescriptions needed to address issues, concerns, and opportunities, the Interdisciplinary Team determined which of them could have their objectives achieved through scheduled (chargeable) timber harvesting. Once the vegetative management objectives were identified for each management prescription, the Interdisciplinary Team members selected the appropriate FORPLAN management emphasis.

FORPLAN management intensities were developed for each of the management emphases which called for chargeable harvest volume on analysis areas which were tentatively suitable. The overriding criterion in this process was that the silvicultural prescription and its associated yields achieve the vegetative management objectives of the management prescription in a cost-efficient manner. This process included the development of both empirical and managed yield tables representing the results of applying the prescription to a particular analysis area.

Analysis of silvicultural options and timing choices was performed for existing seedling/sapling/pole stands and future managed stands using the DP-DFSIM growth simulation model for all species except pine/oak, and the MGYLD5 model was used for pine/oak. The development of silvicultural prescriptions for managed stands and their associated yield tables is described in the October 1984 process paper titled "Mt. Hood National Forest Yield Table Documentation."

The only management activity considered for existing mature sawtimber stands is the final regeneration harvest of the stand. Empirical yield tables are used to portray this timber volume. For each management emphasis and analysis area that allowed timber harvesting, an intensity was also available for FORPLAN to select which called for no chargeable harvest.

1. Silvicultural Practices

The silvicultural regimes pertaining to these intensities varied by species, age, and site. Selection of regimes to be represented in FORPLAN depended on the yields and PNV calculated and the screening process used. Options made available in FORPLAN always included one with the highest PNV, one which produced the highest possible timber volume, and one which included no practices other than a final regeneration harvest, as well as an intensity that did not harvest at all (MINLVL - not included in the chart below).

Regimes were classified as FORPLAN Management Intensities according to the following criteria:

- MAXPNV = Management intensity which maximizes present net value
- LOW\$\$\$ = Management intensity with low investments in timber management
- SILVIC = Silvicultural multi-objective
- MAXVOL = Management intensity which maximizes volume over time (highest CMAI)
- CURSIT = Current management of the Douglas-fir working group

A list and brief description of the management intensities for timber harvesting emphases used in FORPLAN follows. A legend is presented first for clarification.

LEGEND:

- N Reforest through natural regeneration.
- P Reforest by planting.
- PCT Stocking level control by precommercial thinning and/or release of competing vegetation.
- F Fertilization.
- CT Stocking level control by one or more commercial thinnings.

Table B-III-2 Timber Management Intensities In FORPLAN

<u>Working Group</u> Age (Decades)	<u>MAXPNV</u>	<u>LOW\$\$\$</u>	<u>SILVIC</u>	<u>MAXVOL</u>	<u>CURSIT</u>
Douglas -fir 0 (regen) 1-2 3 4-7 8-9	N,PCT,CT,F n,CT,F	N p n n	P,PCT,F p,PCT,F p,pct,F n,CT	P,PCT,F,CT p,PCT,F,CT p,pct,F,CT	P,PCT,CT p,PCT,CT p,pct,CT
True fir 0 (regen) 1-2 3 4-9	N p n	N,CT p,CT n,CT	P,PCT p,PCT p,pct	P,PCT,CT p,PCT,CT p,pct,CT	
Associated Species 0 (regen) 1-2 3 4-8 9	N,CT p n,CT	N p,CT n n	P,PCT P,PCT p,pct	P,PCT,CT P,PCT,CT p,pct,CT	
DF,TF,AS low site 0 (regen) 1-2 3 4-9	N p n	N,PCT	P,PCT p,PCT p,pct	P,PCT,F,CT p,PCT,F,CT p,pct,F,CT	
Pine/Oak 0 (regen) 1 4	N,PCT,CT n,PCT,CT			P,PCT,CT p,PCT,CT	

Notes: Small case letters represent practices assumed to have occurred on these stands in the past. In unroaded areas, age 1-3 analysis areas assume natural regeneration and no PCT. Timber stands 10 decades old or greater assume only final harvest, and use empirical yield tables.

2. Harvest Methods

The criteria for selecting harvest methods to be used in particular circumstances are described in the Chapter III discussion of timber management. For the purpose of FORPLAN modeling, all harvests are assumed to be by clearcut. Analysis area stratification did not provide sufficient detail to identify where other methods would be appropriate. In addition, most shelterwood harvests (the most frequently used alternative harvest method) will be completed within a single decade. Their effects should be roughly comparable to those of a clearcut. Estimates of area harvested by other methods are described in Part F of this section.

3. Timing Options

Timing options for silvicultural practices were analyzed in DP-DFSIM. One sequence was selected for FORPLAN for each management intensity. Assuming a single sequence of practices helped to keep the model size small and run costs manageable.

Choices of timing of final regeneration harvests were made by FORPLAN. Existing stands managed under the GENFOR emphasis could be regeneration harvested at any time from the period in which they reached 95% of culmination of mean annual increment through the end of the modeling horizon. Managed stands under this emphasis could be harvested in any of the five periods following achievement of 95% of CMAI, or more, if needed to achieve 100% of CMAI. The other management emphases had more restrictive timing options in order to meet other resource objectives, as described previously. A more complete explanation may be found in the forest planning process paper "Assumptions used to determine age of timber harvest in FORPLAN."

F. Development of Yield Tables and Coefficients

This section describes how the yields for the outputs and effects described for alternatives in Chapter II were developed. Some yields were developed for analysis in FORPLAN and others were developed for analysis outside of the model. Unless otherwise specified, such calculations were performed following FORPLAN analysis. This was often because they were based on a spatial analysis that could not be done in FORPLAN. The outputs and effects are organized by public issue group.

PUBLIC ISSUE #1: TIMBER How much wood fiber should the Forest produce?

Timber Offered - Regulated, unregulated, total (MMBF, MMCF)

Timber offered is an expression of the amount of timber that is to be harvested each year. It is used as an indicator of timber supply because it can be used by local timber purchasers and national planning processes to project timber supplied by the Forest.

Timber offered is measured by volume, both in million board feet (MMBF) or million cubic feet (MMCF). A board foot is one board, 1' long by 1' wide by 1" thick. It is measured this way when the intended use of the log is dimension lumber. A cubic foot is 1' by 1' by 1'. It is relevant when use of the entire log is planned. Timber volume expressed in MMBF is used frequently for expressing the level of timber harvest at a local and regional level. Timber volume expressed in MMCF is commonly used at the national level. FORPLAN analysis is performed using cubic volume yield tables. In order to report projected board foot volume a ratio of 5.07 BF/CF is assumed (memo from Director of Timber Management, Region 6, March 26, 1985) for all except the No Change Alternative, which uses a ratio of 5.47 BF/CF.

Total timber volume offered can be broken down into chargeable volume and nonchargeable volume. These are standard terms describing timber harvested that meets specific utilization standards and is on suitable land; and timber harvested that doesn't meet one or both of these conditions respectively. Chargeable volume is projected using stand growth models. Nonchargeable volume is less predictable and has been estimated based on past experience. It is not included in Allowable Sale Quantity (ASQ). Mortality salvage contributes to the Timber Sale Program Quantity (TSPQ) and is not included in growth models. Some (estimated at 22 BF/Acre/year) mortality salvage is included in the ASQ. Both volumes are expressed in MMBF or MMCF.

1. Existing Timber Stands More Than 99 Years Old

Empirical yield tables were computed by the Regional Office using 1970-71 field timber inventory data. Data was stratified according to Forest biological model components, and yields were computed using a method developed by Teply. (J. L. Teply, October 6, 1976. Rough Draft: The Development and Projection of Standing Yield Tables, Region 6)

The basic tables were reviewed by the Timber Management Planner and the Forest Silviculturist for reasonableness as suggested in Teply's paper. Projected basal areas, cubic foot volumes and rates of growth were compared with Technical Bulletins 201 (Douglas-fir) and 630 (ponderosa pine), P. H. Cochran's PNW 263 (Eastside Douglas-fir and white or grand fir) local plot data, and past inventory records. Based on these publications and the review by Forest personnel, several of the originally desired tables, as well as stratifications, were deemed unacceptable. This decision was supported by the lack of data or the high variability in small strata. As a result of this review and strata evaluation, several of the original stratifications and supporting yield tables were collapsed to form the present stratification along with the supporting tables.

The tables were originally constructed to reflect volumes starting in 1979. Since there was a significant delay in the completion of the Forest Plan, tables were updated to display ingrowth for the period 1979 to 1983 (4 years). This was done by determining the average annual increment for the decade to be adjusted, multiplied by 4, and added to the decade volume.

Volume projection for existing stands is particularly important in the calculation of ASQ for the first few decades and is a critical component of FORPLAN's calculations. The empirical yields thus calculated were incorporated into the existing yield tables for stands 100 years old or greater.

2. Regenerated Stands

"Managed yield tables" are built to reflect regeneration (natural or planted) after harvest, precommercial thinning, when appropriate, and early suppression of competing vegetation (release). Commercial thinning, fertilization, and timing of final harvest are also reflected. On publically managed lands, no such stands exist that have been under such management throughout an entire rotation in Oregon or Washington. Therefore, to predict growth of newly established stands, many assumptions must be made. These assumptions are derived from measurements of existing stands, research findings from other areas, and broad-based yield tables.

The purpose of managed yield tables is to estimate the standing inventory of wood fiber on existing plantations and future managed stands and to predict how it would grow according to weighted average site conditions and alternative silvicultural intensities. Yield tables were developed for all management prescriptions which permit regulated timber harvest. They were calculated in cubic feet. This section summarizes the managed yield table development process. A more in-depth discussion can be found in a process paper titled "Mt. Hood National Forest Yield Table Documentation, dated October, 1984".

The forest was stratified for yield purposes into species zones and site categories. The following information pertains:

Forest Strata - Yield on the Mt. Hood is categorized by the following:

Table B-III-3 SITE INDICIES

<u>Species Zone</u>	<u>Site Category</u>	<u>Site Index (Kings)</u>	<u>(Yield Model Used)</u>
Douglas-fir	high	80	DP-DFSIM
Assoc. Species	high	77	DP-DFSIM
True Fir	high	74	** DP-DFSIM
Pine/Oak	low	60 (Meyer)	MGYLD5
Douglas-fir, Associated species, True fir*	low	47	DP-DFSIM

** True fir yield tables were adjusted in DP-DFSIM by user supplied hts. and ages (from age 10-250) using Curtis, 1974.

* Low site yield tables were compared between all three species and because of very minor differences in PNV, and no differences in CMAI, the DF yield tables were chosen to represent all low site.

The different treatments by intensity were covered previously in this section for the managed stands by species group and site.

Assumptions Used in Building Yield Tables - Managed Stands

Genetics - A 10% gain was used in all species zones. Select trees exist already in all breeding zones and evaluation plantations will all be in place in the next 3-4 years. Improved stock used only with planting intensities.

Fertilization - Used only in the DF species zone, both high site and low site. Timing of fertilization was left up to economic decision of DP-DFSIM.

Reforestation - Planting and natural regeneration intensities were evaluated in all species zones. Supplemental planting is assumed in natural regen units in the cost of Natural regeneration.

Regen Lag - A 5-year regeneration lag was used for planting. A 7-year regeneration lag was used for natural regeneration. This followed regional direction, and also district silviculturist responses. Our 5-year lag was calculated by weighting (by acres) individual district responses into a forest average of 4.5 years.

Precommercial Thinning - If precommercial thinning is to be done, it is assumed that this will be performed at age 15 and result in 300 trees per acre (all species zones).

Commercial Thinning - Utilization standards supplied in DP-DFSIM were 7.6-inch diameter and a 4-inch top. CT was evaluated on all acres of all species zones. The only CT constraints used in DP-DFSIM were that 1) CTs had to follow Regional policy on relative density (max. 60 RD); 2) Thins have to pay; and 3) Some intensities had a thinning cycle of 20 years starting at certain given ages (i.e.: 45, 65, etc.).

- Release - Assumed on 10% of the acres in all species zones where PCT occurs. Timing was at age 15.
- Herbicides Use would be in conjunction with release. It is expected to be minimal, and no effects assumed in yield tables.
- Falldowns - A 10% falldown is used for all yield tables in all species zones. No further breakdown of falldown is used. No reductions for snags (wildlife purposes). The mortality built into the model will be used for snags. Other items covered by this 10% are: Disease pockets, unimproved roads, competing vegetation, natural openings, rock, animal damage. This was verified on this forest by two studies in 1975 and 1982.

All yield tables were expanded out to age 250 either by using DFSIM model or by hand calculations of the MGYLD5 yields (Pine/Oak). Reduced yields for Category B management area acres are achieved by constraints on the FORPLAN model, not by modifying the timber yield tables.

All management direction from the Regional and Washington offices was followed in building the managed yield tables. Limitations in the DP-DFSIM yield model were followed, but every imaginable silvicultural intensity was considered and run. Coordination between forests was done along the way to make sure that we were in line with our neighbor's assumptions.

3. Stands Less Than 100 Years Old

Acres of existing stands that were between 0 and 100 years old (immature) were determined, and an appropriate DP-DFSIM yield table was assigned by decade or groups of decades to these stands. This was done by species group and site. The treatments by intensity were displayed earlier in this section for these stands. Below are the assumptions used in the DP-DFSIM model for these existing stands. Age classes are decades.

Assumptions Used in Building Yield Tables - Existing Stands

Age Class 0 - This age class will use the yield tables for managed stands in each species zone. All intensities of management will be considered including natural regen, planting Pct, CT, and fertilization (in DF).

Age Class 1 - Natural regen will not be an optional intensity, because almost all our 10 year old plantations were planted. New yield tables were selected that replaced natural regen with planting. Combinations of planting, Pct, CT and fertilization (in DF) are analyzed. Wherever possible, the managed stand yield tables for the particular species is used, rather than developing a new yield table.

Age Class 2 - Planting is the only option here, also, because most of our 20 year old plantations were planted. Precommercial thinning is also required in all intensities because almost all 20 year old stands have been Pct'd. So the only choices are between Pl, Pct, CT, Fh, and Pl, Pct, Fh, and with fertilization in the DF zone.

Age classes 3-7 (DF)
3-8 (AS)
3-9 (TF) - These age classes in each species zone involves only natural regen intensities that have commercial thinning or no thinning. Fertilization is an option in the DF zone. The latest age included in this age class depends on when DP-DFSIM chose to CT. No planting intensities are used because most existing stands in this age class originated naturally, or were planted with offsite stock.

Age classes 8-9 (DF)
9 (AS) - This age class will involve only natural regen and final harvest, because these stands originated naturally and they have not been thinned.

Age Class 10+ - Use existing unchanged empirical yield tables for mature stands.

4. Non-chargeable Timber Volume

FORPLAN timber yield tables include only sawtimber meeting utilization standards removed from suitable timber lands with concurrent regeneration of a new timber stand. Timber volume may be produced in other ways. Such volume may substitute for chargeable volume or be added to it. It has been estimated based upon historic relationships and past experience, and included in total volume estimates (TPSQ) displayed in Chapter II. Such estimates are much less reliable than those based on growth models, and are not included as part of the ASQ. Components of nonchargeable volume are summarized below.

Mortality salvage: While in the past this has been part of chargeable volume, it is not included in FORPLAN yields. The relationship in the present Timber Management Plan is 25.5 board feet per suitable acre per year. This factor has been applied uniformly to all alternatives.

Bull Run Municipal Watershed: When managed as Management Area A1, yields will be based on present planning direction for the area. This is 21 MMBF/yr.

Per acre material: Historically, this material has amounted to about 20% of the chargeable volume. This relationship is assumed to continue in the near future.

Fuelwood (MCF)

Fuelwood or firewood is most often a by-product of timber harvest activities and is estimated based on harvest of sawtimber. It is commonly used for personal use and often sold commercially. Because of the increasing demand for

fuelwood, an indicator of supply is needed. Fuelwood in thousand cubic feet (MCF) is used as it is a standard way of expressing how much fuelwood volume is produced. It also allows discussion in the same measurable terms as timber used for other purposes. It is part of the timber supply planning problems as it is directly related to timber harvest volumes.

Fuelwood is often expressed in terms of cords. Since one cord equals .128 MCF, the volumes of fuelwood were calculated by multiplying .128 times the MCF of fuelwood which were estimated to result from the activities resulting from an alternative. The fuelwood results of some of these activities, such as timber harvesting, were predicted based on the amount of old-growth timber harvested.

Reforestation, Timber Stand Improvement, Harvest Method

Reforestation is the planting of timber lands after harvest activities. Though areas are often reforested naturally, this indicator represents acres planted by hand with nursery-grown seedlings.

Timber stand improvement is a general term used to represent a variety of improvement practices performed on a timber stand, over time. It includes pre-commercial thinning, commercial thinning, fertilization and release. Release represents primarily hand release of trees from competition with other vegetation. It was assumed that 10 percent of acres precommercially thinned would need release at age 15, that manual methods (not herbicides) would be used, that this would cost \$100 per acre, and no increase in growth would result.

Both reforestation and timber stand improvement indicate relative degrees of investment in future timber harvest volumes. They emphasize a commitment to manage timber on a long term basis. Both are measured in thousands of acres (M Acres). They result from a selection of silvicultural intensities by the FORPLAN model.

Through analysis of benchmark scenarios it was found that little or no planting or thinning was chosen by the FORPLAN model during the first decade when the objective function was that of maximizing PNV. In analyzing this situation it was concluded that the model had not been made aware of certain biological factors which were (a) necessary to implement prescriptions related to specific management areas, and (b) impossible to model.

An interdisciplinary task force was used to refine estimates of area scheduled for silvicultural treatments. At the same time, it estimated the amount of area that would be likely to be harvested by methods other than clearcuts. The conclusions drawn and assumptions made by an interdisciplinary task force are shown in Tables B-III-4 and B-III-5. This information was used in calculating the acreages shown for these activities in Chapter II.

In accordance with these findings, alternative's FORPLAN results were post-processed. The specifics of this post-processing procedure appear in the December 20, 1985 process paper on this subject. The following is a summary of that process.

a. The percent of the harvestable land base, by alternative, in each management area was determined.

b. These percentages were then used to proportion the FORPLAN schedules, including costs, back to each management area.

c. The factors shown in Tables B-III-4 and B-III-5 were then applied with respect to individual management areas.

Table B-III-4 MINIMUM LEVELS OF MANAGEMENT REQUIRED
(IN MANAGEMENT AREA C1-Timber Emphasis Area)

WORKING GROUP	M I N I M U M P E R C E N T S				
	HARVEST and REGENERATION METHODS		TREATMENTS (1st Decade of Plan)		
	"Column A" Shelterwood/ Seed Tree	"Column B" Clearcut and Plant ^{1/}	Fertilize	Thinning	
				Pre- Commercial	Commercial
HIGH SITE: Douglas-fir	10% ^{2/}	37% ^{3/}	0% ^{4/}	85% ^{5/}	30% ^{5/}
True Fir	60% ^{6/}	30% ^{7/}	NA ^{8/}	85% ^{5/}	20% ^{5/}
Associated Species	10% ^{2/}	50% ^{9/}	NA ^{8/}	85% ^{5/}	30% ^{5/}
Pine/Oak	10% ^{10/}	90% ^{10/}	NA ^{8/}	75% ^{11/}	0%
All LOW SITE:	5% ^{12/}	95% ^{12/}	0% ^{4/}	85% ^{5/}	20% ^{5/}

^{1/} "Column B" percentages represent the minimum amount of regeneration which must be accomplished through planting. "Column A" is the minimum amount which must be harvested by shelterwood/seed tree methods and naturally regenerated. When the sum of columns A and B do not total to 100%, the remainder may be harvested under either method and regenerated either naturally or through planting.

^{2/} Due to frost pockets and the need to feather adjacent stands for wind firmness, a minimum of 10% must be shelterwood/seed tree harvested.

^{3/} This is the percent of South and West facing Douglas-fir high site stands. Natural regeneration has not been proven effective on such sites.

^{4/} However, future needs may dictate fertilization. If fertilization is applied it will be to 35-55 year old stands.

^{5/} Current stands are significantly overstocked (thousands of stems per acre) compared to what is assumed in FORPLAN (hundreds of stems per acre). If left unthinned, these current stands will result in significantly lower volumes than is assumed in FORPLAN. PCT will normally occur when stands are 15 years old and commercial thins will normally occur when stands are 45-95 years of age.

- 6/ Environmental constraints (frost, solar radiation, etc.) preclude clearcutting more than about 40% of True Fir stands. Shelterwood/seed tree harvesting is the only remaining harvest choice which is economically and biologically viable on the remaining 60% of True Fir stands.
- 7/ About 3/4 of the 40% of the True Fir stands which can be clearcut must be planted in order to assure adequate stocking.
- 8/ To date, research has indicated that fertilization is only considered practicable with respect to Douglas-fir.
- 9/ Clearcutting is needed to mitigate the effects of root rot and gophers. Planting is needed to assure desired species mixes and to assure adequate stocking levels. The current low stocking levels in Associated Species stands precludes an adequate natural regeneration seed source. This is the result of past logging practices.
- 10/ Very tight control over regeneration is required to assure that pine and oak exist in the ratio desired to meet wildlife habitat needs.
- 11/ Pre-Commercial thinning is needed to provide the target tree sizes and hiding cover distribution required for wildlife.
- 12/ Most (95%) of low site stands must be planted in order to assure regeneration within the 5 year legal time limit.

Table B-III-5 DISTRIBUTION OF HARVEST METHODS
IN CATEGORY B MANAGEMENT AREAS

MANAGEMENT AREAS	HARVEST METHODS: ESTIMATED PERCENTAGES REFLECTING PRACTICES NECESSARY TO ACHIEVE OBJECTIVES		
	Distribution Of Harvest Methods		
	Clearcut	Shelterwood	Selective
B2 Retention Foreground Partial Retention	20% 40%	70% 60%	10% -
B6	Same as Management Area C1, Riparian (except 1/2 the Thinning)		
B7	20%	40%	40%
B8	30%	70%	-
	All regeneration must be accomplished through planting in order to assure earthflow stability.		
Other "B" Areas	Same As Category C Areas		

It should be noted that this process included an analysis of cost-efficiencies outside the model in achieving objectives. It was the opinion of the group of

specialists conducting this analysis that the average costs used in FORPLAN, and carried forward in the overall budget, reflected the most efficient way to implement specific management area prescriptions. The cost and acreage totals of timber harvested resulting from this process were the same as those reported in FORPLAN. Costs of harvest systems other than clearcutting should be higher, but historical average data included past shelterwood harvest costs, so total estimated costs should be roughly correct.

The final results reflected management area silvicultural specifics which were not possible to model. While FORPLAN had capably provided for cost efficiency based on its data, it had ignored some physical realities of attempting to do so. These unreasonable results were corrected in this analysis.

LRSY, Timber Growth in 2030 (MMCF)

Long-term sustained yield capacity (LTSYC) is the volume of timber that can continue to be sustained and harvested indefinitely. It is expressed in MMCF, because of the variation in board foot volume (MMBF) related to age and species. FORPLAN calculates both growth and LTSYC.

Timber growth in 2030 is the volume of timber growing in fifty years. It is expressed in MMCF. If timber growth in 2030 is 90% of LTSYC the Forest has come close to reaching its LTSYC within the RPA planning horizon.

5. Non-timber Coefficients

FMEI, Fuel Treatment, Air Quality

The fire management effectiveness index (FMEI) is the index used to measure the costs of protecting land from fire. It represents the amount of money needed to protect an acre of land from fire (protection) and if one occurs, the dollars to put it out (suppression). It is expressed in dollars per thousand acres per year (\$\$/M.Acres/Yr).

Fuel treatment in thousands of acres represents the total acres requiring fuel treatment. This includes treatment by prescribed fire, cat piling or yarding away unmerchantable material. The acres needing fuel treatment differ according to the timber volume harvested, and acres receiving stand treatment that would produce slash, such as precommercial thins and commercial thins. The major tree species in a treatment area are also important in determining fuel treatment acres and its associated costs.

Air quality is primarily a function of fire management and timber management. Prescribed fire and wildfire produce large amounts of smoke and inject particulates into the air. More burning is done as a result of increased harvest activities, generally putting more particulates into the air. Air quality is measured in terms of suspended particulates.

The FMEI, fuel treatment acres, and air quality are all ways to indicate effects of fire management and the fuels treatment program. The FMEI shows cost efficiency, while fuel treatment shows relative investments in reducing fire hazard and risk. Air quality measurements indicate effectiveness of fire management programs and address issues of smoke management. To the extent that prescribed fire, wildfire, and weather conditions are unpredictable, these estimates are subject to high degrees of uncertainty.

Range - Permitted Grazing (M AUMs)

Grazing on National Forests is measured in animal unit months (AUMs). This is the amount of forage required by an animal unit for one month. An animal unit is described as one mature cow or equivalent based on the average consumption of 26 lbs of dry matter. AUMs are used at the local, regional and national level to address range issues. Permitted grazing is determined by the number of animals allowed under the grazing permit.

Grazing is directly related to acres of timber harvest. The more timber harvested, the more openings created, encouraging the growth of grass and forbs for livestock grazing. The following formula was derived based on historical data relating timber harvest levels to AUMs on the Mt. Hood NF:

$$\text{AUMs Utilized Per Year} = 104,000 + [(\text{MMBF, ASQ, Green}) - 262] [290]$$

For each alternative, the level of timber harvest predicted in FORPLAN was plugged into the equation to estimate M AUMs.

Transportation (Miles)

Transportation indicators are broken into four parts:

- 1) Arterial/Collector road construction and reconstruction
- 2) Timber purchaser road construction and reconstruction
- 3&4) Roads suitable for passenger car use and high clearance vehicles

Arterials are roads that serve large land areas and are usually connected with public highways. Collectors are connected to arterials. Timber purchaser roads or local roads serve even smaller areas and connect to arterials and collectors.

Passenger car miles are roads built, maintained, and managed for passenger car use. Road miles managed for high clearance vehicles (logging trucks, four-wheel drives) are in addition to passenger car miles and are managed at a lower standard.

Road miles constructed were calculated using the FORPLAN model and incorporating the following variables:

- 1) Acres of timber to be harvested by time period
- 2) Logging system used
- 3) Slope of the ground
- 4) Area currently roaded or unroaded

With these variables on a drainage basis, FORPLAN estimated how many miles of road were needed. It subtracted those miles from existing miles within a drainage, and the result was additional miles of arterial/collector and local roads that need to be constructed or reconstructed.

Existing passenger car miles are already known. An estimated proportion of the additional roads to be built (from FORPLAN) was added to existing miles to calculate the total miles available for passenger car use. This same process was used for high clearance vehicles.

Road miles, broken down by type, are used as indicators because they represent the transportation system needed to implement the various alternatives. They represent the major expenditures in engineering functions. However, the FORPLAN model is not a spatial model and cannot determine specific road locations.

PUBLIC ISSUE #2: RIPARIAN To what extent should fish habitat and water quality be maintained or enhanced?

PUBLIC ISSUE #3: WILDLIFE How much and what kind of wildlife habitat should the Forest provide?

Wildlife Habitat Improvement (Acres, Structures)

Wildlife habitat improvement is an expression of improvement practices performed within or on an area to benefit wildlife. Though called "improvement," most practices are completed to mitigate effects caused by management activity. Habitat enhancement projects are also part of the "improvement" umbrella. They are done in addition to mitigation and only when additional investment dollars are available.

Non-structural improvement projects measured in acres can include grass and forb seeding, fertilization and establishment of permanent pastures. Structural improvements can include nest boxes, fencing of streams and the creation of potholes. Potholes are man-made depressions in marshy areas that fill with water and provide habitat for waterfowl.

Habitat improvement is related to the management emphasis of a particular area and dollar investments. High timber harvest levels generate a lot of dollars for mitigation activities while low levels provide few dollars. However, with reduced harvest and more emphasis on other amenity resources, few mitigation practices are needed. Enhancement projects then dominate and should result in overall increases in habitat quality, quantity and population numbers.

FORPLAN's findings were evaluated by enhancement and mitigation specialists in order to predict applicable projects, costs, and environmental effects.

Wildlife and Fish Use (M WFUDs)

A wildlife fish user day (WFUD) is a measure of the amount of time (use) individual's spend in wildlife or fishery related recreation activities. One WFUD represents 1 person fishing or hunting for 12 hours, or 12 people fishing or hunting for 1 hour. Cold and warm water fishing, hunting (both small and big game) and viewing wildlife are all examples of WFUDs. WFUDs are a subset of total dispersed recreation visitor days (RVDs).

Wildlife and fish management affect the availability of WFUDs. As more land or habitat is managed for these resources, animal populations increase. As recreation demand increases, more WFUDs will result.

There is a general relationship between WFUD availability and investments in improvement projects. However, the lack of information regarding project length and benefits that off-forest users receive makes this relationship imprecise. For this reason the majority of WFUDs were predicted by multiplying a factor times the amount of dispersed recreation RVDs, and then a small fraction of additional WFUDs were added to reflect the benefits of improvement projects.

Management Indicator Species (Pairs, Numbers)

Management indicator species (MIS) are wildlife species selected to serve as indicators of the amount and condition of a particular habitat. For example spotted owls represent habitat in an old-growth condition, while silver grey squirrels are representative of habitat with large amounts of ponderosa pine and Oregon white oak.

Population numbers of management indicator species are calculated on a per acre basis. Every acre of land that is managed for suitable wildlife habitat results in a certain population of wildlife. The acres of habitat available (and then translated into population numbers) are directly related to how an alternative proposes to manage a piece of land. As the acres of management emphases change by alternative, so do the population estimates of management indicator species. The direct relationship of habitat acres to population numbers also provide information on old-growth protected, an important public issue.

Aquatic Condition Index

The aquatic condition index is an index used to reflect the cumulative effects of a wide array of land allocations and management activities on the aquatic ecosystem.

The index was developed using a simple model which integrated four variables:

- 1) Accelerated delivery of sediment to aquatic ecosystems
- 2) A weighted total of acres where protection of riparian systems was emphasized
- 3) A measure of other acres having management emphases highly compatible with riparian area objectives
- 4) A measure of watershed condition as reflected by the percentage of acres in the 0-30 year vegetation age class

Each variable was given a relative weight based on its importance. All vary according to acres of timber harvested and associated road building activity.

The index was calculated both on a drainage wide and on a forest wide basis. The index is a reliable and specific way to estimate overall stability of the aquatic resource. It is used as an indicator because it uses meaningful variables, based on forest generated data to reflect local issues of water quality, and fish habitat.

Water Yield (M Acre Feet)

Water yield is the amount of water produced on the Forest that flows in its rivers and streams. It is in response to the amount and distribution of precipitation over the forest. Improved water yield results from deliberate land management actions to increase production or alter distribution. Studies throughout the U.S. and elsewhere demonstrate that yield can be increased. These studies have been highly successful when applied to small watersheds. However, these increases cannot be shown to be delivered to a user (a municipality, an irrigation district, etc).

Therefore, since increased yields cannot be measured by a user on either a Forestwide or on a drainage basis, water yield will remain constant in all alternatives.

Improved Watershed Condition (Acres)

Improved watershed condition is an index of watershed stability. It represents the risk of damage to a watershed following or resulting from a major flood. This includes damage to the watershed's capital improvements (roads, campgrounds, buildings) and to public health.

To calculate the index, a mathematical model was developed using the following variables:

1. Harvested acres in 0-10 year age class (representing a high risk condition)
2. Acres of road constructed (roads create additional stream channels, resulting in rapid runoff downstream)
3. A change factor based on the Aquatic Condition Index (see above)

The index was calculated on a drainage wide basis and projected forestwide. The variables are all tied directly to timber harvest activities. The negative index values in Chapter II, Table II-3a represent a decline in watershed condition and therefore an increase in risk. The positive values represent improved conditions and a decrease in risk.

Sediment (M. tons/yr. index)

The sediment index is a relative measure of sediment produced and delivered to streams. It is composed of two parts; the potential for the soil to erode (erodability coefficient) and, once the soil erodes, the potential for it to be delivered to a stream as sediment (delivery coefficient).

The erodability index indicates the relative erodability of an area, due to surface disturbance and debris slides resulting from management activity. It was calculated from a site specific forest model that included variables of soil and geology risk classifications, the forest soil resource inventory (SRI), slope class and silvicultural prescriptions. It also included a general "background" coefficient that represents sediment produced naturally. This background value was calculated for acres that would not be harvested.

The delivery coefficient was based on a regionwide study of sediment delivery. Using a regression analysis that incorporates percent slope and stream buffer width, a coefficient was calculated. It was multiplied by the erodability coefficient and the result was a final sediment index value of thousand tons of sediment year.

The sediment index incorporated several models, using the best data available. However, none of the models have been field tested on the Mt. Hood. The accuracy of results is not substantiated. The sediment output was developed and used only for comparing alternatives. The final output is an index of sediment delivered to streams, not a true sediment value.

PUBLIC ISSUE #4: RECREATION How should the Forest manage its outdoor recreation resources in response to the needs of an increasing nearby population?

Recreation Use (M RVDs ROS)

Recreation use expressed in recreation visitor days (RVD) is a measure of how much time individuals spend recreating in the forest. One RVD represents one person recreating for 12 hours or 12 people for one hour. All the familiar recreation activities such as camping, hunting, and skiing are measured in RVDs. Total RVD use is broken down into several categories to better identify types of recreation use. They include developed, dispersed roaded, dispersed unroaded, and wilderness use.

Supply Of Recreational Opportunities

This was calculated for each type of recreation as follows:

Developed - The theoretical Person at one Time (PAOT) capacity of each of the Forest's managed, developed sites was extracted from the Recreation Information Management (RIM) system (1983 site capacity). Coupling this capacity with the number of days in each site's managed season resulted in a theoretical capacity per season (year). The sum of the individual site capacities was then adjusted to practical capacity to reflect weekend versus weekday use, occupancy rate, and other factors that affect the theoretical maximum.

Dispersed - The first step in the development of dispersed recreational capacity required delineation of Recreation Opportunity Spectrum (ROS) classes. The initial inventory occurred in 1979/1980. The resulting base map was revised in the summer of 1984 to reflect the designation of four newwilderness areas and to update areas affected by timber sale activities.

In 1980, the Forest developed recreation capacity (supply) coefficients to be used in the land management planning process. The development of preliminary coefficients for each ROS class required utilizing 1979 RIM use information for dispersed recreational opportunities. From this base, the coefficients were adjusted to incorporate the practical potential recreational use. This practical capacity considers, for example, factors such as useable acres (based on slope and vegetation) and presence of recreational attractions. The following coefficients were a result of this process:

ROS COEFFICIENTS (CAPACITY)

P (PRIMITIVE) =	1.9 RVDs/acre/year
SPNM (SEMI-PRIMITIVE NONMOTORIZED) =	2.2
SPM (SEMI-PRIMITIVE MOTORIZED) =	2.5
RN (ROADED NATURAL) =	11.1
RM (ROADED MODIFIED) =	12.4
R (RURAL) =	85
U (URBAN) =	789

Dispersed recreation capacity for the current ROS inventory was calculated by assigning the total acres into percent by ROS class. These ROS acres were multiplied by the predetermined coefficients to determine RVDs per year. This resulting capacity represents the practical supply of dispersed recreation available at the time of the revision of the ROS (1984).

Wilderness - Wilderness capacity was originally calculated utilizing existing use data for the Mt. Hood Wilderness. The development of preliminary capacity coefficients (1980) occurred prior to the Oregon Wilderness Act of 1984. The Forest has since reevaluated and developed capacity coefficients that support a primitive or semi-primitive recreational experience in each of the five wilderness areas. Capacity has been calculated based on the following Wilderness ROS (WROS) coefficients:

WROS COEFFICIENTS (CAPACITY)

P TRAILED =	.75 RVDs/acre/year
SPNM (SEMI-PRIMITIVE NONMOTORIZED) =	1.0
TRANSITION =	1.0

The calculation of future capacity (50 years hence) for each alternative required the following processes and assumptions:

Developed - The practical capacity was assumed to remain the same for all alternatives. There will, however, be some shifts in specific site capacity as lesser used sites are reduced or eliminated and more heavily used sites are expanded. The net result is developed capacity that remains greater than projected recreation demand.

Dispersed - To evaluate the different capacities associated with implementing a given alternative, an estimation of the most likely future condition of each management area under full management was necessary. The following allocation of management areas into ROS classes resulted:

Category A

A1 - BULL RUN	NO PUBLIC ENTRY
A2 - WILDERNESS	CALCULATED INDEPENDENTLY
A3 - RNA	SPNM = 100%
A4 - SIA	ALTS. A,D,E,G: SPNM = 30%, SPM = 5%, RN = 65%
	ALTS. B,C,F,H: RN = 100%
	ALT. I: SPNM = 20%, RN = 80%
A5 - UNROADED REC	SPNM = 100%
A6 - ROADED REC	RN = 75%, SPM = 25%
A7 - OLD-GROWTH	RN = 100%
A8 - SPOTTED OWLS	RN = 100%
A9 - KEY SITE	RN = 100%
A10 - DEV REC	CALCULATED INDEPENDENTLY
A11 - WINTER REC	CALCULATED INDEPENDENTLY
A12 - OUTDOOR ED	CALCUALTED INDEPENDENTLY

Category B

B1 - WILD/SCENIC RIVERS	ALT A: SPNM = 99%, RN = 1%
	ALT'S B,C: NO RIVERS INCLUDED
	ALT'S D,F,H: SPNM = 22%, RN = 78%
	ALT'S E,G: SPNM = 41%, RN = 59%
	ALT I: SPNM = 40%, RN = 60%
B2 - VIEWSHEDS	RN = 100%
B3 - ROADED REC	SPM = 100%
B4 - PINE/OAK	RM = 90%, RN = 10%
B5 - WOODPECKER/MARTEN	RN = 100%
B6 - SPECIAL WATERSHED	RM = 100%
B7 - GENERAL RIPARIAN	RN = 100%
B8 - EARTHFLAWS	RN = 100%
B9 - WILDLIFE/VISUALS	RN = 100%

Category C

C1 - TIMBER EMPHASIS	RM = 100%
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These percentages multiplied by the acres in each management area for an alternative produced the ROS acres. The eventual (50 year) capacity was calculated by multiplying these acres by the predetermined RVD/ac/yr coefficients. Several simplifying assumptions were made to arrive at the mix of ROS classes per management area:

Classification of a management area into ROS classes did not consider spatial relationships. That is, management areas were classified independently of one another with limited comparison to the current ROS inventory.

Not all ROS criteria (size and distribution) were strictly maintained.

The ROS classification of management areas indicates the probable shift in ROS acres in the fully managed condition (50 years).

The transition from the capacity of the present ROS inventory (1984) to the estimated eventual condition is presented as if it occurs in a linear fashion.

Wilderness - The current estimated use (demand) in wilderness exceeds the present RVD supply (capacity) of the areas. The future capacity was assumed to remain the same as the present for all alternatives since predicting changes in management that might increase the capacity was not explored.

Demand For Recreation

The current use (proxy for demand) for developed, dispersed, and wilderness was calculated from RIM statistics. For developed recreation, a five year average (1979-1983) was determined to lessen the effects of yearly variation (do to weather, etc.). Dispersed and wilderness use figures were also available from the RIM system and reflect the District's best estimate of use in 1983.

These figures were projected into the future by using the aggregate population growth of the counties that influence the Forest. This, of course, assumes that future growth occurs at the rate predicted by the Center for Population Research and Census. Also, there was no attempt to shift use between the recreation types. The possible shifts between types or acceleration of one type is addressed in the narrative throughout the DEIS.

The tables presented in Chapter II of the DEIS for demand during the first decade represent the capacity or average demand, whichever is lower. This implies that use, as a proxy for the quantity demanded, has an economic value when less than the estimated present capacity. The fifth decade values are the sum of RVDs by ROS class.

Trail Construction/Reconstruction Miles, Developed Site/Reconstruction (Acres)

Trail construction and reconstruction are measured in miles. Included are trail facilities such as trailheads, culverts, bridges etc. Developed site construction and reconstruction is the rehabilitation of deteriorated facilities in campgrounds, picnic areas and other developed sites. It is measured in capacity in terms of the number of Persons At One Time (PAOT) that the site can support.

Forest inventories of trails and facilities show large amounts of "backlog" reconstruction and maintenance work to be accomplished. In accordance with Washington Office and USDA suggestions, all alternatives will eliminate this backlog within the first decade of the Forest Plan. However, no construction will be performed during this or other periods.

Visual Quality (Acres)

Visual Quality Objectives are measurable standards for the visual management of forest lands. They are represented by five terms:

Preservation	Modification
Retention	Maximum Modification
Partial Retention	

Each term describes a different degree of acceptable alteration of the landscape based upon the importance of aesthetics.

Acres of each class of VQO are calculated on specific landscape units called viewsheds. Viewsheds include the area seen from a particular travel route or use area. The VQO measured varies according to the amount and type of alteration that occurs in a particular viewshed. This alteration is the result of the management emphasis of the viewshed and associated activities. These activities may vary from building a campground to openings caused by timber harvest units or road building. Each viewshed is given an overall VQO rating and then the five VQO categories are summed. The result is total acres by VQO for each alternative.

VQOs are the standard measure of the visual management system used on a national level. They encompass the public concerns for scenic quality as well as diversity of natural features.

Non-Energy Minerals Produced (MMS)

Non-energy minerals are minerals represented by both locatable and saleable mineral resources. Locatable minerals refer to mining claims and prospects. Saleable minerals include sand, gravel and crushed rock developed from gravel pits.

The amount of non-energy minerals produced is calculated by estimating rock resource needs for road construction and reconstruction and rock used under special use permits. Road construction is in turn tied to timber harvest levels. An average value of tons of rock/mile was calculated and then multiplied by the number of miles of construction occurring in a particular alternative scenario. Rock sold under special use permits was figured into this overall value. This was then translated to millions of dollars.

Non-energy minerals vary directly according to road construction and the volume of rock existing quarries can produce. It is therefore tied to timber harvest levels and costs. It identifies energy issues in relation to other resource uses and activities.

Energy Minerals Produced (Billions of BTU's)

There are few geologically high potential and economically efficient sites on the Forest available for development. Currently there are no BTUs being produced.

Energy minerals in billions of BTU's are based on estimates provided regionwide by the State of Oregon Department of Geology and Minerals Industries (DOGAMI). These outputs represent only the potential for development, which is assumed to remain constant for each alternative. Though the potential remains the same, economic constraints on a project by project basis will determine the feasibility of the project. These can vary according to land designation and management standards developed for the area where an energy project is proposed.

PUBLIC ISSUE #5: UNROADED AREAS How should the remaining roadless areas
be managed?

Unroaded Areas (Acres)

Unroaded areas are areas of undeveloped Federal land where there are no improved roads maintained for travel by means of motorized vehicles. Appendix C gives a thorough description of all roadless areas on the Mt. Hood, their capability, and resource interactions. Two indicators are used to represent unroaded areas:

- (1) Unroaded areas assigned to roaded management prescriptions, but which have no development activities planned for the next 15 years.
- (2) Unroaded areas assigned to unroaded management prescriptions.

Calculation of these indicators used FORPLAN results. The process is described in Section VIII (Scheduling of Harvests within Unroaded Areas).

PUBLIC ISSUE #6: COMMUNITIES How should the forest respond to the
social and economic concerns of local
communities depending on the Forest?

Economic and social analyses are important parts of the planning process. The following outputs were used to show economic effects of alternatives and address social and economic concerns of local communities depending on the forest.

- 1) Operational Costs
- 2) Capital Investments Costs
- 3) Appropriated Funds
- 4) Non-Appropriated Funds
- 5) Returns to Counties (25% receipts)
- 6) Total Costs
- 7) Present Net Value (PNV)
- 8) Changes in Jobs
- 9) Changes in Income

Operational costs are all costs incurred to operate the forest except capital investment costs. Capital investment costs are those costs associated with man made structures and facilities. The sum of the two represent a total budget for the Mt. Hood National Forest. Another way of separating the total budget is through appropriated and non-appropriated funds. The former being funds appropriated by Congress for operating the forest. Non-appropriated are funds for fire fighting, special engineering projects, and "Transfer Accounts" related to timber sales. Costs affect the production of all outputs. They include salaries, computer use, maintenance, supplies, utilities, etc.

PNV is the estimated market equivalent value of forest outputs, minus the cost of producing these outputs. This includes the market value for timber (for which users pay full market value) and the estimated equivalent market value of range, water, and recreation (for which users pay either a small portion of full value or receive free of charge). The main variable of PNV is level of timber harvest.

Returns to counties are payments to local or State governments based on ownership of Federal land. In the case of receipts from the sale of timber, 25% of these receipts are distributed among the counties in accordance with how much of the Mt. Hood is in each county. These funds must be spent on roads and schools.

Changes in jobs and changes in income in millions of dollars are additional indicators of community stability and livability. Through the IMPLAN computer model, jobs and income dollars are generated as a result of many variables level of timber harvest (jobs for loggers and mill workers), total budget (salaries Forest Service employees spend in their community) and recreation use (many people spend money to recreate in the National Forest that generates jobs and income for others). All these outputs vary by alternative and represent a certain expenditure coefficient. The coefficient is then translated in the IMPLAN model to jobs and income in a community.

All costs and economic indicators vary across alternatives. Total budgets broken down in different ways indicate the funding needed to implement the alternative. PNV is the primary indicator of the total net economic efficiency of an alternative. It is discussed in detail in Section IV of this appendix.

IV. ECONOMIC EFFICIENCY ANALYSIS

This section describes the costs and benefits, as well as some concepts, involved in economic efficiency analysis, how they were derived, and how they were used in the Forest Planning process. Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and played an important role in the development and evaluation of Forest Planning Benchmarks and Alternatives. Specifically, the Regulations (36 CFR 219.12(f)) state that:

"The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits."

They follow up in 36 CFR 219.12(f)(8) by stating that:

"Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

A. Descriptions of Some Concepts Related to Efficiency Analysis

Before we get into the specifics of how economic efficiency analysis was used in the development of the Mt. Hood National Forest DEIS and Forest Plan, a few concepts and terms related to efficiency analysis in general need to be explained.

1. Priced Outputs

Priced outputs are those that are or can be exchanged in the market place. Their quantitative values are determined by actual market transactions or by estimation methods that produce prices commensurate with those determined by market transactions. Timber, forage, and minerals are examples of commodities which are bought and sold in the market. Their values are determined through the interaction of buyers and sellers based on the supply and demand conditions in the market at the time of the transaction. RVDs, on the other hand, are not normally exchanged via market transactions. Their market values are estimated by using some market transaction data in combination with various theoretical techniques. Conceptually, these assigned values should be consistent and comparable to those values which were actually derived via market transactions^{1/}. Therefore, both assigned and market values for priced outputs are appropriate to use for calculating quantitative measures of efficiency such as present net value.

2. Non-priced Outputs

Non-priced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. In these cases, subjective non-dollar values must be attributed to their production. These values are qualitatively rather than quantitatively described. They may be either positive or negative. In fact, what may be considered to be a benefit to someone may represent a cost to someone else. Examples of nonpriced outputs include the maintenance or enhancement of threatened and endangered species, natural and scientific areas, historical and anthropological sites, visual quality, and clean air.

^{1/} Rosenthal, Donald H. and Thomas C. Brown, Comparability of Market Prices and Consumer Surplus for Resource Allocation Decisions. Journal of Forestry, pp 105-109, Feb 1985.

3. Discounting

Financial analyses of alternative investment options usually involves cash flows over different periods of time in the future. Inherently, there is a time value associated with money. Due to human propensity to consume now, a dollar today is worth more than a dollar 10 years from now. Discounting is a process for adjusting the dollar values of costs and benefits which occur at different periods in the future to dollar values for a common time period so that they may be compared. Usually the common time period is the present. In which case, the discounted cash flow is referred to as the present value.

4. Present Net Value (PNV)

Present net value is the difference between the discounted value (benefits) of all outputs to which monetary values or established prices are assigned and the total discounted costs of managing the planning area. The maximization of present net value was the criterion used to help ensure that each alternative was the most economically efficient combination of outputs and activities needed to meet the other objectives established for that alternative. Present net value calculations consider only the benefits for which market prices exist or can be assigned. On the Mt. Hood, the priced benefits included timber, recreation, and range. These were compared against all Forest Service fixed and variable costs associated with managing the planning area, regardless of whether they were incurred for the production of either priced or non-priced outputs, or as overhead expenses for general maintenance of the organization. Therefore, PNV is an estimate of the current market value of the priced forest resources after all costs of producing both priced and non-priced outputs and meeting other multiple-use objectives have been considered.

5. Opportunity Costs

Opportunity costs are defined as the value of a resource's foregone net benefit in its most economically efficient alternative use (FSM 1970.5). In relation to the economic analysis performed for Forest Planning, it represents the decrease in maximized PNV of an alternative or benchmark when some alternative level of resource outputs are forced into solution. Therefore, opportunity costs measure the change in PNV for priced resource outputs, and can be used to measure the relative value traded off in order to produce the non-priced benefits included in net public benefits.

6. Net Public Benefit (NPB)

The maximization of net public benefit is a goal of the Forest Planning process. 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) whether they can be quantitatively valued or not. Net public benefit cannot be expressed as a numeric quantity because it includes qualitatively valued nonpriced outputs.

Conceptually, net public benefit is the sum of the present net value of priced outputs plus the value of all non-priced outputs. The full value of non-priced benefits is used because the costs associated with their production is accounted for in the calculation of PNV. It is only necessary to identify the marginal values of non-priced outputs when management inputs are increased in order to provide these outputs at levels above current standards or legal requirements. In such cases, it is important to depict the physical, biological, and social dimensions of the non-priced outputs, as well as who will benefit and who will suffer from their production. Account should also be taken of any changes that may occur among the other non-priced outputs as a result of providing a particular non-priced output. In assessing the net public benefits of a particular alternative, it is necessary to judge whether the subjective value to society of its non-priced outputs exceeds the opportunity costs associated with their production.

7. Welfare Distribution Effects and Impacts

There is another level of effects which are also a concern of National Forest Policy and Management. These are the welfare distribution effects influenced by the mix and level of outputs produced by the National Forest. They can be either positive or negative. Their impacts can also be local, regional, or national in scope. Some distributive effects such as changes in consumer prices or taxpayer costs have national level impacts. Others, such as induced jobs and income, or payments in lieu of taxes are more local or regional in nature. They are more related to questions of equity (ie. who pays and who benefits) rather than efficiency. They are not assessed in the context of the efficiency criteria associated with the PNV and net public benefit concepts. However, these positive and negative distributive effects need to be assessed in conjunction with the net public benefit measures since equity objectives often influence efficiency objectives and vice versa. These will be discussed in more detail in Section V.

B. Parameters and Assumptions Used For Economic Efficiency Analyses

In order to calculate the present net value for each alternative, several assumptions had to be made regarding discount rates, demand curves, real dollar adjustments, and real price and cost trends. This section will summarize these decisions and their resulting parameters. A more detailed discussion can be found in various process records in the Supervisor's Office.

1. Discount Rates

Discounting requires the use of a discount rate which is an interest rate that represents the cost or time value of money in determining the present value of future costs and benefits. Two discount rates were used to calculate the present net values for each benchmark and alternative. Both of them were real discount rates meaning that they were adjusted to exclude the effects of inflation (Real dollar adjustments will be discussed more below). According to FSM 1971.71:

For evaluations of long-term investments and operations in land and resource management in the 1980-1985 planning period, a 4-percent real discount rate shall be used. Evaluations should also discount benefits and costs at the real discount rate used in the most recent RPA to determine sensitivity of alternatives to variations in the discount rate.

The 4-percent rate approximates the "real" return on corporate long-range investments above the rate of inflation^{2/}. The 4 percent rate was used to solve FORPLAN and calculate the PNV for each benchmark and alternative. The 1985 RPA program used a real discount rate of 7-1/8 percent. The present net values of benchmarks and alternatives were also recalculated using this second discount rate (FSM 1971.71). All costs and benefits were discounted from the midpoint of the decade in which they were incurred.

2. Demand Curves and Real Price Trends

As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand Curves," 2/3/81) and in keeping with FSM 1971.65, horizontal demand curves for timber and nontimber resources were used to analyze the benchmarks and alternatives for the DEIS. Many factors can influence the demand for stumpage off of any one forest^{3/}. Some of these factors include trends in (1) interest rates, (2) the species and products mix of forest products consumption, (3) use of wood for energy, (4) forest products exports, (5) the cost of wood in Canada, (6) the rate of technical improvements in wood and fiber processing, and (7) the levels of other national forests harvests. All of these contain some degree of uncertainty regarding their future states of nature. Neither the empirical nor the theoretical bases have been well enough developed to derive reasonable estimates of the demand functions for the resources offered at the Forest level. Evidence does exist, however, that suggests that the elasticity in the portion of the timber demand curve for which the Forest can influence output levels is such that prices would be relatively insensitive to some "reasonable" range of quantity offerings. In other words, it appears that the timber demand curve for the range of output levels analyzed during the development of alternatives is nearly horizontal.

As a surrogate for resource demand curves, real price trends were developed and used to represent the rate at which resource values will change over time as a result of anticipated supply and demand interactions in the market place. As specified by the Regional Office (1920 letter to Forest Supervisors, "Timber Price Trends, Values, and Costs," 9/25/84), a 1 percent per year real price trend for stumpage was used for FORPLAN harvest scheduling analyses. These were applied for the first 50 years, and then a 0 percent price trend was assumed for the remaining 100 years of the harvest scheduling planning horizon. These imply that nominal stumpage prices (ie. those which include the effects of inflation) will increase during the next 50 years at a rate of 1 percent greater than the rate of inflation, and equal to rate of inflation from there on after.

Since price trends are reflections of expected futures, there is an inherent uncertainty involved with making such projections. In recognition of this uncertainty, we performed a sensitivity analysis which is discussed in detail in Section VI.

^{2/} Forest Service Manual 1909.17, Economic and Social Analysis Handbook.

^{3/} Adams, Darius M., and Richard W. Haynes, "Changing Perspectives on the Outlook for Timber In the United States", Journal of Forestry, January 1985.

Based on Washington Office direction, a 0 percent real price trend for all other resources was used during the development of the benchmarks and the alternatives. In other words, their future nominal values will change at rates equal to inflation.

3. Real Cost Trends

Based on Washington Office direction, 0 percent real cost trends were used for all future costs used in the development of the benchmarks and alternatives. In other words, the costs of labor, fuels, materials, and all other factors of production involved with managing the Forest are assumed to change at a rate equal to the rate of inflation.

4. Real Dollar Adjustments

Future prices and costs can be expressed in both nominal and real terms. The projection of nominal values includes the effects of inflation on these values. Real value changes are the result of the interactions of supply and demand forces in the market place. They do not include the effects of inflation.

All values and costs used in the Forest Planning process were expressed in real 1982 dollars, consistent with the 1985 RPA program. The GNP implicit price deflator index was used to convert historical nominal prices and costs to this common base (FSM 1971.32b).

C. Costs Used for Economic Efficiency Analysis

This section describes the costs used to perform economic efficiency analysis for each of the benchmarks and alternatives considered during the development of the DEIS.

All Forest Service costs were included for purposes of estimating budgets and calculating present net values for each alternative. These costs were identified by their Management Information Handbook (MIH) codes as described in FSH 1309.11. The MIH activity descriptions and their associated codes were useful for identifying how different costs would be treated during the planning process. The following is a listing of the costs and associated MIH codes corresponding to FY86 expenditures on the Mt. Hood National Forest.

Table B-IV-1 MIH Codes, Activities, and Costs (FY86 Budget)

<u>MIH Code</u>	<u>MIH Activity Description</u>	<u>FY86 Budget (Thousands of Dollars)</u>
A01	Recreation Planning	161.2
A02/308	Cultural Resource Inventory	24.6
A03	Cultural Resource Evaluation	18.0
A04	Cultural Resource Protection & Enhancement	14.2
A05	Facility & Site Reconstruction	9.0
A06	Facility & Site Construction	6.6
A07	Facility & Site Management	463.3
A08	Use Administration	50.6
A10	Trail Reconstruction	2.5
A11	Trail Construction	0.6

Table B-IV-1 (Continued)

<u>MIH Code</u>	<u>MIH Activity Description</u>	<u>FY86 Budget (Thousands of Dollars)</u>
A12	Trail Operation & Maintenance	101.9
AZ9	Recreation Support to Other Resources	2.2
B01	Wilderness Planning	5.8
B02	Wilderness Inventory	0.1
B03	Wilderness Use Administration	25.4
C01	Surveys, Planning, Prescriptions, Monitoring	157.5
C02	Non-structural Habitat Improvements	161.1
C03	Structural Habitat Improvements	285.6
C04	Structural Habitat Improvements Maintenance	3.2
CZ9	Wildlife Support to Other Resources	29.9
D01	Range Resource Planning	9.1
D02	Range Resource Inventory	8.4
D03	Range Non-Structural Improvements	6.6
D05	Range Structural Improvements	1.2
D07	Range Administration & Management	13.7
D12	Noxious Weeds	10.1
DZ9	Range Support to Other Resources	1.5
E00	Timber Resource Planning & Inventory	177.8
E03	Field Data Collection	489.9
E04	Reforestation	1,459.9
E05	Timber Stand Improvement	641.5
E06	Timber Sale Prep	1,452.4
E07	Timber Harvest Administration	1,200.5
E08	Nursery Management	118.8
E09	Genetic Tree Improvement	254.4
F01	Soil and Water Inventory	18.2
F02	Soil and Water Planning	42.7
F03	Soil and Water Improvements	15.7
F04	Soil and Water Admin. and Management	20.1
F09	Monitoring	67.4
FZ9	Soil, Water, and Water Support	21.0
G01	General Technical Inventory and Evaluation	18.8
G02	Site Specific Technical Investigations	73.3
G03	Processing of Exploration Proposals	1.8
G04	Processing of Lease Applications	22.7
G05	Processing of Site Specific Dev. Proposals	5.7
G06	Administration of Operations	30.7
G07	Contest, Hearings, and Appeals	2.1
GZ9	Lands Support to Other Resources	0.3
H07	Human Resource Programs	86.2
J01	Special Use Management	28.9
J03	FERC License & Permits	16.5
J04	Withdrawals, Modifications, Relocations	4.6
J06	Property Boundary Locations	120.5
J07	Property Boundary & Corner Maintenance	9.5
J13	Land Exchange	28.4
J15	Land Acquisition	7.0
J18	Rights-of-Way Acquisition	18.7
J22	Land Management Planning	284.6
L01 -L18	Transportation Investments	4,800.0
L19	Road Maintenance	3,193.3
L24	FA&O Construction and Reconstruction	57.5

Table B-IV-1 (Continued)

<u>MIH Code</u>	<u>MIH Activity Description</u>	<u>FY86 Budget (Thousands of Dollars)</u>
L25	FA&O Facility Maintenance	398.2
L28	Dams Management	5.6
L46-L47	Water & Waste Management	62.0
L48	Water System Construction	1.7
P01	Fire Management Planning & Analysis	135.9
P02	Fire Prevention	289.0
P03	Fire Detection	50.6
P04	Primary Attack Forces	589.2
P06	Fire Reinforcements	125.9
P07	Forest Fire Support & Facilitating Services	3.1
P10	Fuels Management Inventory	11.7
P11	Treatment of Fuels	2,679.7
P12	Treatment of Natural Fuels	39.6
P19	Aerial Transportation of Persons	1.0
P21	Aerial Application of Materials	16.1
P24	Law Enforcement	159.3
T01 -T03	General Administration	2,798.5

At the outset, each cost was categorized as either a fixed or a variable cost. If it was identified as a variable cost, decisions were made as to whether it would be analyzed in FORPLAN, TRANSHIP, or some form of electronic spreadsheet. Costs were determined by examining: (1) the PAMARS database, (2) Advent RPA budget planning files, and (3) historical records and contracts. Professional judgment was also an important factor when it came to making assumptions regarding what bearing historical costs had on anticipated future costs. All costs were developed and reviewed by the appropriate staff and sub-staff personnel. The following discussion summarizes the cost breakdowns and how they were incorporated into the efficiency analyses for each alternative. A more detailed presentation of the specific costs and their functions in the analytical tools can be found in the process records at the Supervisor's Office.

1. Costs Considered to be Fixed Across Alternatives

A cost was classified as "fixed" if it: (1) was not expected to vary significantly over the range of alternatives considered, (2) could not be tied to specific activities within any of the prescriptions, (3) represented a very small and insignificant amount of the Forest budget, (4) had insufficient cost records to support assumptions about when or how much it would vary as different prescriptions were implemented, or (5) was not related to the production of outputs and effects which were relevant to addressing the Forest Planning IC0s. Fixed costs were a component of the budget estimates and present net value calculations for each alternative.

2. Costs Considered to be Variable Across Alternatives

All other costs were classified as "variable". These costs were tied to the implementation of activities within a Management Area Prescription, and were expressed as costs per acre or costs per unit of output. Variable costs were analyzed in FORPLAN or some form of spreadsheet.

In general, FORPLAN contained all of the variable costs associated with implementing multiple use vegetative management activities, and the road construction and reconstruction costs incurred to complete transportation systems. Table B-IV-2 depicts the variable Forest Service costs that were included in FORPLAN and contributed to its calculation of PNV for alternative multiple use timber harvest scheduling solutions.

Table B-IV-2 FORPLAN Variable Costs

<u>FORPLAN Cost Category</u> <u>Activity</u>	<u>Variables</u>	<u>Cost Range</u>
Site preparation Fuels management Reforestation	slope working group existing vs regen stands working group natural vs artificial	\$246-1647/acre \$188-412/acre
Cultural treatments Precom thin Release Fertilization	slope working group none none	\$359-406/acre \$101/acre \$65/acre
Road system costs Local roads Collector roads	drainage slope existing vs regen stands unroaded status slope	\$70-886/acre \$957-1647
Sale prep costs Commercial thin Final harvest	none none	\$11.78/MBF \$8.71/MBF
Costs reflected in timber price Logging cost Haul/maintenance	none drainage slope	\$112/MBF \$12-27/MBF

Conversion of sale prep and timber prices and costs from MBF to MCF produced variation by working group and diameter.

As an example, Table B-IV-3 shows the amount of these costs expected to pertain in FY88 to the No Action alternative. This table lists the categories of costs which were derived from FORPLAN for subsequent alternative evaluation. These categories were also used for comparison of the alternatives with the maximum PNV benchmark. Additional categories of costs were used in the comparison of the other benchmarks. Since Version I of FORPLAN does not easily track its activities by individual category, some of these elements were combined into broader FORPLAN cost categories during the alternative formulation and analysis phase of planning.

Table B-IV-3 Actual Variable Costs

A C T I V I T Y D E S C R I P T I O N	Approx. Cost In No Action Alt (for FY88)
Timber (excluding engineering):	
Timber Inventories	\$ 235,000
Timber Planning	16,000
Input To Timber Sales by specialist (such as visual or wildlife input)	740,000
Timber Sale Preparation	1,952,000
Timber Sale Administration	1,170,000
Reforestation, TSI, Genetics	2,636,000
Improvements To Resources by Timber	1,047,000
Subtotal For Timber (excludes roads)	\$7,796,000
Engineering (related to timber sales):	
Timber local road design, survey, and construction	\$3,299,000
Timber roadless area arterial/ collector road costs	259,000
Upgrade locals to arterial/collectors	702,000
Maintenance of all timber roads	1,950,000
Subtotal For Road Costs (for timber only)	\$6,210,000
Grand total of FORPLAN variable costs for the No Action Alternative (average annual).....	\$14,006,000

This shows that an annual total of \$14,006,000 was identified as variable timber and engineering costs related to the current timber program on the Mt. Hood. This involved 11 general cost categories. In terms of MIH codes, this would have been further subdivided into more than 20 categories. In order to remain within the capabilities of Version 1 of FORPLAN, the 11 categories had to be aggregated into 6 types of FORPLAN reporting categories. Continuing with the previous example, these FORPLAN report categories and the associated costs pertaining to the No Action alternative are as follows:

<u>FORPLAN Report Category</u>	<u>FORPLAN Report Number</u>	<u>Cost As Shown In The FORPLAN Report For The No Action Alt</u>
Local Road Design, Build	Econ Report # 1	\$3,299,000
Local Road Upgrade	Second Deck Report 2	702,000
Roadless Art/Col Build	Econ Report # 5	259,000
Timber Site Preparation	Econ Report # 7	4,113,000
Timber Cultural Treatment	Econ Report # 7	3,559,000
Timber Sale Preparation	Econ Report # 7	<u>2,074,000</u>
Total FORPLAN variable costs for No Action Alternative		\$14,006,000

So, the model came up with the same timber and engineering costs related to harvesting as were budgeted in FY88 for the No Action Alternative. However, the 11 cost categories shown in Table B-IV-2 had to be compressed into 6 categories in the process.

The TRANSHIP model was used to help determine the least cost transportation network needed to serve the timber and recreation traffic loadings for each alternative. These findings were then factored back into FORPLAN cost tables.

Variable costs not associated with timber harvesting were analyzed outside of these two models with the use of spreadsheets. In the case of recreation, the capital investment, and the operations and maintenance costs were directly related to the resulting recreation allocations and projected RVD consumption trends for each alternative. With non-timber prescriptions being evaluated outside of FORPLAN, efficiency analysis was a little more cumbersome, sometimes requiring iterative examinations with both analytical tools. But the spreadsheet gave the ID Team more flexibility to examine alternative recreation management options for each alternative. As we further refine the joint production relationships between timber and recreation, and as we get a better understanding of the economic worth of recreation, the more desirable it will be to analyze the tradeoffs between these two important resources in one integrated model.

Range outputs and economics were calculated outside of FORPLAN (but using FORPLAN timber volumes) for subsequent calculation and analysis of alternative's PNVs. This was done because economic analysis of the benchmark results disclosed that range had a relatively insignificant effect on the Forest's present net worth (less than 1 percent) and because the relationship between timber cutting and the creation of transitory range was more effectively predicted using non-FORPLAN methods.

The remaining identified variable costs that were not related to the range and recreation programs were also evaluated outside of the model. It was evident that these costs should vary between alternatives. Generally, it appeared that these activities and their associated costs should vary as a function of land allocations, timber management activities, resource output levels, or road and facility development activities. However, due to the very soft data regarding the per unit costs of many of these activities, and the uncertainty as to the exact nature of their production relationships, the Team decided to examine them outside of FORPLAN. Basically, the costs associated with these activities were estimated

by comparing the amounts of relevant allocations or activity levels in a particular alternative to the current direction and indexing the projected costs based on those relationships. Again, as our management accounting databases improve, and as we learn more about the production relationships of these activities, it would be desirable to incorporate these into one integrated resource allocation and scheduling model. Fish, water, wildlife, soils, geology, protection (fire mangement and law enforcement), and miscellaneous monitoring and overhead expenses were included in the PNV calculation as variable costs in addition to timber, recreation, range, and engineering. The following table shows the decision space related to these other costs.

Table B-IV-4 Variable Costs Other Than Timber, Engineering, Range, and Rec

Item	Range Of Costs Among The Alternatives (Average Annual, First Decade)				Difference
	Lowest Cost		Highest Cost		
	Alternative	\$ MM	Alternative	\$ MM	
Fish and Wildlife	A,D,NC	0.8	I	2.4	1.6
Soils and Water	A,NC	0.4	I	1.2	0.8
Geology	A,F,H,I,NC	0.03	B,C,D,E,G	0.04	0.01
Protection	H	0.64	C	2.04	1.4
Miscellaneous Monitoring and variable overhead costs	H	2.13	C	5.82	3.69

These costs do not include input to timber sales. Input to timber sales appears in FORPLAN. As noted in Table B-IV-2, the FORPLAN report for Alternative A (without MMRs) showed approximately \$740,000 for FY88 specialist input. This also does not include monitoring costs. The \$3,500,000 includes monitoring costs. This also does not include KV and BD funds. KV and BD are included in FORPLAN (part of the \$1,047,000 shown in Table B-IV-2).

"Protection" includes approximately \$1,526,000 for FFF (non appropriated funds for fighting forest fires) and \$54,000 for fuels treatment. The backbone protection organization is included as a fixed cost (see Table B-IV-1).

Miscellaneous costs are estimated as 18% of the total variable (non-fixed) amount of an alternative's budget. This pays for monitoring and such variable overhead items as computer systems, personnel staff, etc. Documents are available in the Supervisor's Office documenting the derivation of this estimate.

By summing the "Differences" on the previous table, it is noted that \$7.5 MM is the maximum spread in the budget that could possibly be attributable to the aggregation of "other" variable costs.

The spread between the overall budget for the most costly alternative and the least costly alternative was \$24.34 MM, or more than 3 times the possible spread due to the costs other than timber, recreation, and range. It is concluded that

the aggregation of these "other" variable costs accounted for less than a third of the total variation among the alternatives' total budgets.

D. Benefits Considered for Economic Efficiency Analyses

Resource outputs to which dollar values were assigned in FORPLAN constitute the priced benefits included in the present net value calculations. Like all of the costs included in the analyses, those benefits incurred during the 150 year planning horizon were incorporated in the PNV calculations. They include both market and assigned values.

The market values constitute the unit price of an output normally exchanged in a market after at least one stage of production, and are expressed in terms of what people are willing to pay as evidenced by market transactions. Nonmarket (assigned) values constitute the unit price of a nonmarket output not normally exchanged in a market at any stage before consumption, and thus must be imputed from other economic information (FSM 1970.5). They are valued in terms of what reasonable people would be willing to pay (above participation costs) rather than go without the output. In either case, their values are theoretically commensurate and appropriate for inclusion in PNV calculations. The resources for which dollar values were estimated on the Mt. Hood consisted of timber, range, commercial fish, water, and developed, dispersed, and wildlife oriented recreation.

Timber was the only resource for which market prices were used in FORPLAN. All other priced benefits were analyzed with electronic spreadsheets outside of FORPLAN. As discussed earlier, this sometimes required some iterative analyses between FORPLAN and the spreadsheets to ensure that in fact the solution for an alternative reasonably approximated the most economically efficient set of prescriptions and outputs to achieve the objectives of a particular alternative.

Evaluation of alternatives also considered non-priced benefits. These are outputs for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value commensurate with the market values associated with the priced outputs. In these cases, a subjective qualitative value must be attributed to their production. Conceptually, the addition of the non-priced benefits to PNV is used to derive the net public benefits (NPB) associated with each alternative.

The provision for many of the non-priced benefits is achieved by applying constraints to the production of priced outputs (ie. such as timber harvesting constraints in FORPLAN). These constraints usually result in a decrease in the PNV of the priced outputs to which the constraints were applied. Subjective judgments are then necessary in assessing whether the benefits of producing the non-priced outputs exceed the opportunity costs associated with producing fewer priced outputs. If a PNV tradeoff induced by the provision of a non-priced output is judged acceptable, then a positive contribution to NPB has resulted. This tradeoff analysis is described for alternatives in Section VIII.

1. Timber

Timber values were expressed in terms of dollars/MCF paid at time of harvest. All calculations were performed in terms of constant 1982 dollars. Also, since most of the source data was expressed in terms of dollars/MBF, it was necessary to convert these to dollars/MCF in FORPLAN.

Calculation of stumpage prices began with mill values. These were provided by Region 6, and were based on Timber Sale Statement of Accounts for the Mt. Hood National Forest covering the period of April, 1977 through September, 1983. Values for each species sold are presented in the table below. Weighted values were calculated for each FORPLAN Working Group based on the species harvested from that working group in calendar year 1980 sales. These are also shown in the table.

Table B-IV-5 MT. HOOD NATIONAL FOREST TIMBER VALUES PER MBF

	<u>Mill Value</u>
<u>Species</u>	
Douglas-fir	\$352
Noble fir	\$271
Western hemlock	\$269
Western larch	\$265
Ponderosa pine	\$250
Western White Pine	\$245
Grand fir	\$222
Englemann Spruce	\$215
Subalpine fir	\$206
White fir	\$196
Red alder	\$185
Cedar	\$184
Lodgepole pine	\$139
<u>Working Group</u>	
Douglas-fir	\$330
True fir	\$254
Associated species	\$253
Pine/oak	\$303

Based on work done at the Pacific Northwest Forest and Range Experiment Station, lumber selling price diameter relationships were used to develop diameter specific lumber selling values. Since none of the source data was diameter specific, assumptions had to be made regarding the average diameter of trees sold for each species during the period for which the data sources covered. The diameter specific values and costs were then developed based on diameter class relative indices for lumber selling values. Price variation by diameter class was introduced into FORPLAN economics tables, using five diameter categories:

1. commercial thinning diameters
2. minimum regeneration harvest diameter
3. average regeneration harvest diameter for small condition class
4. average regeneration harvest diameter for large condition class
5. diameter at age 250

Logging costs for analysis area groups were deducted from mill values to determine stumpage prices. These costs introduced further variations (as described previously). Finally, stumpage prices were converted from value per MBF to value per MCF using conversion factors based on working group and diameter.

2. Range

The range outputs represent the amounts of forage permitted to be grazed and is measured in units of animal unit months (AUMs). AUM values were calculated as the value of the marginal product of an AUM in the production of a marketable animal. The Forest Service entered into a cooperative agreement with the USDA Economic Research Service to develop livestock enterprise budgets for each National Forest. The Range Budget Approach was used for this analysis. Because Forest AUMs are not actually priced in a free competitive market, the calculated price is an estimate of market value. First, returns from all ranch products were determined. Then, all costs of production were subtracted. The remaining returns plus the cost of the Forest Service permits became the residual value of the AUM. This residual value of an AUM to ranch livestock production is comparable to conversion surplus timber values. Based on the information provided in the RPA 1985 Program analysis for the DEIS, and a Regional Office Memo (2340, 9/30/83), the AUM value for the Mt. Hood National Forest in 1982 dollars is \$11.04.

3. Water

The water outputs represent the amounts of culinary (domestic, municipal) water quality maintained and is measured in units of acre feet of water (AF). The principle used in applying a benefit value to an AF is that value is given only to that portion of the water on which dollars are directly spent to either improve or maintain its quality. In the situation where watershed support dollars are spent as part of the cost of producing another output (e.g., timber sale volumes) the prevention of water quality degradation is not captured as a direct benefit since it is an associated cost. However, the water volumes associated with these costs are in fact kept at a maintained level and are not degraded. Those areas and related volumes that may be of good quality but which the Forest Service spends no dollars to directly improve or maintain - are also not included. This does not imply that the remaining water volumes are not used or do not have value. Those volumes of water that are the direct result of water quality improvement and/or maintenance Forest Service expenditures are assigned a value assumed to be equal to the marginal utility of the last increment of water in the lowest value consumptive use, which is irrigation. Irrigation is traditionally the lowest value in the western United States. Based on the information provided in the RPA 1985 Program analysis for the DEIS, and a Regional Office Memo (2340, 9/30/83), the value for maintaining the quality of water produced on the Mt. Hood Forest in 1982^{4/} dollars is \$0.20 per AF. This value was developed from a study by Frank, et. al. ^{4/}

4. Commercial fish

The value of \$1,050 per thousand pounds of commercial fish was derived from National Marine Fisheries Service data. The Forest Service Wildlife and Fisheries Staff provided a 3-year average value adjusted to the 1982 base year. One value for commercial harvest of anadromous fish was calculated for each Region. The commercial fish values were adjusted to provide RPA values consisting of market

^{4/} Frank, Michael D. and Bruce R. Beattie. The economic value of irrigation water in the Western United States: an application of ridge regression. Technical Report 99, Texas A&M University, 1979.

value at dockside less the private costs of haul. The private haul costs were estimated from studies that have been conducted at the University of Washington and in Region 10 (Alaska).

5. Recreation

The non-wildlife related recreation and wilderness outputs represent the amount of use consumed on the Forest and are measured in terms of recreation visitor days (RVDs). The wildlife related recreation use is measured in terms of wildlife and fish user days (WFUDs). The values used for these priced outputs were derived directly from the 1985 RPA program assessment. This discussion is a summary of the write-up found in Appendix F the 1985 RPA DEIS.

The Resource Evaluation Group at the Rocky Mountain Forest and Range Experiment Station conducted an extensive literature search to develop the 1985 activity values for recreation. Benefit values for recreation, wilderness, and wildlife activities^{5/} were developed from recent travel cost models and contingent valuation research. In-service and academic specialists reviewed the research and activity values and adjusted the initial values to achieve methodological consistency to apply them to regional conditions. The values represent total willingness to pay for an additional recreation site, herd unit, or wilderness area. The RVD values by recreation activity that were generated by this study can be found in Table F.4 of the 1985 RPA DEIS.

For program evaluation purposes, these values were subsequently adjusted downwards because:

- The travel cost method represents a total willingness-to-pay. Other resource values in the RPA evaluation represent market price or value of the marginal product. Consequently, the willingness-to-pay values were adjusted in an effort to make the recreation values more compatible with values used for other resource outputs.
- The travel cost method estimates values on a site-by-site basis. The method does not address the question of whether regionally or nationally a given quantity of RVDs will, in fact, be consumed if that price were changed.
- It is believed that the travel cost studies are typically done at higher quality sites, do not take into account substitutes to individual sites, and do not accurately measure trip length; consequently, values from these studies may be on the high side when applied to average situations on a region-wide basis.

In response to the first concerns, the values were adjusted based on the relationship between the proportion of recreation provided by the Forest Service and estimates of an average nationwide demand elasticity for outdoor recreation. It is estimated that nationally, roughly a 5 percent increase in price will result

^{5/} Loomis, John and Cindy Sorg. A Critical Summary of Empirical Estimates of the Values of Wildlife, Wilderness, and General Recreation Related to National Forest Regions. Rocky Mountain Forest and Range Experiment Station, USDA Forest Service, 1982.

in a 1 percent decrease in quantity demanded.⁶ It is also estimated that in 1982 the Forest Service provided 7.5 percent of all outdoor recreation. Consequently, it is roughly estimated that there will be a 5 percent decrease in price for each percent of the 7.5 percent Forest Service market share or a total decrease of 37.5 percent for clearing the market. Therefore, the initial willingness-to-pay values were reduced 37.5 percent for use in comparing resource allocation choices.

These values were expressed in terms of the recreation opportunity spectrum (ROS) activity categories in accordance with the way they were developed and tracked during the process of analyzing alternatives. The resulting values are as follows:

Table B-IV-6 1985 RPA Recreation Benefit Values (1982 \$)

<u>ROS Type: Non-Wilderness</u>	<u>Value(\$/RVD)</u>
Primitive (STD)	11.25
Semi-Primitive Non-Motorized (STD)	13.25
Semi-Primitive Motorized (STD)	12.13
Roaded Natural (STD)	9.38
Rural (STD)	8.47
Urban (STD)	11.38
<u>Wilderness</u>	<u>Value(\$/RVD)</u>
Primitive (STD)	17.50
Semi-Primitive Non-Motorized (STD)	17.50
<u>Wildlife & Fish</u>	<u>Value(\$/WFUD)</u>
Big Game	30.00
Nongame	25.00
Resident Fish	15.00
Other Game	19.00
WL/F REC (STD)	21.00

In accordance with guidance from the Washington Office and the USDA, only standard (STD) levels of service/costs/benefits were considered.

^{6/} Lewis, Robert C 1977, "Policy Formation and Planning for Outdoor Recreation Facilities." Pages 62-69 of Outdoor Recreation - Advances in Application of Economics by Jay M. Hughes and R. Duane Lloyd, USDA, Forest Service, General Technical Report WO-2.

V. SOCIAL AND ECONOMIC IMPACT ANALYSIS

A. Overview of socioeconomic conditions

The following is a summary of the Mt. Hood National Forest Socioeconomic Overview, which is available at the Forest Supervisor's Office.

A "forest influence area" was delineated to assess current social and economic conditions and to estimate potential changes. The influence area is the geographic area where the majority of forest resources such as recreation, timber, water, range, and wildlife are first used and where public concern is concentrated. Clackamas, Hood River, Multnomah, and Wasco Counties comprise the forest influence area for this analysis (see map). Note that exclusion of Washington County from the influence area means that only part of the City of Portland is included. This division facilitates the input-output analysis performed by IMPLAN as this model only deals with discrete counties (as described in Part C).

Eight counties form a secondary influence area: Marion, Columbia, Washington, Jefferson, Lane, Linn, Skamania (WN), and Clark (WN). While this Secondary Influence Area is affected by the Forest, linkages are quite weak and affect only small sectors of the population. Socio economic impacts of forest management are difficult to quantify and are of questionable importance to these areas. For these reasons, the analysis of effects will concentrate on the four county influence area.

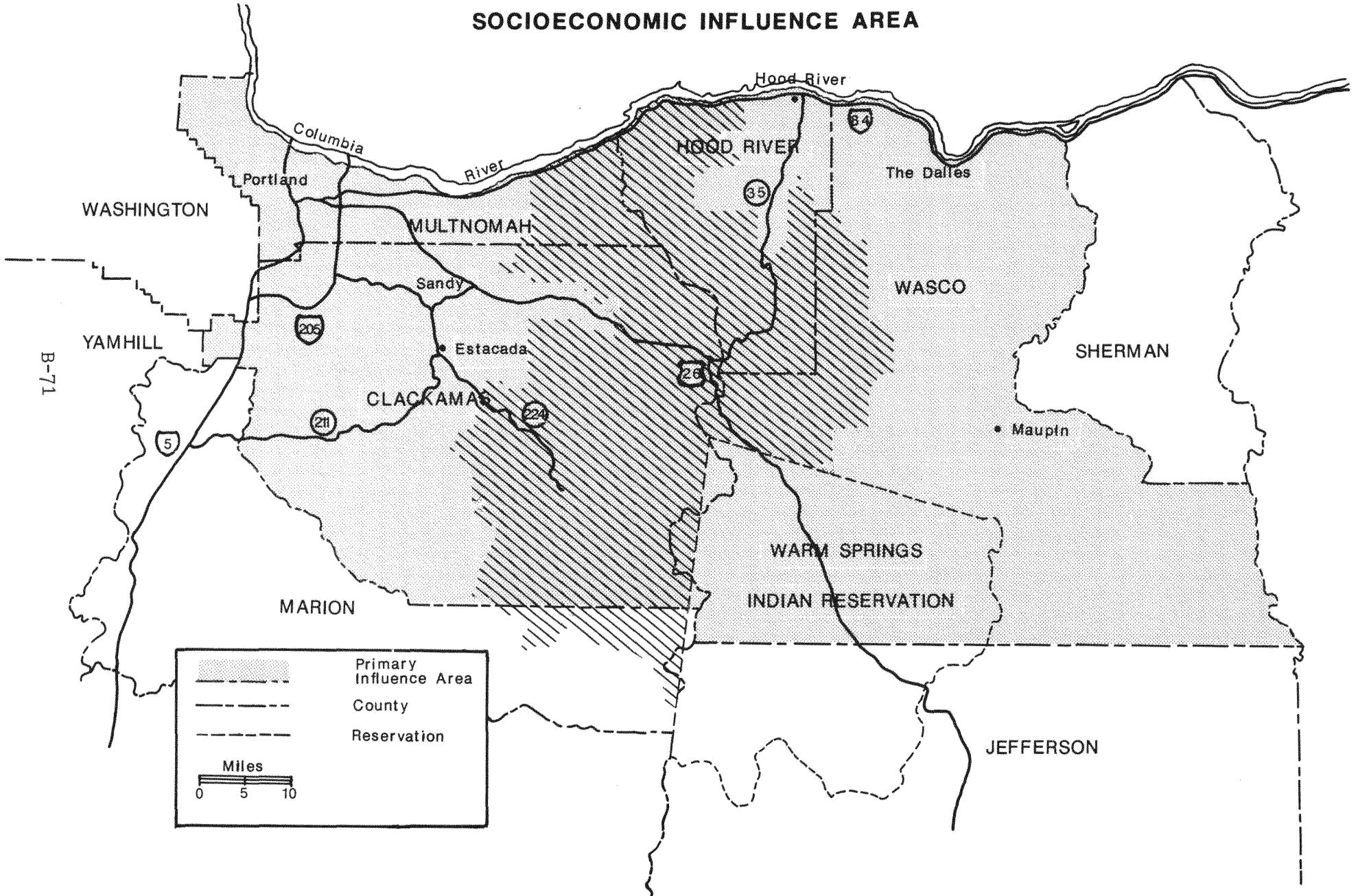
The 1980 population of the forest influence area was 842,126 persons. This is almost thirty three percent of the State's population. Fourteen percent of the area population lives in rural settings; the remainder in urban settings, a considerably lower proportion than the State average.

Over the last fifty years there has been considerable population growth in the area surrounding the Forest, with population increase concentrated on the west side. The Portland Standard Metropolitan Statistical Area (the SMSA includes areas outside of the primary influence area) grew to 1.2 million in 1980, a 22.5% increase over 1970 and a 50% increase over 1960.

Multnomah County was the only part of the area which did not have significant net growth during the 1970's. Despite rapid growth in east county communities such as Gresham, the county's high population density (1305 per square mile) and urban character discouraged net population growth, as people seeking suburban and rural lifestyles out-migrated from the urban core of the county. Growth of small cities in eastern portions of Clackamas and Multnomah Counties is the result of spreading influence of the Portland Metropolitan area. Planning surveys in Estacada, Molalla, and Sandy indicate a growing number of residents commuting to work in Portland.

On the east side of the Influence Area, Hood River and Wasco Counties lost population between 1960 and 1970. However, since 1970, these counties have experienced significant population growth as employment opportunities increased (primarily in The Dalles and Hood River).

Figure B-2



In 1970, age distribution of the Influence Area was relatively uniform with a high proportion of the population over 45 years of age or under 15 years of age. The influence area is overwhelmingly white and of northern European extraction. Population figures reveal enclaves of minority population, primarily in Multnomah County, and to a lesser extent in southern Wasco County, and the upper Hood River Valley.^{2/}

Population projections indicate that by the year 2,000, the influence area will increase by 350,000 persons to total 1.2 million, with an average annual increase of 3.2 percent. The population of the influence area is expected to remain centered around the Portland Metropolitan Area with suburban and rural Clackamas County absorbing most of the additional population. Hood River and Wasco Counties are expected to gain in population, although not as rapidly as the west side counties.

B. Social Assessment

The influence area includes regional distribution and commercial centers (Portland, The Dalles) with Portland situated at the crossroads of the region's highway, rail, and river systems. This west side urban area has a large base of manufacturing firms including several "high tech" industries. The influence area also contains highly productive forest and agricultural lands, with wood products, grain and fruits providing considerable economic strength. In addition, the influence area contains magnificent scenery and a variety of recreational opportunities, which are a powerful attraction to tourists and in some cases, new industries.

While the influence area has a strong economic base, economic growth has not been evenly distributed. Growth is concentrated in west side urban and suburban areas such as western Clackamas County and to a lesser extent larger east side communities. Rural communities and unincorporated areas remain quite dependent on the forest products and agriculture industries for employment.

For several communities in the influence area, mill operation is the main generator of business. Loggers, mill workers, local business and governments all depend on the revenues generated by product outputs of a local mill. Where economic conditions dictate cutbacks or closure, there is seldom any warning and little opportunity to prepare for the crisis. Retail and service businesses and public agencies lose revenue and further layoffs occur. Dislocated workers must choose between "waiting out" the cutback and seeking other employment.

The consequences of unemployment may go far beyond loss of income. Layoffs affect a persons sense of self; who they are, what they do, their relationships with others, and their plans for the future. Evidence indicates that employment loss leads to a variety of social disorders. Various indicators of social dislocation have been used to track this factor, including increases in alcohol consumption and child abuse. While the severity of these social problems depend on the individuals and communities involved, it is safe to say that some influence area communities will be severely impacted by declining wood products employment.

An examination of community attitudes, lifestyles and related characteristics must recognize the variety of socioeconomic conditions extant within the influence area. Each identifiable group of communities will be discussed separately.

Both economic and social conditions are described in the community discussion below. Impacts of management alternatives on local communities must be assessed against this backdrop. Area-wide quantitative economic effects have been evaluated using the information developed in Part C of this Section.

1. The Portland Metropolitan Area *

The Portland Area is the largest distribution center in the northwest and the 19th largest in the nation. It is a major northwest manufacturing, trade, and finance center. Chief manufacturing employers include instruments, machinery, fabricated metals, and food processing.

Portland's status as a trade center is made possible by its location at the hub of ground and water transportation, with two major highways, a deep water port, and the Columbia River as transportation routes. In 1981, Portland waterborne exports amounted to 10.5 million tons of goods (primarily grain, forest products) and imports reached 2.5 million tons (primarily oil, automobiles, metals).^{13/} In the same year, over 100,000 people were employed in retail and wholesale trade.^{14/}

Finance, insurance, and realty are growing employers in Portland, with two dozen banks offering services through 250 banking offices. Manufacturing provides a proportionately smaller share of the metropolitan areas employment than it has in the past, declining from 21% of total employment in 1972 to 19% in 1982. The proportion of direct employment in lumber and wood products industries has declined from 2.4% to 1.3% during the same period.

Future growth will likely occur in trade, tourism, convention, and service industries. Growth will be facilitated by interregional and international transportation facilities, banking capabilities and perceived livability of the area.

Population of Portland city proper is 368,000, while the Portland SMSA has a population of 1.2 million. Portland's population has grown rapidly through the 1970's primarily due to in-migration by people attracted to the areas job opportunities and quality of life. Metropolitan areas have expanded with the population and several outlying communities have a substantial "bedroom" population of people who commute to jobs in the central city. Income levels are higher than the State average but there is considerable disparity in income and standard of living. Black, Indian and Asian people are generally much poorer than the white majority. As with many cities, Portland has both wealthy suburbs and decaying inner city neighborhoods.

The Metropolitan area uses both local and regional government structures. Public services and government regulations (such as zoning) form an extensive and complex network. People tend to become involved in issues through organizations or interest groups, rather than as individuals. Public interest is relatively high regarding some issues, particularly water quality, land use planning, environmental quality, schools, and recreational activities.

* All statistics in this section are for the Portland Standard Metropolitan Statistical Area which includes parts of Clackamas, Multnomah, Washington, and Clark (WN) Counties.

Portland area residents have a sense of ownership with regard to the Columbia Gorge, Mt. Hood, Bull Run, the Clackamas, and Sandy Rivers and the west side of the Forest in general. Predominant recreation activities include driving for pleasure, downhill and cross country skiing, hiking, camping, hunting, fishing, and snowmobiling. Winter sports have grown faster than other activities in recent years.

Another Forest-related activity that has increased in popularity is cutting firewood. While this growth has occurred throughout the influence area, the City of Portland accounts for a significant volume of use and attendant problems connected with urban users. The increase in wood consumed has also exacerbated pollution problems in Portland.

Conservation groups in the Portland area have been actively involved in Forest issues for many years. Primary concerns include wilderness and roadless areas, wild and scenic rivers, old growth habitat, threatened and endangered species, and ski area development. Timber industry groups (both labor and management) are also very active. Their chief concerns are timber supply, management practices, and availability of sales to small mills.

2. Clackamas County, East Multnomah County service and wood products centers

Clackamas County has a strong and diversified economy, particularly in the northwest urban area, but smaller communities in eastern and southern Clackamas County are still tied to resource based employment. 25% of county employment is in manufacturing, one third of which is in forest products and paper manufacturing. The county has a labor force of 176,000 which is expected to increase by 77,000 by the year 2000. Close to half of these workers commute out of county (Portland) to work. The county has a total of 60,400 non-agricultural jobs, and major industrial areas include Wilsonville and Milwaukie, with smaller manufacturing centers (mostly sawmills) in Molalla. The Forest industry payroll was \$17 million in 1976.

West side communities have been significantly affected by the growth of metropolitan Portland. Traditionally dependent on logging and wood processing, these areas are diversifying economically. Their location on the fringe of the metropolitan area has led to dramatic increases in population in recent years. Many new residents are seeking a combination of rural lifestyles and urban amenities. Population increases have been greatest in areas adjacent to the metropolitan area. In Sandy and Estacada, a significant portion of the work force commute to jobs in the metropolitan area (15% for Estacada).

Growth has brought new people into communities which had previously experienced little change. The lifestyles, occupations, and education level of these new residents are different from the more homogeneous social patterns of the past. New residents tend to have more formal education, more mobility, smaller families and a high proportion of these people work in white collar occupations.

Demand for education, health, and social services are increasing with population. Family size, education and income levels are changing with the spreading metropolitan influence, particularly in Sandy, Estacada, and Molalla. These communities are beginning to experience problems common to urban areas such as crime, traffic congestion, and pollution. This is creating conflicts between long-term residents and new residents who came to the area for its small town rural amenities. Paradoxically, new residents tend to be more interested in roads and services and are willing to organize and pay for such improvements. Some long-time residents resent these improvements for the additional taxes and government structure that they bring.

Westside rural communities tend to use those areas of the Forest closest to their communities. Sandy residents tend to use the Mt. Hood area, and Estacada residents frequent the Clackamas River drainage. Some families use the Forest to extend their income by fishing, hunting, and woodcutting. Commercial woodcutting, river guide services, and other business uses are growing.

There is a sense of having to share the Forest with outsiders from the metropolitan area. This feeling is exacerbated by supply limits on campsites and firewood. Forest Service regulations are often seen as an unnecessary burden on local Forest users.

There is considerable concern over timber harvest levels, with many residents opposed to non-timber designations (such as wilderness) of Forest land. This view is by no means universal in the community.

Forest Service Ranger Districts are highly visible in the communities. They are an important source of local employment, and are recognized for their influence on the communities.

3. The Mt. Hood Corridor

The Mt. Hood Corridor is a collection of small communities along Highway 26 in northeast Clackamas County. There are 6,500 residents, over half of which (58%) are seasonal. Population growth is rapid, with a projected population of 15 to 20 thousand by the year 2000. Growth is fueled by the areas proximity to recreational opportunities as well as urban amenities.

The corridor was originally logging country, but as private land was cut over, employment shifted to service and recreation. Considerable employment is generated by recreation and tourism. Three ski areas generate 40% of the community's commercial activity. Businesses (other than ski resorts) are generally small, with 103 commercial enterprises; 90% of which employ less than six people.¹⁶ Most commercial activity is along Highway 26 in a "strip" development pattern.

With the exception of a growing commuter population, most people work in jobs related to recreation and service. Many people alternate between a summer job and a winter job. Pay is low and work is seasonal in most recreation related jobs. This type of employment is expected to increase as the Portland metropolitan area grows in population.

The community is polarized about growth. Many business interests and property owners are "waiting for the boom" in land values as inevitable growth occurs. Many younger and middle-aged residents are against unplanned growth or in some cases, any growth at all.

Population pressure from the spreading Portland Metropolitan area has created recreation demand problems. Winter recreation is centered on five ski areas, all of which are reached via Highway 26. The highway is increasingly congested on winter weekends.

There is considerable concern about forest management among corridor residents. Many residents feel that clearcutting in the corridor will hurt business, property and scenic values, or damage water quality. The Forest Service sends timber sale plans to twenty organizations in the area. Problems associated with the private/public land interface are expected to continue as the corridor population increases.

4. The Columbia Gorge

Despite its proximity to the metropolitan area and its status as a major transportation corridor, the Gorge remains quite rural in character. Employment is primarily limited to mill jobs in Cascade Locks and Bridal Veil, dam maintenance work in Bonneville, and some service jobs connected with the highway. Some residents commute to jobs out of the area. Taxes are high (\$30 per \$1000)¹⁷ and land for development is limited by topography and adjacent public lands.

There is a feeling of independence among Gorge residents, perhaps engendered by the rather harsh weather conditions and the sense of isolation created by the topography. The one thing that seems to unite the "strung out" communities in this area is a strong attachment to the beauty of the Gorge. This was a driving factor behind recent legislation creating the Columbia River Gorge National Scenic Area.

Summer use has increased significantly in the Gorge. Developed camping areas are heavily used and these trends are predicted to continue.

A National Park Service study in the late 1970's proposed an area from the Sandy River to Maryhill as a National Scenic Area managed by the Park Service. The study was quite controversial and numerous groups and individuals expressed their point of view. Since that time, the USDA Forest Service has been identified as the agency responsible for the proposed Scenic Area. The Oregon and Washington congressional delegations have identified the management of the Gorge as the top Northwest environmental issue for the 1985-86 congressional session. The main point of controversy for Gorge residents appears to be one of local control versus Federal control, with most residents favoring the current pattern of mixed private and Forest Service ownership.

5. Hood River County

This county has an agricultural base with over 15,000 acres in orchards and an annual harvest worth 37.9 million dollars.^{18/} Fruit, nuts, livestock and hay lead agricultural production. Employment in this industry tends to be unskilled and seasonal, with employment peaking in July. A substantial portion of total employment is in food processing (fruit and nuts), with a seasonal peak of approximately 450 employees.^{19/} The upper Hood River Valley has experienced significant growth.

Water from the Forest is important for both irrigation and residential use. Forest products mills employ over 400 people.^{19/} The industry is second only to agriculture as an employer. The Mt. Hood National Forest is a major supplier of logs for these operations. 54% of the total county road budget comes from Forest Service in lieu payments. Recreation is primarily a seasonal employer in this county, with two ski areas using 350 workers at peak season and accommodating an estimated 350,000 skiers per year.^{20/} Residents also use the Forest for recreation and woodcutting.

Residents take pride in the scenic and rural character of the valley. There is significant controversy over growth and development, particularly with regard to second home and recreation development. As with many agricultural and forest products communities, people feel that the land is for work and not for play. Expanding recreation and commercial businesses are seen by some as providing economic diversity. However, many local people feel such development will threaten the quality of life in the area.

Trends indicate that eastside rural communities will continue to rely heavily on agriculture and wood products. The reliance on the industries creates high seasonal unemployment (the highest average unemployment in the State) and attracts a seasonal influx of migrant workers (average of 1,145 farm workers in July and 110 workers in May) which in turn engenders some resentment among local workers. Most of the seasonal workers are Hispanic.

6. Wasco County

Wasco County's economy is based on agriculture, wood products and manufacturing. The Dalles dominates Wasco County, in terms of population and economic activity. It is a center of trade in the Mid-Columbia region and has substantial employment in food processing (approximately 300 employees at peak season) and until the recent aluminum plant shutdown, there was significant employment in primary metals. The Columbia River provides access to shipping and hydroelectric power while the remainder of Wasco County provides agricultural products for processing and shipping.

Grain and cherries are the main products, with substantial sales of livestock adding to gross farm sales of 39.6 million dollars in 1982.^{21/} Wood products are a substantial portion of the economic base in Wasco County and several small communities owe their existence to this industry. The sawmill in Maupin employs 90 people.

Change has been relatively slow in Wasco County. Rural Wasco communities are growing slowly, but remain dependent on timber and agriculture as an employment base. Maupin is a local center of manufacturing, tourism and trade with some tourist-oriented business, due to the proximity of the Deschutes River. Tygh Valley, Wamic and Pine Grove are strongly dependent on forest products employment, with 90% of Pine Grove's work force so employed. The Friend area and Dufur are agricultural in character, and grazing is an important use of adjacent forest lands. People in rural Wasco County are generally opposed to rapid growth, have strong feelings of independence, and feel that local control is important. There are few minorities in the area.

Rural Wasco County is oriented toward the Forest in terms of irrigation water, community watersheds, log supplies, grazing, woodcutting, and recreation. The Forest Service is a significant source of employment in the Dufur and Pine Grove areas. There is considerable interest in Forest decisions affecting timber supply, range resources, and employment. The Forest also contains The Dalles watershed, the primary drinking water source for The Dalles.

7. Warm Springs Indian Reservation

The Warm Springs Indian Reservation involves 640,000 acres located on the southeast side of the Forest. The Confederated Tribes, led by a Tribal Council, direct the use of commonly owned lands and businesses (mill, resort, etc.). It is an economic, social, cultural and political unit. Tribal members receive dividends from profits and can be allotted land.

The Confederation is active in providing education, health and social services. There has been significant population growth, particularly from 1950 to 1960, and in the last decade.^{22/} Population growth was caused primarily by expansion of tribal employment opportunities. The majority of the population lives in or near the community of Warm Springs on Highway 26.

The economy is diversifying, but still is highly dependent on wood products, recreation, and fishing. Almost 60 percent of the reservation is forested land. Tribal members enjoy fishing and hunting, and there is a resurgence of interest in traditional activities such as root digging and huckleberry picking.

Forest products operations on the Warm Springs Reservation provided 36% of total employment and 82% of (1973) Reservation income. Interest in ranching and allotments in rural areas is increasing.

Direct reliance on the Mt. Hood National Forest is minimal because the Tribal Confederation can operate totally on its own resource base. However, the Forest and the Confederation do have common concerns about the anadromous fishery, wildlife management, transportation, and fire. One high elevation area on the reservation adjacent to the Forest is being considered for harvest, road building and possibly, ski area development. Tribal members vary in opinions on this and other land management issues. The differences are based on conflicting values and attitudes of traditional and nontraditional lifestyles. People are concerned about timber management, fish runs, housing and employment.

C. Economic Impact Analysis

1. Employment Trends

Oregon has historically relied on the wood products industry as a mainstay of the economy. While wood products are still Oregon's major industry, recent trends indicate that the long period of growth in employment for this industry is over. From a peak of 86,400 workers statewide in 1951, wood products employment has declined to 65,000 in 1984.^{10/} The same trend is apparent in the Mt. Hood influence area.

While the recent decrease in demand for wood products brought about by an overall economic slump will not be permanent, a variety of factors are contributing to a longer term decline in both total volume processed and total wood products employment. Capital substitution and technological advances have taken their toll: between 1950 and 1970 the number of employees required to produce a million board feet of lumber declined from 8 to 4; in veneer plants it fell from 14 to 8 per million square feet; and between 1958 and 1970, employees per thousand tons of paper produced dropped from 5.1 to 1.4.¹¹

In addition to the decline in employees per unit of output, there has been a decline in total demand for Oregon wood products. Rising fuel costs and low raw material costs have increased the advantage of Canadian forest products in U.S. markets.^{12/} Proximity to market and cheap labor have enabled southern producers to capture east coast markets. Demand has been hurt by high interest rates for home construction and a tightening of various mortgage subsidy programs. The trend toward smaller families has also impacted new home construction.

Supply problems have also increased. Private lands are nearing the end of their supply of merchantable timber, and a temporary shortfall is expected until second growth plantations become available for harvest. Raw material costs have been rising as logging moves to steeper and more remote areas.

While periodic recession and expansion is a fact of life in the United States economy, many influence area communities are especially sensitive to fluctuations in the nation's economy. Historic dependence on wood products have made the influence area's economy somewhat of a roller coaster ride as the fortunes of small one-industry towns rode on the highly cyclical housing market. The Oregon wood products industry had experienced rapid growth through the late 1960's and early 1970's when the 1974 recession reduced employment to 76,000. This recession was followed by a rapid upturn in 1975. Employment peaked at 90,600 in 1979, and by January of 1982, had fallen to 65,300 employees.

Economic fluctuations and changes in the wood products industry have combined to produce high unemployment in the industry and at least one large mill in the Influence Area has closed for periods of a year or more, with several others reporting extensive employment cutbacks. Current trends may force further cutbacks and closures.

Although agriculture and forest products are still important to the influence area economy, a variety of other employment bases have expanded in recent years (trade, finance, services, insurance, realty, printing and publishing, electrical machinery). This expansion has been especially pronounced in urban portions of the influence area. The expansion of the number and kind of commercial enterprises tends to stabilize employment and is therefore encouraged by State, County and local Governments.

For example, while the wood products industry declined in its share of total Oregon manufacturing employment, the so called high technology industries have gone from 15% to 22% of total employment.¹⁷ Various service industries have experienced similar growth (18.2% increase in service and miscellaneous jobs between 1977 and 1981)¹⁸ with tourism a leading component of this growth. This is a particular interest to influence area communities since the average visitor to Oregon spends 16% of his or her time in the Portland/Columbia Gorge area and 16% of their¹⁹ time in the central Oregon area which includes Wasco and Hood River counties.²⁰ Some of the communities where tourists spend their money (average \$427 per trip, per party) are areas where wood products and agriculture employment are declining.

While service industries and tourism are not economic panaceas, they diversify the economic base, and alleviate the hardships created by fluctuations in the wood products industry.

2. Impact Analysis

Impacts of alternatives on employment and income in the Forest influence area were estimated using input-output analysis. IMPLAN was used to perform the economic impact analysis for the DEIS. IMPLAN is an input-output model software program on the Univac computer at the Fort Collins, Colorado Computer Center. The structure and use of IMPLAN is summarized here. Complete documentation is available in the IMPLAN User's Guide, USDA Forest Service, Systems Application Unit, Land Management Planning, September, 1983.

Economic input-output (I-O) analysis is a procedure for describing the structure of interindustry dependencies in a regional economy. The region, in this case, has been defined as Clackamas, Hood River, Multnomah and Wasco counties. I-O analysis is based upon the interdependence of the production and consumption sectors of the economy for the region being studied. Its foundation rests on the concept that industries must purchase inputs from other industries, as well as from primary sources (i.e., natural resources), for use in the production of outputs which are then 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 areas economic structure at one point in time. In this case, the point in time is 1977. This structure is represented as a mathematical transaction matrix of buyers and sellers in the economy.

The proposed output levels associated with each alternative are represented as changes from the current levels of final demand for these outputs in the IMPLAN model. The resulting production requirements needed to satisfy these changes in final demand and the flow of industrial inputs and outputs can then be

traced via the I-O accounts to show the linkages between national forest goods and services and the impacts on the different industries composing the regional economy. Through mathematical matrix manipulations, the estimated direct, indirect, and induced impacts of changes in outputs to final demand can be evaluated. The impacts that concern most people in the local influence area are those dealing with the changes in employment and personal income.

The IMPLAN model has a data base consisting of: (a) a national level technology matrix, and (b) a file of estimated activity levels for total gross output, 6 final demand components, 3 final payment indicators, and employment estimates for 466 industrial/business sectors. The national level technology matrix is based on a 1972 Department of Commerce I-O model that was converted to an "industry by industry" basis and updated to 1977.

The county level information is based on a 1977 data set constructed by Engineering Economics Associates of Berkeley, California. Utilizing the national technology matrix and the control totals for Clackamas, Hood River, Multnomah and Wasco Counties, a data reduction method is employed to develop the input-output table for the economic impact area. The method used exploits the property of "openness" displayed by smaller regional economies when compared to the National economy (Richardson, H.W. 1972). Smaller regional economies exhibit much greater tendencies to import and export goods and services than does the national economy. Therefore, they are more "open" than the national economy. 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 for data reduction was adopted.

Once this step was done, the resulting 301 sector input-output model of the 1977 local economy was compared against alternate sources of information regarding employment by sector in order to verify its 'reasonableness'. An important characteristic of the Mt. Hood four-county model is the inclusion of a large metropolitan area. The inter-industry linkages of such large areas are less open than a small community and the multiplier effects of changes in activities are more pronounced. The impacts occurring in Portland overshadow those occurring elsewhere. The model is valid only for the entire influence area, and results should not be applied to individual counties or communities.

For each alternative, the I-O model was used to translate proposed changes in resource output levels from their current levels of production into changes in employment and income for the Forest Influence Area. An intermediate step in this process was to equate the changes in the respective resource outputs to changes in final demand expenditures by sector.

Final demand expenditures are different from the values used in the PNV efficiency analysis (discussed in Section III). The PNV efficiency analysis examines only the market value of the raw material that leaves the forest. In the case of timber outputs, this would be the stumpage values. On the other hand, final demand expenditures represent the dollars spent by the ultimate consumer at the point of final consumption. The point of final consumption is the sector from which the ultimate consumer purchases a product, or the sector

beyond which the output is exported from the region. For example, the point of final consumption for an output of timber might be in the construction sector because the timber is used in the construction of a house which a consumer may purchase. However, if the timber is exported following processing at the sawmill, the point of final consumption is the primary wood processing sector. By identifying the final consumption point, the transactions of all industries involved in processing the output are considered.

The modeling of economic impacts was based on the proposed changes in resource output levels between each respective alternative and the output levels upon which the current economy is based. These changes were used as input to the I-O model and it, in turn, would provide the estimated direct, indirect, and induced impacts on jobs and income. The analysis was performed using response coefficients which indicated the changes in jobs and income produced by a change in one unit of output.

Table B-V-5 presents the units of output for each resource, and the total jobs and income response coefficients that would result from an output change of one unit for each resource. For example, roughly 350 MMBF of sawtimber has historically been harvested on the Forest annually. If an alternative proposed to change this by 100 MMBF, a potential change of 1,246 jobs and 27 \$MM in 1982 dollars could be realized in the local economy after all direct, indirect, and induced effects are accounted for.

Chapters II and IV of the DEIS present the details of the anticipated socio economic impacts associated with the implementation of each alternative. In particular, Table II-3a displays the estimated impacts associated with each alternative for the first, second, and fifth decades. As indicators of the relative effects of alternatives on community economies, IMPLAN is a useful tool. Caution is urged in treating IMPLAN estimates as absolute numbers of jobs or income. The model incorporates significant assumptions relating to the national technology matrix and ten year old data. Second and fifth decade estimates are particularly suspect.

Table B-V-5 EMPLOYMENT AND INCOME RESPONSE COEFFICIENTS BY RESOURCE

	IMPLAN Per Million Units Response Coefficients		
	Units	Income MM\$/MM Units	Employment Jobs/MM Units
Variable By Alternative			
Motorized Disp. Rec	RVDs	32.1713	1845.28
Non-Motorized Disp. Rec.	RVDs	24.7316	1513.14
Big Game Hunting	WUDs	20.0340	1614.16
Small Game Hunting	WUDs	24.1784	2008.31
Freshwater fishing FUD's	FUDs	20.5284	1732.10
Non-Consumptive	WUDs	55.8279	4542.12
Lumber and Wood Products	BF	.3257	15.30
Pulp and Paper	BF	.0253	1.12
Livestock	AUMs	9.39	615.91
Coho/Silver Salmon	LBs	.8145	79.37
King/Chinook Salmon	LBs	4.3492	397.12
Salaries, F.S.	\$.6486	36.96
Other Govt. Expenses and payments to counties	\$.7396	38.61
Constant in All Alternatives			
Canoeing	RVDs	4.2844	4,080.26
Waterplay	RVDs	12.3496	986.42
Picnicking	RVDs	8.9500	744.02
Downhill Skiing	RVDs	110.8671	11,520.04
VIS	RVDs	37.2362	3,272.26
Rec. Cabins	RVDs	3.6803	304.34
Camping	RVDs	4.0431	319.21

3. Returns to the U.S. Treasury and Local Governments

In addition to expenditures generated by goods and services produced from Forest resources, the Forest Service makes payments directly to counties that contain National Forest lands. These funds are paid to the State of Oregon which distributes them to the county in which they originated. These funds are often referred to as the 25% fund.

Payments to counties are based on returns to the Federal Treasury and were estimated based on anticipated receipts for goods and services. These direct payments in turn generate indirect and induced effects included in IMPLAN analysis.

Returns to the U. S. Treasury and payments to local governments were estimated by multiplying FORPLAN outputs by unit values which were derived from returns and payments generated by the fiscal year 1981-84 Forest programs.

4. Conclusions

In general, alternatives which emphasize commodity outputs tend to produce the most jobs, income, returns to the U.S. Treasury, and payments to local governments. Recreation accounts for the most employment and income in total, but doesn't vary significantly between alternatives. The management of the Forest in terms of recreation varies considerably between alternatives, but the number of estimated recreation users does not. Timber receipts are by far the greatest source of returns to the U.S. Treasury and payments to local governments.

With regard to lifestyles and social organization, different groups will be affected differently depending on the nature of the alternative being considered. Commodity oriented alternatives tend to do well with regard to maintaining the economic aspects of the social structure in the area. Increased supplies of timber, in particular, provide the where-with-all for the local wood processing industry to respond to regional and national markets, which in turn means more relatively higher paying jobs. To the extent that some communities are more dependent upon the wood products industry than others, they will benefit. In addition, more timber means more revenues to the counties which is also an asset when it comes to implementing and maintaining public projects in the local communities, whether they be timber dependent or not. Some communities are much more dependent on recreation and tourism, however. Maintenance or enhancement of scenery and recreation opportunities may be more important to community stability in these cases.

Finances aside, other types of Forest Service decisions can influence the attitudes, beliefs, and values of Forest dependent communities. Generally, those groups or communities who view or use the Forest from an amenity standpoint are positively impacted by amenity-oriented alternatives and negatively affected by those alternatives with a commodity emphasis. Decisions regarding whether or not to develop roadless areas for timber harvesting and how much timber should be harvested at the expense of scenic quality, wildlife, and other noncommodity types of resources will tend to polarize groups with different values and pull together groups with common values. The composition of the groups may change with regards to different issues.

Almost all groups and communities can adapt to slow changes in their environment. However, rapid and dramatic changes in the way the Forest is managed are likely to result in broad levels of social disruption.

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VI. ANALYSIS PRIOR TO DEVELOPMENT OF ALTERNATIVES

A. INTRODUCTION

The analysis process included compiling data and using the FORPLAN model to analyze it. Analysis of the alternatives was the final step in the analysis process presented in this Appendix. It is described in Sections VII and VIII.

Prior to using the model at all, analysis was performed to determine what data should be used in the model, and how it should be used. These steps were generally reviewed in the first four sections of this Appendix.

This section of the appendix describes preliminary analysis performed using FORPLAN. It includes examination of:

The effects of major assumptions, policies and discretionary constraints

The maximum physical, biological and economic production potentials of single resources or sets of resources

The potential to resolve issues and concerns

The relationships among management activities designed to achieve different resource objectives

The tradeoffs associated with choosing to produce different market and non-market goods

The range of opportunities within which management alternatives may be developed.

Further discussion of findings related to the production potential of the Forest has been described in the Analysis of the Management Situation. This document was completed in March, 1985. It provides the information required by 36 CFR 219.12(e).

B. MINIMUM MANAGEMENT REQUIREMENTS (MMRS)

The following discussion is expanded upon in Appendix G.

36 CFR 219.27 sets forth the "minimum specific management requirements to be met in accomplishing goals and objectives for the National Forest System. These requirements guide the development, analysis, approval, implementation, monitoring and evaluation of forest plans." The complete list of Minimum Management Requirements (MMRs) is presented here. The method of incorporating each MMR in the analysis has been indicated, and is described following the table.

<u>Minimum Management Requirement</u>	<u>Method of Incorporation</u>
219.27(a) Resource protection	
(1) Conserve soil and water resources.	2
(2) Minimize effects of natural hazards.	2
(3) Reduce pest hazards.	1
(4) Protect riparian areas and aquatic resources.	3
(5) Provide plant/animal community diversity.	3
(6) Maintain viable wildlife populations.	3
(7) Conduct project environmental assessment.	1
(8) Protect habitat for threatened/endangered species.	1,3
(9) Designate right-of-way corridors.	1
(10) Construct roads appropriate for use.	1
(11) Rehabilitate temporary roads within ten years.	1
(12) Maintain air quality.	1
219.27(b) Vegetative manipulation	
(1) Prescriptions are to meet management area objectives.	1
(2) Ensure adequate restocking of timber management areas.	1
(3) Producing greatest volume or revenue is not necessary.	1
(4) Consider residual trees and adjacent stands.	1
(5) Maintain site productivity.	1
(6) Provide desired results.	1
(7) Be practical in terms of costs.	1
219.27(c) Silvicultural practices	
(1) Regulated harvest on suitable acres only.	1
(2) Establish allowable sale quantity (ASQ) under nondecline.	1
(3) Restock within five years.	1
(4) Cultural treatments may be used to meet objectives.	1
(5) ASQ may be changed as management practices monitored.	1
(6) Even-aged management should protect resources.	1
(7) Consider pest management.	1
219.27(d) Even-aged management	
(1) Forest openings are defined by management objectives.	2
(2) Harvest opening size limits.	2
219.27(e) Special attention will be given to riparian areas	2,3,
219.27(f) Soil and water conservation will be guided by official technical handbooks	1
219.27(g) Preserve and enhance plant and animal diversity	2,3

- 1 : Provided by management direction, but not explicitly modeled
- 2 : Modeled through harvest area scheduling constraints
- 3 : Modeled by special management prescriptions in selected areas

1. Rationale

Management Direction

The Forest Plan will provide for meeting all of the MMRs by written management direction. Much of this is not dependent upon land allocation or scheduling, which are the variables in FORPLAN modeling. For this reason, these MMRs have not been explicitly modeled. However, the measurable effects (if any) of meeting these requirements have been implicitly incorporated into the costs, yields and effects of all management activities. Section IV of this Appendix discusses the development of management prescriptions used in FORPLAN analysis. The Forest Plan contains a complete set of management direction. Appendix G provides a description of the process of developing this direction.

Timber Harvest Area Scheduling Constraints (Dispersion)

Other MMRs may be met by making sure that timber harvest scheduling is not overly concentrated in a particular area at any point in time. This is a consideration wherever timber is to be harvested.

The planning regulations listed above (36 CFR 219.27(d)) have been supplemented by standards and guidelines in the Regional Guide with regard to size and distribution of forest openings created by even-aged timber management:

- 2-1. Maximum size of openings will not normally exceed 60 acres in the Douglas-fir forest type and 40 acres in other forest types
- 2-2. Created openings will be separated by areas that are not openings that contain one or more logical harvest units
- 2-3. Openings are no longer considered openings when prescribed stocking is at least 4.5 feet tall

These guidelines are among those approximated by the timber harvest area dispersion constraints. The complete documentation of the analysis of dispersion relationships is described in the Nov. 20, 1984 process paper titled "Dispersion."

Through the use of geometrical techniques involving actual layouts of potential logging units it was determined that not more than 32% of a previously unentered area, such as a roadless area which had never been harvested, could be harvested without violating the regulations or Regional Guide regarding dispersion. Furthermore, it was determined that the cumulative amount of the area entered could not be more than 54% by the end of the second decade, 77% by the end of the third, and not more than 92% by the end of the fourth decade.

If 20% of the area was already cutover then the maximum area accessed was less, because there are some existing openings which cannot be enlarged. The process determined that such an area could only sustain 25% more units during the first decade, a total of 50% by the second decade, 70% by the third, and 93% by the fourth decade.

Special Management Prescriptions in Selected Areas

Alternatives will meet some of the MMRs by assigning portions of the Forest to management that will provide a particular forest condition. The basis for choosing which areas to be selected and for determining how these areas will be managed is set out below. Management guidelines provided by the Pacific Northwest Regional Office are summarized in an accompanying table.

Habitat for Northern Spotted Owls, and Other Old Growth-Dependent Wildlife Species

The spotted owl represents the many species that use or require "old growth ecosystems/habitat." The following paper describes the considerations recommended in the future management of spotted owl/old growth ecosystems (habitat).

The Oregon Interagency Spotted Owl Management Plan, along with NFMA interpretations provided by the national and regional Forest Service offices, resulted in direction that areas designated as spotted owl habitat/old growth ecosystems of at least 1000 acres be distributed over the Forest on land capable of producing this habitat/ecosystem. The distribution should follow a grid pattern with a maximum distance between pairs of different Spotted Owl Habitat Areas (SOHAs) of 12 miles. A draft supplement to the Regional Guide regarding SOHAs has since been released. The potential effects of this draft supplement on the Mt. Hood's DEIS are addressed in Appendix F.

The following process was followed to establish the minimum number of pairs needed to maintain a viable population. A computer map of the Forest indicating, in 21.3 acre blocks, stand age and suitability as commercial forest was used to identify 1000 acre blocks which would provide a minimum number of pairs distributed over the land capable of producing old growth timber. Starting at the Forest perimeter the pair locations were distributed throughout the Forest. Where possible owl/old growth habitats were located on land presently supporting timber 200 years or older and not suitable as commercial forest land. If that combination was not possible, the land having the oldest stand was included. If there was a choice between lands supporting the same age forest, lands designated as not suitable for commercial forest was selected. Previously confirmed owl pairs were included whenever possible.

An "old growth ecosystem" that provides the suitable habitat for spotted owls could not be adequately defined. Without such a definition, it would not be prudent to propose timber management goals and objectives. Therefore, dedication of apparently suitable old growth spotted owl habitat was chosen as the management direction.

Habitat for Pileated Woodpeckers, Pine Martens and Other Species Dependent on Mature Forest Habitats

Pileated woodpecker and pine marten areas were located by the same process used for locating spotted owl MMR areas, e.g. priority = suitable habitat on unsuitable timber acres; suitable habitat on suitable acres; capable land on unsuitable acres, capable land on suitable acres. The pattern was a 5-mile grid (+ 5-10%) for woodpeckers and a 2-mile grid for marten.

Unlike spotted owl habitat, "mature forest habitat" used by pine marten and pileated woodpeckers may be defined with more confidence. For this reason, management activities to achieve mature forest habitat conditions has been prescribed.

Riparian habitat

A number of MMR requirements deal directly or indirectly with riparian areas and/or riparian dependent resources. Protection and special attention of riparian areas is required by 36 CFR 219.27(a) and 36 CFR 219.27(e). Protection of aquatic resources is stressed in 36 CFR 219.27(a) as is the conservation of soil and water resources. Providing, preserving and enhancing plant and animal community diversity is cited in 36 CFR 219.27(a) and 36 CFR 219.27(g). Strategic application of two riparian area management prescriptions - General Riparian (Management Area B-7) and Key Site Riparian (Management Area A9) was used to wholly or partially meet the above listed MMR requirements.

Generally speaking, minimum riparian dependent resource requirements are met by management which emphasizes maintenance or improvement of terrestrial and aquatic habitat diversity. Conditions which are emphasized include: relatively diverse assemblages of plant communities; multiple canopy layers; frequent, small openings; ample ground and bank/shoreline; ground cover; complex aquatic habitats and a diverse, well distributed supply of standing and down, large woody material. The location, type, extent, duration and/or magnitude of management activities is intended to maintain these general conditions over the long term (50 yrs +).

The General Riparian prescription was applied in full to areas associated with perennial and fish-bearing streams, lakes and reservoirs, and wetlands. These riparian area types are judged to be closely linked in defining the quality and condition of aquatic resources (fish habitat and water quantity/quality) and in providing primary diversity for riparian dependent plant and animal species. They include aquatic and riparian ecosystems and variable amounts of upland area which strongly influence their character and function. The actual location of individual General Riparian areas will be determined based upon local site conditions (slope, soil condition, vegetative and aquatic habitat type, etc.) determined as part of normal project planning and reconnaissance activities.

The Key Site management prescription was applied to a select number of sites having: outstanding habitat diversity and complexity of riparian ecosystem types; relatively high natural quality; and notable capability for the production of multiple riparian resources. A strategic network of these areas was identified to provide a minimum geographic distribution and representation of most riparian area types - perennial and fish bearing streams, lakes and wetlands. Very often each individual area contains complexes of two or more of these types closely interacting with each other. Selected Key Site areas have been located on a 1" = 1 mile location map and on 1:12,000 resource photos. Actual management area boundaries will be defined by site-specific conditions including slope, vegetative character, etc., during project level field reconnaissance work planning.

General Riparian areas will be managed for timber at less than full intensity, generally on longer rotations. Physical and biological attributes of these areas commonly reflect conditions most frequently associated with mature and old-growth timber stand types.

Key Site Riparian areas will not have a chargeable timber harvest. Timber management activities will occur to the extent necessary to accomplish riparian management objectives as necessary on individual areas. Management emphasis will favor natural ecosystem processes associated with each area.

A variety of management options were considered to meet riparian resource MMRs. Separate management prescriptions for water, aquatic habitat, special wildlife habitats, sensitive plant species habitats and generalized wildlife/plant community diversity were explored. Preliminary analysis indicated a very large number of acres would result by attempting this individualized approach. This led to exploration of techniques which would integrate requirements for all riparian dependent resources in one or more generalized management strategies. This "ecosystem" approach appeared to be an efficient alternative. An obvious application was to select a base set of riparian area types and geographic distribution and to minimize activities likely to adversely effect their general character and function. Applying no chargeable harvest to these areas was considered. It was attractive because it minimized "manageable" disturbance levels and avoided the need to fully understand or establish threshold of change levels for this array of diverse and relatively poorly understood areas. Additionally this approach would merely entail on-the-ground identification of areas and would avoid costly evaluation, prescription and logging system development associated with timber management activities.

After careful discussion and review, however, another and final approach was selected. It avoided chargeable timber harvest only in areas of highest value and sensitivity to riparian dependent resources. Those areas - (Key Sites) - were closely evaluated and strategically positioned across the Forest.

Of the remaining riparian area acres, those most closely controlling riparian resource MMR requirements were identified. This group included perennial and fish bearing streams, lakes/reservoirs and wetlands. Utilizing an interdisciplinary process involving disciplines in soils, hydrology, botany, wildlife, fisheries and silviculture a set of "minimum" conditions was described for each riparian area type. Using these desired conditions as a base, the team identified an extended rotation form of timber management as consistent. For remaining riparian area types - intermittent streams and seeps/springs - a separate set of conditions ensuring the general long-term integrity of ground cover, slope and stream channel stability, and water quality was defined. These conditions allowed for full levels of timber harvest with mitigation measures. These include but are not limited to: area specific delineation and evaluation during planning; special falling, yarding and suspension requirements; leaving of dead and downed trees, culls and/or whips; and special fuel management and site preparation techniques.

This tiered approach which emphasizes ecosystem management for all riparian dependent resources appears to be most efficient and appropriate to meet the wide range of conditions found on this Forest.

2. Model proxies

In order to ensure that the minimum management requirements described in the preceding section will be met in all alternatives, constraints have been applied to the FORPLAN model. They fall into the three categories below.

Dispersion of Timber Harvests

This information was used in FORPLAN through the use of analysis area accessibility constraints. Since the Level One identifier for analysis areas delineated drainages, and since the amount of cutover land in each drainage was known, it was possible to tailor the accessibility constraints to reflect past harvests in specific drainages. In order to not allow a majority of a drainage's analysis areas to be harvested after the first decade, scheduled output constraints were imposed which limited harvests in decades 2 thru 15 to not more than 32% per drainage. The analysis area accessibility constraints are as follows:

Table B-VI-1 DISPERSION CONSTRAINTS

<u>DRAINAGE</u>	<u>Analysis Area Accessibility Constraints</u> <u>(Cumulative By Decade)</u>		
	<u>Decade 1</u>	<u>Decade 2</u>	<u>Decade 3</u>
1=COLUMB	30%	54%	77%
2=BULRUN	30%	54%	77%
3=WFHOOD	27%	51%	74%
4=SANDY	30%	54%	77%
5=EFHOOD	28%	52%	75%
6=MILECK	23.75%	47.75%	70.75%
7=BADJOR	25.75%	49.75%	72.75%
8=WHITE	26.25%	50.25%	73.25%
9=SALMON	28.25%	52.25%	75.25%
10=LOCLAK	27%	51%	74%
11=FISHMM	27.75%	51.75%	74.75%
12=OAKLAK	24.5%	48.5%	71.5%
13=HOTCOL	23.5%	47.5%	70.5%
14=COLLOW	25.75%	49.75%	72.75%
15=UPCLAK	24.74%	48.75%	71.75%

4% Rate of Harvest, 250 Year Rotation

Mature timber stands needed to provide minimum viable populations of pine marten and pileated woodpeckers and species requiring general riparian habitats will be maintained by managing designated areas for appropriate habitat characteristics. Those characteristics that may be readily modeled relate to harvest unit size and distribution over time, and age of timber stands maintained in these management areas.

The former is modeled by applying a separate dispersion constraint to these areas. Instead of limiting harvests to 30% of the area in a decade, no more than 4% of selected areas in each drainage may be harvested. Maintenance of mature and old growth timber in the model has been assured by establishing a rotation age for these areas of 250 years. The full range of timber management intensities is available for the model to select.

No Regulated Timber Harvest

Land that is needed to provide habitat for northern spotted owls, as well as selected key site riparian areas, will not be available for regulated timber harvest. In the model, this option is represented by the Minimum Level emphasis. This closely approximates the planned management for such areas.

3. Applying the constraints

There are 24,000 acres of pileated woodpecker habitat (not already in SOHAs), and 20,500 additional acres of pine marten habitat. Approximately 50,000 acres of tentatively suitable riparian timber land is included.

The Mt. Hood's share of regional targets for spotted owl pairs is 51. They will require a total of 51,000 acres of suitable owl habitat, of which 31,800 acres for 45 pairs must be taken from land tentatively suitable for timber production in order to meet spatial dispersal needs of the species. There is a withdrawal of 5,400 tentatively suitable acres (.8% of Forest total) from regulated timber harvest in key site riparian areas.

Model constraints were applied as follows:

Analysis Areas Were Subdivided Among the MMRs

GMS was used to overlay the MMRs having a 0% harvest rate proxy (Spotted Owl and Key Site Riparian areas) on top of those having a 4% harvest rate (pine martin, pileated woodpeckers, and general riparian areas). In the case of overlap on a given acre, the 0% proxy was assigned. Areas which were not overlaid by a 0% or 4% proxy were assigned to the 32% proxy (before the dispersion constraint was applied). The resulting GMS 0%,4%,32% MMR overlay map was then overlaid atop the FORPLAN analysis area map.

A computer program was then employed which translated the GMS data into FORPLAN analysis area data sets and computed the applicable dispersion constraints. The result was a data set of analysis areas, each partitioned into proxies in proportion to the amount of acres of MMRs.

Scheduled Output Constraints Were Applied To The 4% Proxy Acres/Drainage

This was done in order to assure that not more than 4% of the acres in a drainage assigned to the 4% proxy were harvested per decade.

Prescriptions Were Limited in the Case of 0% Proxy Acres

Since the Spotted Owl and Key Site areas fell under the 0% (no regulated harvesting) proxy, no harvesting prescriptions were available for these areas.

Two features of the approach to modeling MMRs are important to achieving efficiency in multiple-use management. Overlap in the selection of MMRs was an objective of locating MMR areas for this analysis. Constraints were then applied which achieved multiple benefits. Compounding of constraints was thus minimized. Further analysis of MMR constraints is included in Section VI of this Appendix.

Areas selected in the modeling process will not be binding on actual management if greater economic efficiency can be achieved by a better location on the ground, while still meeting the MINIMUM management requirement. This analysis was performed with relatively gross data, and site specific analysis should offer opportunities to improve overall management.

C. BENCHMARKS

Before the FORPLAN model was used in developing and analyzing alternatives, it was tested for sensitivity to the assumptions and data built into it. It was then used to analyze the general relationships among resource management activities on the Forest. This included the exploration of maximum economic resource use and development opportunities, the capability to produce priced and non-priced outputs, and the ability to respond to major issues and concerns.

This understanding of the model and the Forest provided the foundation for the analysis of alternatives described in the next sections of this Appendix and Chapter II. Much of the analysis described in this section has previously been included in the Analysis of the Management Situation.

The process involved the creation of "benchmarks," and the inspection of their outputs, costs, and consequences. Benchmarks are similar to alternatives in that they are a combination of land capability, and management practices and schedules to achieve certain objectives. However, unlike alternatives, it would usually not be feasible to actually implement them, because they do not adequately consider issues and concerns, specific geographic locations, environmental effects, compliance with management regulations, legal requirements, or other factors.

There are several benchmarks that are required by 36 CFR 219.12 (e). They include:

Minimum Level: This benchmark specifies the minimum level of management which would be needed to maintain the Mt. Hood National Forest as part of the National Forest System. This benchmark was not based on FORPLAN analysis, and is described in the Analysis of the Management Situation.

Maximum Present Net Value Including Assigned Values: This benchmark specifies the management which will maximize the present net value of those outputs that have either an established market price or assigned monetary value. This Benchmark, #7, is discussed in parts D and E of this section. It is also compared to alternatives in Chapter II.

Maximum Present Net Value Based on Established Market Price: This benchmark specifies the management of the Forest which will maximize the present net value of those outputs that have an established market price. This benchmark was not based on FORPLAN analysis. The effect of ignoring assigned values is discussed in Part D of this section.

Current Level: This benchmark specifies the management of the National Forest most likely to be implemented in the future if current direction is followed. This benchmark forms the basis for the "no action" alternative, which is discussed in Sections VII and VIII.

Maximum Resource Levels: Each of these benchmarks estimates the maximum capabilities of the Forest to provide for single resource values. The

major issues and concerns on the Mt. Hood National Forest resulted in the following maximum resource benchmarks, which are described in Part E:

Timber
Visual Quality
Fish and Water
Wildlife
Roadless Recreation

Other benchmark analysis is conducted to determine the effect of various assumptions and constraints which will be held constant when alternatives are developed. These include the effects of minimum management requirements, restricting timber harvest rotations to the culmination of mean annual increment (CMAI), and nondeclining flow (NDF) of timber harvest. These are described in the following section on sensitivity analysis.

If a benchmark appeared to offer a viable opportunity to respond to issues, concerns, and opportunities, further analysis was conducted to examine it as a potential alternative. Thus some benchmarks are the basis for alternatives. Others display too many environmental, fiscal, legal and practical problems in the analysis and have been eliminated from detailed study. Use of benchmarks in developing alternatives is described in Section VII of Appendix B.

1. Demand and monetary value

Economic assumptions incorporated into the model have been described in Section IV. They have not been varied in any FORPLAN runs described here, except for the examination of price trends and costs in Part D below. FORPLAN benchmarks do not include assigned values for non-market resources. The contribution of such resource outputs to PNV has been evaluated separately. It is described in the later discussion of the effect of assigned values on the analysis (Part D).

2. Constraints common to all benchmarks

All benchmarks described include the following constraints.

Timber management is permitted only on those lands that were identified as tentatively suitable for such use according to the process described in Section II. No analysis of possible opportunities for timber management on unsuitable lands has been undertaken, nor have attempts been made to quantify salvage or other nonchargeable volume in any of the benchmark descriptions presented here.

Other constraints relate to controlling what the model does at the end of the planning horizon. Harvest in the final period can never exceed long run sustained yield capacity, and an ending inventory constraint has been applied in all FORPLAN runs. These provide for enough standing timber volume after 150 years so that harvest at the long-term sustained yield capacity can be maintained. The effects of these two constraints have not been evaluated.

A number of ways to constrain timber harvest flow have been investigated. Where departures from nondeclining yield have been evaluated, increases or decreases in timber volume offered between decades of the plan have been limited to 25% for the purpose of maintaining some level of local community stability.

D. SENSITIVITY ANALYSIS

The following table summarizes the definitions and purposes of each benchmark used in analyzing the sensitivity of the model to selected assumptions or constraints. Using different combinations of these benchmarks, it is possible to perform a with/without analysis and to identify the effects of the assumptions or constraints. Narrative comparisons of the benchmarks which analyze these effects follow the table.

Table B-VI-2 CONSTRAINTS APPLIED IN BENCHMARKS

Number	Objective Function	Constraints			
		95% of CMAI	Non- Decline	Minimum Management Requirements	Other
#1	Maximum Timber	X	X	None	
#2	Maximum Timber				
#3	Maximum PNV	X	X	None	
#3a	Maximum PNV	X	X	Dispersion	
#3b	Maximum PNV	X	X	Spotted Owls, Key Site Riparian	
#3c	Maximum PNV	X	X	Woodpecker, Marten, General Riparian	
#3d	Maximum PNV	X	X	None	No Price Trend
#4	Maximum Timber			All	
#5	Maximum Timber	X		All	
#5a	Maximum Timber	X		All	Floor
#5b	Maximum Timber	X			Floor
#5c	Maximum Timber	X			
#5d	Maximum PNV	X			Floor
#6	Maximum PNV		X	All	
#7	Maximum PNV	X	X	All	

Because the purpose of departures is to accelerate timber harvest, all benchmarks and alternatives that do not include nondeclining flow as a constraint have maximum timber as their objective function. In each case, the FORPLAN run has been rolled over with a subsequent maximum PNV objective to ensure that timber has been maximized in the most economically efficient manner. In the benchmarks, timber has been maximized for the first decade, and PNV has been maximized for 15 decades.

A comparison of Benchmarks #5b and #5d shows that there is no difference at all between an objective of maximizing PNV and timber, when the nondeclining flow constraint is relaxed. This fact should be kept in mind when departure benchmarks or alternatives are discussed. Though the initial objective is always maximum timber, the results are not likely to be significantly different than if it were economic efficiency.

1. Effects of Price and Cost Assumptions

Direction for timber resource values includes an assumption of a 1% real rate of growth in timber product prices for the next 50 years. There are arguments supporting price trends that are either larger or smaller than this rate. Costs and prices are based upon historical data, and future costs and prices are uncertain. If future timber values are different than those assumed by the model, or if management costs are higher or lower than estimated, the most economically efficient allocation of land or federal funds may not occur.

FORPLAN analysis can readily shed some light on discussions of the effects of assuming particular timber price trends. Sensitivity to changes in the costs could also be estimated, however it is more complicated than simply changing a trend parameter. Given the apparent insensitivity of the model to timber price changes described below, no further specific analysis of costs has been undertaken. Inferences have been drawn regarding costs from the analysis of prices.

Underestimating Price / Overestimating Cost

Examination of two benchmarks with the 1% trend may be used to assess the risks associated with this trend being too low. Effects of lower costs would be generally similar.

The only difference between Benchmark #3 and Benchmark #1 is the objective function. PNV is maximized in Benchmark #3 and timber volume in Benchmark #1. Maximizing timber volume should produce the greatest possible allocation and investment to timber management, regardless of economic considerations. The difference between the level of timber harvest achieved in this case and that associated with the PNV objective represents potential effect of underestimating value or overestimating costs. The following table makes this comparison.

Table B-VI-3 PRICE TRENDS

OUTPUT OR EFFECT	1% Price Trend		0% Price Trend
	Timber (#1)	PNV (#3)	PNV (#3d)
Acres managed for timber (M)	647	647	647
1st decade MMBF/yr	348	335	329
LTSYC (MMCF/year)	69	66	65
Percent Of Timber Management Area Managed At Maximum Intensity	99	72	57
Average annual acres, 1st 50 yrs.			
planting	5912	5023	3836
precommercial thinning	5920	4698	3788
fertilization	4630	2732	2084
commercial thinning	3638	718	194

The potential increase in first decade and long term timber volume is 3.8%. The changes appear more significant when measured in terms of actual management practices. There are more intensive management practices (and consequently higher costs), especially in the first decade. These are necessary to achieve the higher level of timber volume. Some amount of relative increase in timber value would render this intensive management economically efficient. The small opportunity to increase timber volume indicates that the model is not sensitive to increases in relative timber value.

Overestimating price / Underestimating cost

The third set of information in the preceding table is based on an assumption of no real increase in timber value over time. Increases in costs of producing timber volume would have a similar effect. The effects are very similar to changes from timber to economic objectives: management practices for timber in the first few decades are reduced and consequently timber volume is slightly lower (1.8%). Again, the conclusion is that the model is not very sensitive to downward changes in the value of timber.

2. Rotations Constrained to 95% of CMAI

36 CFR 219.12(e)(iii)(C) requires analyses to be conducted, "with and without scheduling of harvest of even-aged stands generally at or beyond culmination of mean annual increment of growth." A comparison will be made here of two pairs of FORPLAN runs in order to show the differences between establishing the minimum age of harvest as: 1) the decade when the stand reaches 95% of CMAI and; 2) the decade when the stand first reaches merchantable size.

The age at which a stand reaches 95% of CMAI is dependent on timber working group and site, and timber management intensity. This information is summarized in the table below along with the age of merchantability, that is when it meets utilization standards.

Table B-VI-4 ROTATION CONSTRAINTS

Working Group	95% of CMAI		Utilization Standards	
	High Intensity	Low Intensity	High Intensity	Low Intensity
Douglas-fir, high site	70	100	40	50
True fir, high site	90	120	40	70
Associated species, high site	80	100	40	60
Pine/oak, low site	150	150	50	50
Other species, low site	110	160	60	10

Runs #4 and #5 identify the opportunity costs of this constraint under a departure from nondeclining even flow, while runs #6 and #7 make the same comparison under nondecline. Constraints which provide for meeting minimum management requirements are present in all four benchmarks. Without MMRs, first decade volume may be increased by 2% under a departure by relaxing the CMAI constraint, based on a comparison of benchmarks #2 and #5c. Unlike most other benchmarks, no harvest floor was applied to the departures. As discussed in the next section, the absence of a floor has no effect on first decade outputs.

Effects on first decade timber volume and timber PNV are summarized in the following table. The difference in long-term sustained yield capacity is the same as the difference in first decade volume under nondeclining flow.

Table B-VI-5 CMAI VS UTILITIZATION STANDARDS

	95% CMAI	UTILITIZATION STANDARDS
NONDECLINING FLOW	(#7) 287 MMBF/yr. 57 MMCF/yr. 1042 MM\$ PNV	(#6) 288 MMBF/yr. 57 MMCF/yr. 1049 MM\$ PNV
DEPARTURE	(#5) 427 MMBF/yr. 84 MMCF/yr. 1146 MM\$ PNV	(#4) 439 MMBF/yr. 87 MMCF/yr. 1212 MM\$ PNV

The increase in first decade harvest volume obtainable by relaxing the 95% CMAI policy constraint is minimal. Under nondecline, first decade harvest volume is limited by long-term sustained yield capacity rather than the existing merchantable inventory. In this case, the shorter rotations are of no appreciable benefit. Shorter rotations have two opposing effects on long-term sustained yield capacity. A stand may be entered and volume removed more frequently, but the volume will be less at each entry than if postponed until culmination. There appears to be no net change.

In a departure, the major limiting factor may be the constraint applied to harvest flow between decades (25% in this case - and there is no harvest floor) or other specific management constraints such as the MMRs (primarily dispersion of harvest units). Other analyses have indicated that dispersion is a major determinant of departure capabilities (see MMR discussion following). This would indicate that the only opportunity to increase first decade volume in this situation is by making additional areas available for harvest in the first decade. Relaxing CMAI requirements has done this for existing stands between roughly 70 and 100 years old, yielding a 3% volume increase.

For Douglas-fir high sites which are harvested twice in the planning period, the rotation length averages one decade shorter under both kinds of harvest flow constraints when 95% of CMAI is not a constraint. There are also more acres managed under the most intensive management. The combination of shorter rotation lengths and higher investment levels is more economically efficient than lower management intensity and deferred benefits.

3. Nondeclining Flow Constraint and Harvest Floors

36 CFR 219.12(e)(iii)(C) requires that benchmark analysis be conducted, "with and without meeting the requirements for compliance with a base sale schedule of timber harvest." Extensive evaluation of opportunities to increase first decade timber yields by not complying with a base sale schedule (ie., departing) has occurred. Other conclusions may be found in the analysis of timber supply potential.

FORPLAN has been used to compare the effects of two different departure formulations and nondeclining flow. The constraints common to all benchmarks have been included, as well as those needed to meet MMRs. All of these runs were constrained to harvests at or beyond 95% of CMAI. The effects of departing where rotations are governed by utilization standards can be observed in the table in the previous section (compare #5 to #7 and #4 to #6). The effects do not differ significantly from the results presented here.

The effects on timber harvest volume and PNV are shown below. A graphic display of departure opportunities follows.

Table B-VI-6 EFFECTS OF DEPARTURE AND HARVEST FLOOR

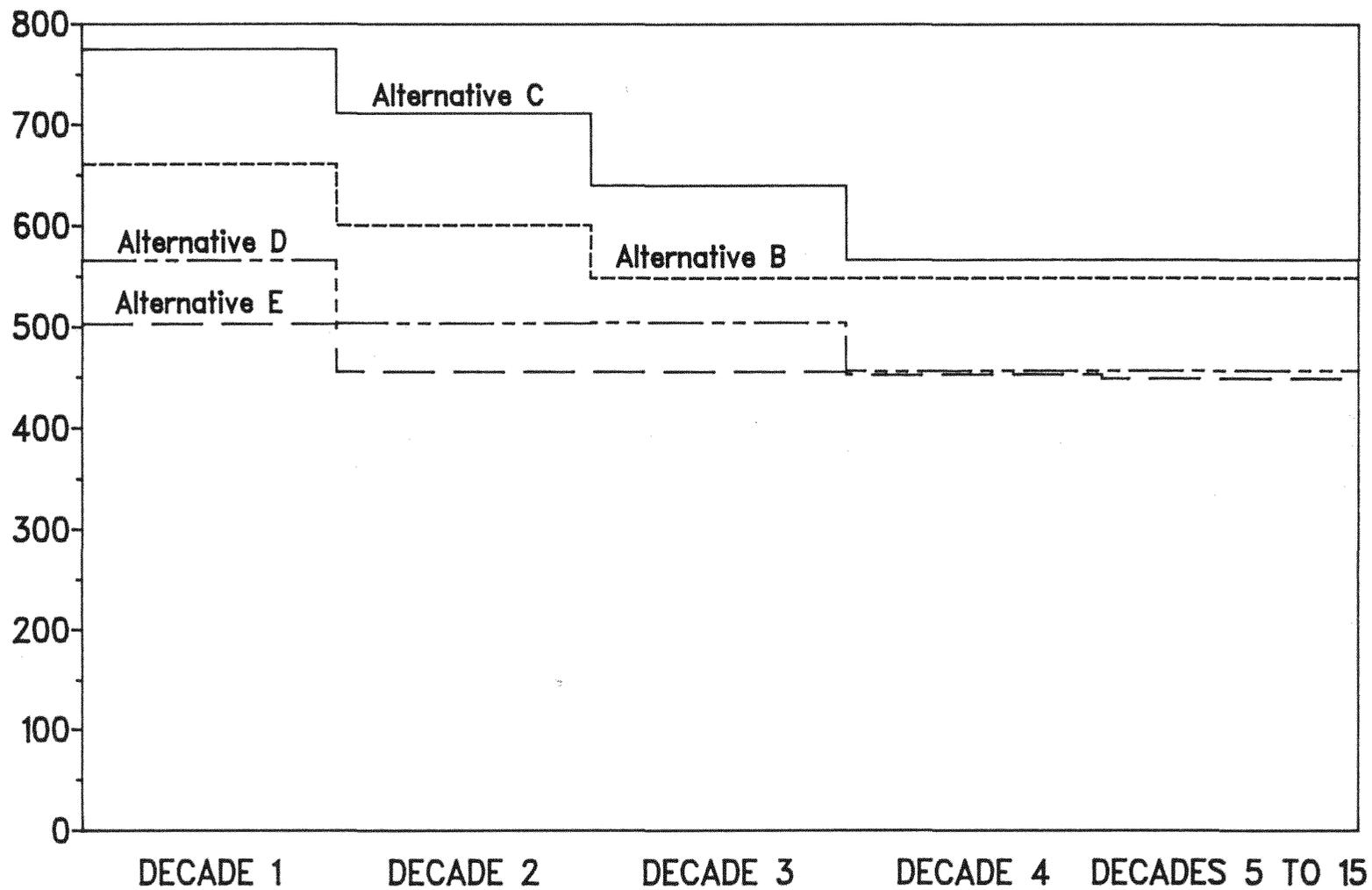
Benchmark	Timber Volume Expressed In MMCF/Year				
	1st Decade	2nd Decade	5th Decade	Minimum	150 Year Average
Base Harvest Schedule (#1) (Timber PNV = 1042 MM\$)	57	57	57	57	57
Departure with Harvest Floor > or = LRSY (#5a) (Timber PNV = 1090 MM\$)	84	67	57	57	59
Departure with No Harvest Floor (#5) (Timber PNV = 1146 MM\$)	84	72	56	26	51

Volume in the early decades can be increased significantly on the Mt. Hood by allowing a 25% departure between decades. The nondeclining flow constraint is a limiting factor on harvest volume. Under nondecline, it is necessary to defer harvest of timber that is presently ready for harvest in order to maintain levels of harvest in the future. The relationship reflects the fact that timber on the Forest is primarily mature or over-mature. Thirty-eight percent of this land supports stands of timber that are 200 years old or greater, and on 60% of the timber is 100 years old or greater.

A harvest floor equal to long-term sustained yield capacity does not limit first decade volume, but it does limit how long high levels may be obtained. They are maintained above long-term sustained yield capacity only at the expense of much lower harvests in later decades. The harvest floor does lead to higher total volume produced from the Forest. It does so at the expense of economic efficiency. Benefits are decreased because the volume is harvested later than where there is no harvest floor. Costs are increased because higher investments, particularly in planting, are needed to maintain high volumes in the middle decades.

The harvest floor constraint becomes non-binding in the first decade when MMR constraints have been applied, as the display below demonstrates. Since all alternatives and most benchmarks include MMR constraints, a harvest floor of long-term sustained yield capacity has been included in all decades where a departure from nondeclining flow has been allowed. This constraint provides a stable long-term timber future supply. It also has the effect of ensuring that the long-term sustained yield capacity of any departure at least equals that of the base sale schedule. This prevents the sacrifice of long-term productivity for short-term production.

DEPARTURE ALTERNATIVES (MMCF Per Decade, ASQ, Green)



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Graph B-1 DEPARTURE OPPORTUNITIES

Table B-VI-6 EFFECT OF HARVEST FLOOR CONSTRAINT

FIRST DECADE TIMBER HARVEST VOLUME AND PNV EFFECT OF HARVEST FLOOR CONSTRAINT		
	NO MMRS	MMRS
	(#5c)	(#5)
NO FLOOR	765 MMBF/yr. 151 MMCF/yr. 1628 MM\$ PNV	427 MMBF/yr. 84 MMCF/yr. 1146 MM\$ PNV
HARVEST FLOOR	(#5b) 531 MMBF/yr. 105 MMCF/yr. 1428 MM\$ PNV	(#5a) 427 MMBF/yr. 84 MMCF/yr. 1090 MM\$ PNV

4. Constraints Providing for Minimum Management Requirements

The constraints which provide for MMRs have been described in Part B of this section. Their effects are described here. The following tables compare the benchmarks used in conducting the analysis of the effects of MMRs. Note that spotted owl and key site riparian areas are combined as they both require unregulated harvest, while pine marten, woodpecker and general riparian require mature sawtimber which can be maintained under a regulated timber management regime with a reduced harvest level. The effects of each group of constraints on management is examined separately. Effects within each group may be apportioned based on their respective acreages as described in Part B.

It is important to keep in mind that there is overlap of habitats for the wildlife species that cannot be accurately accounted for separately. As is the usual case, aggregate effect of all constraints cannot be determined by adding their separate effects. The aggregate effect is shown by comparing Benchmark #3, which does not constrain to meet MMRs, to Benchmark #7, which applies all constraints as a package. All benchmarks included in this discussion have also been constrained to rotations determined by CMAI and by nondeclining flow.

Table B-VI-7 CONSTRAINT SETS USED IN MMR ANALYSIS

BENCHMARK	CONSTRAINT SETS USED IN MMR ANALYSIS		
	<u>Dispersion</u>	<u>Non-chargeble</u>	<u>Reduced Harvest</u>
#3			
#3a	X		
#3b		X	
#3c			X
#7	X	X	X

Table B-VI-8 OUTPUTS FROM MMR CONSTRAINT ANALYSIS

OUTPUTS/EFFECTS	B	E	N	C	H	M	A	R	K
	#3	#3a		#3b			#3c		#7
Area (m acres)									
managed for timber	647	647		608			543		516
managed for timber and wildlife	0	0		0			94		92
<u>Total (m acres)</u>	<u>647</u>	<u>647</u>		<u>608</u>			<u>647</u>		<u>608</u>
Annual timber volume									
1st decade (MMBF/yr.)	335	332		313			318		287
long term (MMCF/yr.)	66	65		62			62		57
PNV (timber)	1291	1229		1193			1204		1042

Dispersion

Based on the information provided by Benchmark #3a, it appears that dispersion constraints alone have little impact on the management of the Forest. Where, like here, there are few other constraints, it is possible to substitute areas of comparable volume when dispersion limits are exceeded on the areas of first choice. Timber volume is reduced 1%. Analysis later in this section shows that the effect is greater under a departure from nondeclining flow.

Value of the timber is affected more than volume (5% reduction in PNV) as unit costs increase when more expensive sites must be harvested earlier. This is also indicated by an increase in agency expenditures, even though sale volume is less. It is further indicated by a shift to less intensive timber management regimes on about 10% of the sites. This shows up particularly as a change from planting to natural regeneration methods in the first decade when less valuable sites are harvested. The magnitude of the rescheduling of areas for harvest over time is indicated by a shifting of about 150 MMBF/yr. from Douglas-fir high sites on slopes less than 30% to areas with lower volume and/or higher costs.

Old growth is actually eliminated faster because more area is needed to yield the same volume. Roadless areas are more likely to be harvested in the first decade because of constraints on the development of other areas.

Spotted Owl Habitat Areas and Key Site Riparian Areas

In Benchmark #3b, 39,000 acres suitable for timber management have been allocated to non-timber management. Roughly 85% of this is required for spotted owls, and 15% for riparian areas. The 6-8% reductions in PNV and timber volume are comparable to the reduction in area available for harvest.

Pine Marten, Pileated Woodpecker and General Riparian Habitats

The same number of acres is available for timber harvest in Benchmark #3c as in Benchmark #7. Of these, 94,000 are managed jointly for timber and wildlife. Habitat for the two wildlife indicator species comprises about 55% of this while the remaining 45% is attributable to riparian areas.

The effects on timber yield are represented in FORPLAN by two constraints. Initial rate of harvest is limited to 4% or less per decade, and rotation length for these management areas is assumed to be 250 years. In comparison to Benchmark #3b, there are more total acres involved, but the per acre effects on timber management are less, as some timber is still being harvested. The net effects of Benchmark #3c turn out to be virtually the same as Benchmark #3b.

These constraints for pine martens, woodpeckers and general riparian areas affect timber volume by lowering long-term sustained yield capacity. This reflects the predominance of mostly old, slow-growing trees that will be maintained on these areas. These constraints also affect PNV by deferring the harvest of some of the more valuable timber on the Forest.

Combined Effects of the Three MMR Constraints

The main reason for the overall 14.5% reduction in timber volume is the provision of old growth or mature timber habitats which will maintain viable dependent wildlife populations. To the extent that these requirements will be met in separate areas, the effects will be largely additive. The effects of dispersion are apparent in changes in locations of timber harvest. Total old growth available on lands managed for timber has increased 74% by the 10th decade. Mature timber (100-200 year old) has increased 10% (see table below).

Table B-VI-9 AGE OF STANDS ON TENTATIVELY SUITABLE ACRES AFTER 100 YEARS

<u>Age</u>	<u>Benchmark #3</u>	<u>Benchmark #7</u>
100-200	104,000 acres	116,000 acres
200+	21,883 acres	85,896 acres

The preceding discussion assumes that management is constrained only by constraints common to all benchmarks plus one or more minimum management requirements. If there are other factors that result in reduced timber harvest, the reduction attributable to MMRs will be less. This is generally the case in the alternatives. Departures, however, represent a situation where a constraint has been relaxed.

Effects of MMRs on Departure Capability

A comparison of Benchmark #5a to Benchmark #5b demonstrates that constraints providing for MMRs have a more pronounced effect when the nondeclining flow constraint is relaxed. Constraints representing the timber harvest dispersion component of MMRs are especially limiting on the ability to achieve high levels of timber harvest in the first few decades. Both dispersion constraints and rate of harvest constraints for wildlife make much of the standing old growth timber effectively unavailable in the early decades.

Table B-BI-10 INTERACTION OF HARVEST FLOW AND MMRS

	<u>NO MMRS</u>	<u>MMRS</u>
	(#3)	(#7)
NONDECLINING FLOW	335 MMBF/yr. 66 MMCF/yr. 1291 MM\$ PNV	287 MMBF/yr. 57 MMCF/yr. 1042 MM\$ PNV
	(#5b)	(#5a)
DEPARTURE	531 MMBF/yr. 105 MMCF/yr. 1428 MM\$	427 MMBF/yr. 84 MMCF/yr. 1146 MM\$ PNV

5. The effect of adding non-market (assigned) values

Chapter II, of the DEIS lists discounted benefits and costs by resource group and alternative. These are the components of PNV. The groups are Timber, Recreation, Range, and Other (Fish and Wildlife). Of these, only Timber was modeled. So, the effect of adding non-market values for recreation and "other" did not affect the FORPLAN solution. It follows that adding constraints (such as restricting rotations, NDY, etc.) to the FORPLAN model has no effect on non-market quantities and values. Conversely, decisions related to non-market values do not effect the model's determination of market quantities, regardless of which harvest constraints are applied.

As is documented in Section VIII of this Appendix, the additon of recreational non-market values related to investment decisions. This had nothing to do with land use decisions being made by FORPLAN relative to timber lands.

Decisions related to adding or not adding non-market values for Range and "Other" did not significantly affect total PNV: Range and "Other" non-market decisions had less than 1% effect on PNV.

E. RESOURCE ANALYSIS

This section describes how the model was used to evaluate the opportunity to respond to major issues and concerns. Six benchmark runs have been included. Findings will be discussed in separate sections below. The following table summarizes the outputs and effects of these benchmarks. The "Public Issue Groups" and "Indicators of Responsiveness" are described in Chapter I of the DEIS. All of these Benchmarks were constrained by MMRs and the policy of non-declining flow.

Table B-VI-1 SUMMARY BENCHMARK OUTPUTS & EFFECTS
(N.E. = Not Estimated)

PUBLIC ISSUE GROUP Indicators of Responsiveness	B E N C H M A R K T H E M E					
	Max PNV (Assigned Values)	Max Timber	Max Wildlife	Max Visual Quality	Max Fish & Water	Max Unroaded Areas
ISSUE 1: TIMBER						
ASQ, Green (MMBF/decade)	2870	3040	1140	2070	1300	2460
TPSQ (MMBF/decade)	3630	3830	1470	2650	2030	3110
LTSYC (MMCF/decade)	565	599	288	437	281	485
ISSUE 2: FISH HABITAT AND WATER QUALITY						
Aquatic Habitat Stability Index	2.7	2.7	N.E.	N.E.	N.E.	N.E.
Acres Managed	82,800	166,300	166,300	166,300	284,800	166,300
ISSUE 3: WILDLIFE						
Acres of Old Growth after 50 Yrs	225,300	180,000	404,000	288,000	346,000	261,000
Acres Of Young Growth	112,300	87,600	86,100	69,500	43,200	76,400
ISSUE 4: RECREATION						
Naturally Appearing Viewsheds .	5	5	N.E.	22	N.E.	10
Slightly Altered Appearing	0	0	N.E.	24	N.E.	0
ISSUE 5: UNROADED AREAS						
Areas Unroaded after 15 Years . .	0	0	10	.5	10	10
Areas Unroaded after 50 Years . .	0	0	0	3.5	0	10
ISSUE 6: COMMUNITIES						
Payments to Counties	9	10	4	7	5	8
Change in Employment (Number of Jobs)	+ 700	+ 900	- 3,300	- 1,200	- 2,300	- 400
ECONOMICS						
Average Annual Costs During The First Decade (\$MM/Year)	27	31	23	24	19	25
Timber PNV Components (\$MM):						
Discounted Benefits	1,413	1,436	554	1,009	704	1,208
Discounted Costs	371	445	275	266	170	321
Net = Timber PNV	1,042	+ 991	279	744	534	887

Constraints applied to the following resource benchmarks include, unless otherwise specified, the following common benchmark constraints:

1. Timber harvest on tentatively suitable timber lands only
2. Ending inventory constraint
3. Long-term sustained yield link
4. Maximum variation of 25% in harvest volume between decades
5. Rotations constrained to equal or exceed 95% of CMAI
6. All Minimum Management Requirements
7. Nondeclining harvest flow

1. Timber Volume

FORPLAN readily provides information on timber production potential when the Maximize Timber objective function is used. The following table provides examples of timber that could be produced in the first decade under different sets of constraints.

Table B-VI-11 OVERVIEW OF TIMBER SUPPLY POTENTIAL

<u>Benchmark</u>	<u>Constraints</u>	<u>First Decade Timber Volume (MMBF/yr.)</u>
2	Constraints 1-4 (above)	783
5c	2 + 95% CMAI	765
5b	5c + Harvest Floor	531
5a	5b + MMRs	427
7	5a + NDF	304

Purpose:

The particular focus of the maximum timber benchmark is to identify the opportunity to meet demand for commercial wood products by providing a nondeclining even flow of timber, while meeting Minimum Management Requirements. The results of this benchmark meet the requirements of 36 CFR 219.12(e)(1)(ii). They are discussed in further detail below, and are compared to those of Benchmark #7, where the objective function is Maximum PNV.

Objective Function: Maximize timber yield in the first decade,
then maximize PNV for 150 years

Constraints: Common constraints 1-7

Table B-VI-12 COMPARISON OF BENCHMARKS TM AND 7

	Benchmark TM	Benchmark #7
Acres suitable for timber	608,000	608,000
Proportion managed at max. int.	89%	40%
Timber PNV	991 MMS	1042 MMS
Annual budget (1st decade)	31.3 MMS	27.3 MMS
TSI acres (50 yr. annual avg.)		
Planting	4956	3257
Precommercial thinning	5606	3883
Commercial thinning	3145	401
Fertilization	3762	2160
First decade annual volume	353 MMBF	287 MMBF
Long term sustained yield	60 MMCF	57 MMCF

The only difference between these two benchmarks is the objective function. On the same land base, a different set of timber management intensities and a different harvest schedule have been selected to maximize timber volume, as opposed to maximizing economic efficiency. More intensive timber management regimes are selected to increase timber volume. This results in more cultural practices, especially in the first decade. Though timber volume can be increased, it is at the expense of present net economic value as the incremental volume costs more than it is worth. The increase in timber production achieved through higher investments affects amenity resources less than would the utilization of more land area to achieve the same results.

Differences in costs of timber management result in higher budget expenditures. Changes in harvest scheduling also result in higher costs where higher timber volumes are found on sites with higher development costs. Harvest in such areas would be more often postponed where the objective is maximizing economic efficiency. Such areas would include unroaded areas and steep slopes. More roads are constructed in the first decade to maximize timber, and more sediment is produced.

2. Unroaded Recreation Opportunities

Purpose:

A critical issue in National Forest management has been the rate of development of unroaded portions of the forests. The Oregon Wilderness Act of 1984 formally added 134,900 acres of the Mt. Hood to the National Wilderness Preservation System. In addition to the areas on the Forest now classified as wilderness, there are 130,000 acres of land that are sufficiently free from development that they have been identified through an inventory process as having special recreational value if maintained in their existing condition. Complete descriptions of the remaining non-wilderness roadless areas on the Mt. Hood National Forest may be found in Appendix C.

Though they are available for development, these areas could also continue to be managed as roadless and thereby supply a different kind of recreational experience than they would if developed for timber management. A benchmark analysis has been performed to determine the outputs, effects, costs and benefits of retaining all inventoried roadless areas in their present condition while managing the remainder of the Forest in an economically efficient manner.

Objective Function: Maximize PNV for 150 years

Constraints: Common benchmark constraints 1-7
Road construction and timber harvest will not be allowed in any area identified as roadless.

Results: The 130,000 acres of Forest land being managed for roadless recreation will provide approximately 4.7 MMRVDs/year in the first decade. This amount will increase to about 8.3 MMRVDs annually by 2035. The types of recreation opportunities provided will generally be considered to be primitive or semi-primitive non-motorized, which are those in the shortest supply. Allocation of this land to this type of use will also benefit other resources.

In order to not subject any of the roadless areas to chargeable harvesting, 91,400 acres have been removed from the timber base. The table below summarizes the proportion of each working group on the Forest that is unroaded.

Table B-VI-13 AMOUNT OF WORKING GROUP THAT IS UNROADED

<u>DF-HIGH</u>	<u>TF-HIGH</u>	<u>AS-HIGH</u>	<u>LOW</u>
18%	25%	2%	10%

The predominance of the true fir working group suggests that the productivity of these areas is lower than average. Timber volume has been reduced 14% from the economically efficient levels indicated by Benchmark #7. PNV has been reduced 10%. The costs of obtaining the timber volume are higher because of the additional road construction necessary and the fact that the terrain is generally more steep and operating conditions more difficult in the areas that have not yet been developed. A further analysis of the trade-offs between management of timber and dispersed unroaded recreation in presently unroaded areas, beyond that provided by FORPLAN, may be found in the Analysis of the Management Situation.

3. Managing the Scenery of the Forest

Purpose:

The maintenance and enhancement of the scenic quality of the forest is a significant issue on the Mt. Hood. One of the reasons for this is the high level of recreation use and the Forest's relationship to a large nearby metropolitan area. Another reason is that forest users utilize the visual resource to interpret the management of the forest. When landscapes which people are familiar with are visually altered, they perceive the changes as positive or negative, depending on how well it "fits" with their expected image. Certain landscape units, or viewsheds, have been effectively off limits to management activities such as road building and timber harvest because the local publics are very sensitive to such activities in these places.

In accordance with 36 CFR 219.12(e)(1)(ii), an analysis has been undertaken to determine the maximum potential to provide scenic values. The FORPLAN model has been used as part of this assessment, particularly in relation to the effects on other resources of managing for visual quality.

Objective Function: Maximize PNV for 150 years

Constraints: Common benchmark constraints 1-7
Viewshed management constrained as described below

The unique feature of this benchmark is that the allocation of land to different types of timber harvest activities is guided by a visual resource inventory. A visual quality objective has been established for all areas on the forest based on visual variety class and sensitivity levels. This process was more fully described in Section III of this Appendix. In Benchmark VQ, all of these identified visual quality objectives will be met. In most cases, meeting such objectives does not require the elimination of other management activities such as timber harvest. However, five particularly important viewsheds are placed in an unregulated harvest category. These viewsheds are: Columbia Gorge, Highway 26 West, Highway 35, lower Clackamas River, and Lost Lake.

For modeling purposes, there are four levels of timber management emphasis:

Table B-VI-14 LEVELS OF TIMBER MANAGEMENT EMPHASIS

<u>Emphasis</u>	<u>Model Proxy</u>
OWLRIP	Unregulated harvest only
25OROT	</= 4% limit to harvest area per decade, 250 year rotation
125ROT	</= 8% limit to harvest area per decade, 125 year rotation
GENFOR	Harvest limited only by dispersion MMRs

The following table shows how inventoried visual quality objectives were translated into model constraints.

Table B-VI-15 MANAGEMENT EMPHASIS FOR VQOs

<u>VQO</u>	<u>Emphasis</u>
All Preservation*	OWLRIP
Foreground Retention	
Foreground Partial Retention	250ROT
Medium Ground Retention	
Foreground Modification	
Medium Ground Partial Retention	125ROT
Background Partial Retention	
Medium Ground Modification	
Background Modification	GENFOR
All Unseen Areas & Maximum Modification	

* Also included are the five most critical viewsheds on the Forest described above.

Results:

The change in land allocation from the maximum PNV benchmark is summarized below.

Table B-VI-16 LAND ALLOCATION DIFFERENCES BETWEEN BENCHMARKS 7 AND VQ

	Benchmark	
	<u>#7</u>	<u>VQ</u>
OWLRIP	39	95
250ROT	92	210
125ROT	0	166
GENFOR	516	176

A feeling for the overall impact of visual quality constraints can be gained by looking at the increases in area of land allocated to more restrictive timber management in this benchmark relative to Benchmark #7. There is a total of 340,000 acres where timber volume may be expected to be reduced or eliminated.

This benchmark provides for meeting or exceeding the Visual Quality Objectives recommended by the Visual Resource Inventory. This would constrain the management of other resources sufficiently to allow the viewsheds associated with all of the primary and secondary travel routes and use areas to retain or partially retain their landscape character. Including the wilderness areas, 28% of the forest would be natural appearing and another 25% would be only slightly altered. This would provide benefits to both the public and the land manager because the Forest users would generally have the impression that the forest is being managed with a great deal of care and concern for the resources.

This is accomplished by extending the average rotation age on 31% of the tentatively suitable acres, and allowing only unregulated harvest on 9% of the suitable acres. Timber volume is reduced by 28% to 207 MMBF/yr. in the first decade. By the fifth decade this increases to 222 MMBF/yr. (44 MMCF/yr.). This increase in volume available for harvest over time indicates that under this set of constraints, long-term sustained yield capacity is not limiting harvest in the early decades. The additional constraints that establish maximum rates of harvest have more of an effect on volume in the first few decades than the extended rotation constraints have on long-term sustained yield capacity. It eventually becomes the factor that limits first decade harvest.

Another characteristic of this benchmark is reduced timber management intensities (investment options within the emphases described above). In the short run there is a reduction in the amount of planting, precommercial thinning and fertilization, and in the long run there is a prevailing shift towards more extensive silvicultural prescriptions. It is likely that deferring the benefits of cultural practices through extended rotations renders these practices no longer economically efficient.

As a by product of management to meet visual quality objectives, more old growth timber will be maintained for use by wildlife. After 40 years there is 17% more available than in Benchmark #7. Development of roadless areas may be accelerated, however, because much of the area they include is not seen by most Forest users.

4. Habitat for Wildlife

Purpose:

There are three substantial public issues related to the management of wildlife habitat on the Mt. Hood National Forest. They are the maintenance and distribution of old growth, protection of threatened and endangered species, and providing diversity of habitats. All three may be addressed by managing portions of the Forest to retain old growth values. Diversity, however, also necessitates managing to maintain some level of all habitats that the Forest is capable of providing. A second objective of this benchmark is to provide as much area as possible in a grass-shrub stage, defined as stands less than 20 years old. A benchmark has consequently been developed that focuses on both old growth and seral habitat management.

Objective Function: Maximize Timber for 50 years,
then Maximize PNV for 150 years

Constraints: Common benchmark constraints 1-4, 6-7
Rotation constrained by utilization standards
Additional constraints to maintain wildlife habitat
characteristics, as described below

All existing old growth will be managed to maintain its present condition, which means there will be no regulated harvest. For modeling purposes, old growth has been defined as any timber stand which exceeds a certain age. These ages depend on the location of the stand.

Table B-VI-17 OLD-GROWTH CLASSIFICATION

Location	"Old Growth" Constraint Age
EAST SIDE DRAINAGES W. F. Hood River E. F. Hood River Mill Cr. Badger Cr. White River	150 years
WEST SIDE DRAINAGES Columbia River Bull Run River Sandy River Salmon River Lower Clackamas River Fish Cr. Oak Grove Fork Hot Springs Fork Collawash River Upper Clackamas River	200 years

* In analyses of old growth elsewhere in this document, stands of timber are counted as "old growth" when they reach 200 years old, regardless of location.

All of the pine/oak habitat type (24,000 acres) will also be managed for its wildlife resources, primarily turkey and silver gray squirrel. This represents an additional 16,000 acres of otherwise suitable timberlands that will not be available for regulated timber harvest. The remainder of the Forest is available. Creation and maintenance of forest openings by timber harvest is facilitated by the emphasis on harvest of timber during the first 50 years combined with the short rotations.

Results: Protection of existing old growth removed over 300,000 suitable acres from the regulated timber base, which is about 45% of those that were initially available. The area withdrawn for all reasons in this benchmark constitutes the following proportions of each timber working group.

Table B-VI-18 OLD-GROWTH BY WORKING GROUP IN BENCHMARK

Douglas-fir	43%
true fir	56%
associated species	64%
pine/oak	100%

The lesser impact on the most productive timber type is probably the result of having been the most frequently harvested in the past and, therefore, more of it is already in second growth than any other working group.

The remaining area managed for timber is harvested substantially before culmination of mean annual increment is reached. For example, on Douglas-fir high sites, which still predominate the timber management area, the most common rotation length is 60 years. In Benchmark #7, the average rotation length is about 100 years on these same sites. As a result of the short rotations, much of the area managed for timber is less than 20 years old at all times. A minimum of 70,000 acres in this age group is reached at the end of the planning horizon.

Timber harvesting will be programmed to benefit early seral stage vegetation for appropriate management indicator species, primarily elk and deer, by providing the desired quantity, quality, and distribution which optimize habitat conditions. High expenditures for habitat improvement would be made including fertilization, seeding, planting, and road use constraints. At least four times the current habitat improvement expenditures would be needed to maximize the wildlife habitat quality and distribution. Most of these improvements would be on acres other than old growth. The intensive habitat enhancement would result in about a three-fold increase over the habitat improvement acres needed to address RPA requirements.

Managing for maximum wildlife in this way would most fully meet the public's demand for old growth for wildlife habitat as well as for cultural fulfillment. These same old growth acres would strongly address the wildlife issue concerning threatened, endangered, and sensitive species. Wildlife and plants listed as sensitive would receive the maximum maintenance of presently suitable habitat. This is best demonstrated by the high number of spotted owls that would be maintained.

Opportunities to produce commercial timber volume on a regulated basis are foregone on the area that is not available for timber management. The reduction in timber volume from the most economically efficient level is substantial: 60% in the first decade, and 50% in the long run. This difference is also attributable to the fact that much of the best timber producing area available is not presently old enough to yield commercial volume.

Commercial volume is achieved most quickly under timber management intensities that invest in growth-inducing cultural practices. This benchmark utilizes more planting, precommercial thinning, fertilization, and commercial thinning than any other benchmark except the maximum timber benchmark (TM). There is a monetary price to be paid for this. Timber volume per acre, average timber price, and PNV are the lowest of any benchmark.

5. High Quality Water and Fish Habitat

Purpose:

Fish and water resources are a factor to be considered in addressing the Forest issues and concerns relating to:

1. maintenance, enhancement and rehabilitation of anadromous and resident fish habitat.
2. maintenance of high quality water from Forest lands.
3. maintenance of hydrological balances.
4. maintenance and distribution of old growth.
5. providing a diversity of habitats for fish and wildlife species.
6. protecting threatened or endangered species.

In accordance with 36 CFR 219.12(e)(1)(ii), a benchmark has been formulated that can be used to assess the effects of allocating Forest land in such a way that fish and water resource values are maximized. The fish and water benchmark is fashioned to provide the highest net increases in fish habitat capability and water quality. This is accomplished by minimizing potential disturbance to riparian areas while maximizing investments in fish habitat and watershed improvement.

Objective Function: Maximize PNV for 150 years

Constraints: Common benchmark constraints 1-7
Constraints to exceed Minimum Management Requirements for riparian resources, and to provide high quality water Forest-wide, as described below

To maximize watershed stability and to minimize riparian area disturbance, major additional restrictions are applied to timber management. No regulated harvest is to occur in any of the Forest's inventoried riparian areas. Additionally, no regulated harvest is scheduled in any of the 38 special emphasis watershed management areas. These areas generally include municipal watersheds, fish hatchery water supplies, areas of very high riparian resource sensitivity, and key or critical fish habitat. There would be no regulated timber harvest in the Bull Run Municipal Watershed in this benchmark. Inventories of riparian and watershed resources were described in Section III of this Appendix.

On remaining lands managed for timber, a harvest rate limitation of 8% per decade is applied in conjunction with requiring rotation lengths of 125 years. This allows for timber management activities at a level well within watershed and riparian area tolerances for natural recovery, even assuming large-scale disturbances, such as flooding or wind storms. This harvest schedule permits a wide range of choices for dispersal of timber harvest activities within any given drainage area.

Results:

Maximum riparian management emphasis (unregulated timber production) on 300,000 acres assures maintenance and gradual improvement (recovery of previously disturbed areas) of riparian areas. Harvest rate limits of 8% per decade on remaining lands assures trends for maximum watershed stability and minimum accelerated sediment. Coupled with maximum investment levels for fish habitat, highest net gains in habitat capability are realized. By the second decade, anadromous habitat capability will reach 420.7 M lbs., which exceeds Forest RPA targets set at 288 M lbs.

With a 45% reduction in the area available for timber harvest and a reduction in yield obtainable from those areas that are available, timber volume is reduced by 50% from the economically efficient volume in Benchmark #7. Most of this reduction is a result of withdrawing land from the timber base. The remainder is due to deferred harvest of standing timber and to extended rotations on managed stands. The latter effects are expressed through a shift to less intensive timber management, as the benefits of intensive practices become delayed to the point where they no longer exceed their costs. Costs of both harvesting and reforestation are much lower, but the loss of timber value is much greater and PNV is about half of its potential.

6. Maximum Production of Amenity Resource Benefits

Purpose:

Previous benchmarks have been used to analyze the results of constraints applied to address individual or groups of related issues. Some issues have not been addressed by separate benchmarks. They include, in particular, earthflow hazards, roaded areas needed to preserve primitive and semi-primitive recreation opportunities, inventoried wild, scenic and recreational rivers, research natural areas and special interest areas that haven't already been considered for some other reason.

It is expected that constraints will be applied to all of these kinds of areas in some forest management alternatives. Another characteristic of alternatives will be that they will be designed to produce a more balanced array of multiple-use benefits than has been the case with these single resource benchmarks. As means of estimating the possible effects of the maximum constraints that could be applied to provide non-market benefits, a final resource benchmark has been developed.

Objective Function: Maximize PNV for 150 years

Constraints: Common benchmark constraints 1-7

All of the constraints described previously, and adds more to address the remaining issues mentioned above. A summary of these constraints is presented below.

visual

Columbia Gorge, Highway 26 West, Highway 35, Lower Clackamas River, and
Lost Lake Viewsheds: unregulated
Other viewsheds: 125ROT, 250ROT or GENFOR, according to VQO

earth flow areas

All: unregulated

Special Interest Areas

All existing and proposed: unregulated

Research Natural Areas

All existing and proposed: unregulated

Wild and Scenic Rivers

Clackamas and Salmon Rivers: unregulated
White and Roaring Rivers: unregulated and 250ROT, as inventoried

wildlife

East Side Old Growth (150 + years): unregulated
West Side Old Growth (200 + years): unregulated
Pine/Oak: unregulated
MMRs: unregulated and 250ROT, as designated

Fish & Water

Bull Run: unregulated
Key Site Riparian, complete inventory included: unregulated
General Riparian, area enlarged: unregulated
Special Emphasis Watersheds: unregulated
Remaining Forest: 125ROT

unroaded areas (not already wilderness)
All: unregulated

P and SPNM Recreation Opportunities

Selected land adjacent to wilderness or unroaded areas, or otherwise providing such opportunities: unregulated

Results:

As might be expected, the impacts on timber production in this benchmark are extreme. Although overlap of constraints is common, it appears that two of them in combination are the major cause of such a large reduction in timber volume over that of the next lowest benchmark (93% reduction from Benchmark WL in the first decade). The wildlife constraints remove all land supporting existing old growth from the available timber base. The fish and water constraints then place restrictions on how quickly the remaining areas may be harvested. With very little volume of merchantable size (roughly one-third of the total beginning inventory) and only 8% of this available in each decade, only about 2.5% of the inventory may be harvested in each of the first few decades.

As additional stands reach CMAI, harvest levels show some increase over time. However, the restrictions on rate of harvest keep outputs from increasing as fast as the inventory becomes available. As a result, 45,000 acres are available at the end of the planning horizon that have not yet been cut. The conclusion that can be made here is that if more time were available, these additional acres could be added to the timber base. This would result in a continued increase in harvest levels over time and eventually a higher long-term sustained yield capacity. It would not affect volumes already established for the first 150 years.

This benchmark does produce the highest benefits for all amenity resources, with one possible exception. Wildlife species that depend on early successional forest communities could be adversely affected because the amount of this kind of habitat may be reduced below a minimum threshold. The amenity benefits generate considerable economic opportunity costs. The present net value of timber management is only 3% of that obtainable in Benchmark #7.

F. SUMMARY OF FORPLAN RUNS USED IN THIS SECTION

Following is a listing of the identification codes assigned to each of the FORPLAN runs made on the benchmarks. I.D. team members based their analysis work and development of benchmarks on these FORPLAN runs.

Table B-VI-19 CROSS REFERENCE OF BENCHMARKS TO FORPLAN RUN IDENTIFIERS

BENCHMARK	RUN-ID
#1	HOOD10
#2	HOOD63
#3	HOOD06
#3a	BNCH3A
#3b	HOOD28
#3c	BNCH3C
#3d	51HOOD
#4	54ROLL
#5	45RMTH
#5a	43RMTH
#5b	53ROLL
#5c	21RMTH
#5d	PNV53R
#6	HOOD50
#7	HOOD16
TM	19ROLL
RD	BENCHC
VQ	BENCHE
WL	DDDROL
FW	HHHBEN
AM	16AMEN

VII. FORMULATION OF ALTERNATIVES

A. INTRODUCTION

The Analysis of the Management Situation (36 CFR 219.12(e)) discussed in Part VI identified needs and opportunities to change the management direction on the Mt. Hood National Forest. It also demonstrated that not all objectives for this management could be achieved simultaneously. Alternative ways of managing the Forest were examined which stressed different management objectives. The process by which these alternatives were developed is described in this section of this Appendix. Differences in objectives led to differences in outputs and environmental effects. An analysis of the differences among the alternatives' constraints and results is found in Part VIII.

1. Requirements of Alternatives

Each alternative Forest Plan is composed of land management prescriptions applied to selected locations, schedules of management activities, and associated management standards. Alternatives must also meet the following requirements of 36 CFR 219.12(f):

Be formulated by the interdisciplinary team

Be distributed between the minimum resource potential and maximum resource potential (within the decision space)

Facilitate analysis of opportunity costs and of resource use and environmental trade-offs

Facilitate evaluation of the effects on present net value, benefits and costs of providing at specified levels outputs and values that are not assigned monetary values

Provide different ways to address and respond to the major public issues, management concerns, and resource opportunities identified during the planning process

Recommend changes in existing law, if necessary, to address a major public issue, management concern, or resource opportunity identified during the planning process

Represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative

State the condition and uses that will result from long-term application of the alternative; the goods and services to be produced and the timing and flow of these resource outputs together with associated costs and benefits; resource management standards and guidelines; and the purposes of the management direction proposed.

As a group, the alternatives must comprise a broad range of reasonable options which may be evaluated according to NEPA procedures. They must also provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits, consistent with requirements of NFMA.

Consideration of certain alternatives was required.

Current direction (No action): This alternative meets the requirement of 40 CFR 1502.14 (CEQ Regulations) that at least one alternative reflect the most likely condition of the forest in the future if current management direction continues. It includes the goods and services, costs and benefits, and the environmental effects of current management carried into the future. It is based upon management direction in existing plans. Alternative A is this alternative.

Emphasis on the RPA Program: This alternative meets the 36 CFR 219.12(f)(6) requirement that at least one alternative be developed that responds to and incorporates RPA Program targets and resource objectives. This is Alternative B.

Emphasis on market opportunities: This alternative manages the Forest primarily for outputs that have an established market price. These are timber, livestock forage, developed recreation, commercial fisheries, and minerals. Alternative C places the greatest emphasis on market opportunities.

Emphasis on nonmarket opportunities: This alternative manages the Forest primarily for goods and services that do not have an established market price. These are dispersed recreation, wildlife, fish, water, and visual quality. Alternatives H and I both provide such opportunities in different combinations.

Emphasis on non-development and intensified management: This alternative maintains four of the largest roadless areas with the greatest unroaded values, as unroaded. Commodity production will be emphasized on the rest of the forest. Alternative E incorporates these objectives.

Additional alternatives include those necessary to respond to the full range of public issues, management concerns, resource uses, and development opportunities. They respond to 36 CFR 219.12(f)(1) which requires that alternatives be distributed between the maximum and minimum resource potentials in order to display the full range that the Forest can produce. Alternatives D, F, and G are respond to this objective.

CEQ regulations (40 CFR 1502.14) require that this DEIS identify the agency's preferred alternative or alternatives, if one or more exists. Alternative E is the preferred alternative. The Forest is also required to display a variation of the preferred alternative that departs from nondeclining flow of timber. Alternative E does this.

2. Alternative Development Process

The issues, concerns, and opportunities identified through public involvement were the basis for formulating the range of management alternatives analyzed. Information obtained from the analysis of benchmarks was used in translating alternative objectives into constraints used in modeling the alternatives. The steps involved are listed below:

1. The interdisciplinary team selected the major issues and concerns to be addressed by the alternatives. (See Appendix A for a complete discussion of issues and concerns.)
2. Team members described possible alternatives in terms of a theme or emphasis, and associated objectives.
3. Benchmarks were reviewed for their ability to meet an alternative's objectives.
4. Benchmarks were modified, as needed, to incorporate multiple-use considerations which would make them reasonable to implement as alternatives. This step involved prioritizing the management requirements needed to address the major issues and concerns, and it is described in more detail below.
5. Land use and investment objectives were identified.
6. A computer map (GMS) of the alternative was created and land use objectives were translated into model constraints by location in FORPLAN; investment alternatives for resources other than timber were analyzed separately. This analysis disclosed that the decision space related to investments in range (livestock) was insignificant whereas the decision space related to investments in upgrading recreational facilities was great. Section VIII, part D.2.b. discusses investments in recreation.
7. Other constraints (if any) were added and the model was run.
8. The result was reviewed by the ID Team and by representatives of the Management Team for conformance with the original objectives of the alternative and for reasonableness of the resulting outputs and effects.
9. Adjustments were made, if necessary, and steps 6-8 were repeated.
10. Alternatives were eliminated from detailed study if their objectives were reasonably addressed in another alternative, or if their objectives could not reasonably be obtained in the manner attempted in the alternative.
11. Implementable alternatives that contributed significantly to a broad range of choices for management were fully evaluated by the ID Team, and these evaluations have been displayed in Chapter II of the DEIS and Section VIII of Appendix B. The process of evaluation that followed FORPLAN analysis has been described in Sections III and IV.

The constraints used in alternatives were the same kinds as those applied to benchmarks. They were extensively evaluated at that time, and this evaluation has been described in Section VI. Little further analysis of individual constraints was performed on alternatives. The complete package of constraints was analyzed for each alternative and is discussed in Section VIII. While there was seldom more than one step between a benchmark and an alternative, there was sometime supplemental analysis. This is also described in conjunction with the alternative analysis in Section VIII.

Cost efficient management of timber has been promoted making a full range of management intensities available in all alternatives. FORPLAN was always free to select an intensity that did not harvest timber (except in Alternative A, where the only option available was the current intensity). Each alternative employed a final objective function of maximizing PNV, which prevented managing areas for timber that did not increase overall PNV. Economic efficiency of management of resources with no market values was increased by the ranking process described below.

3. Resource Priorities

Benchmark analysis indicated that competitive relationships exist in varying degrees between the need to produce economically efficient levels of timber volume, and the need to respond to the major issues and concerns for unroaded recreation, visual quality, wildlife and fish habitat, and water quality. Because these latter issues and concerns are for outputs to which dollar values could not be easily assigned, an analysis was performed by the resource specialists on the ID Team to determine where on the Forest their highest values could be achieved. The resources analyzed in this way included:

- a. Unroaded resources and roaded areas with potential to contribute to primitive and semi-primitive non-motorized recreation opportunities
- b. Scenic viewsheds
- c. Habitat required for wildlife species requiring mature and old growth forest
- d. Riparian resources and watersheds
- e. Candidates for inclusion in the National Wild & Scenic River System
- f. Candidates for Research Natural Areas
- g. Areas of special interest (scenic, historic, biological, geological)

Inventories of these resources have been described in Part III of this Appendix. The process used for their prioritization is described in a report entitled "Resource Priorities Used in Alternative Development," on file at the Mt. Hood National Forest Supervisor's Office.

For the resources a-d above, there were up to six stratifications in addition to Minimum Management Requirements. Each stratification was represented by a computer map showing areas of the Forest with comparable values for the particular resource.

After considering the theme and objectives of an alternative, its emphasis on management of each of these four resource groups was determined. The degree of emphasis determined how many map layers would be used in determining management constraints for an alternative. A low emphasis on a particular resource meant that only the higher priority areas would be included for that resource, and a greater emphasis would result in constraints applied to increasingly lower priority areas.

For resources e-g, the process was more site specific because of the diverse nature of these resources. A decision was made regarding each area in each alternative. There was also special treatment of sensitive earthflow areas, the Bull Run Municipal Watershed, and present management emphasis that does not lend itself to a general discussion. Constraints related to these resources are indicated by alternative in Table 6-A.

Another factor used in deciding whether constraints relating to a particular area or resource priority group should be included in an alternative was the objective that the broadest range of possible combinations of constraints should result when maps of areas selected for each resource were combined. No resource could be emphasized highly in every alternative, and each had to receive a low emphasis in some alternatives. By striving for a mixture of constraints, a range of alternatives would be created for evaluation.

Where there was overlap of areas selected for management for different resources, the most restrictive management constraint was selected. The relationship between management prescriptions and constraints has been explained in Part III.

The priorities resulting from this process improve the economic efficiency of alternatives. While no dollar values have been assigned, relative values have been established. Higher valued uses will be found in more alternatives than lower valued uses.

B. CONSTRAINTS COMMON TO ALL ALTERNATIVES

This section is concerned with using information developed during the benchmark analysis to formulate proposed management alternatives for the Forest. In the benchmark analysis, constraints were evaluated for suitability for inclusion in alternatives. Their effects were discussed in Section VI. Based on this analysis, constraints that would be common to all alternatives were identified. This group of constraints is reviewed below.

1.

Constraint: Chargeable timber volume may occur only on tentatively suitable acres.

Purpose: Chargeable volume is based on projections of growth and yield on a continuing basis over time. It is this volume that establishes the upper limit to the Allowable Sale Quantity for each alternative. This constraint permits inclusion in such projections of only those lands on the Forest that have at least 10% tree cover, can reasonably be expected to produce a new merchantable stand following harvest, and where timber management activities are presently not prohibited by law (see Section II). Harvest may occur on unsuitable acres in unusual situations, where needed to protect the forest resources.

Effects: The constraint places an initial ceiling on the number of acres that can be managed for timber. The Mt. Hood National Forest includes 1,059,439 acres of National Forest land. No alternative will have more than 647,118 acres under timber management.

Rationale: 36 CFR 219.14 requires that lands be identified as not suitable for timber production as part of the Analysis of the Management Situation. Regulated timber harvest is precluded on such lands by 36 CFR 219.27(c)(1). Nonchargeable volume has been estimated for alternatives, some of which may come from unsuitable acres, but such volume would not be part of the ASQ.

2.

Constraint: Harvest in the final decade of the analysis cannot exceed long-term sustained yield capacity, and sufficient inventory must be available at the end of the final decade to maintain harvest at long-term sustained yield capacity indefinitely.

Purpose: These constraints prevent the model from liquidating the inventory of standing timber at the end of the planning horizon.

Effects: Effects on harvest volume have not been estimated. Where first decade volume is limited by long-term sustained yield capacity, as it is under nondeclining flow constraints, these constraints should not be binding in the early decades. First decade volume is more likely to be affected in departures. Volume in the last few decades would probably have increased without these constraints.

Rationale: 36 CFR 219.16 (2)(iv) requires attainment of long-term sustained yield in perpetuity. The selected model planning horizon in Region 6 is 150 years. Choice of this cutoff point for analysis should not result in ignoring effects beyond this point. Direction for alternative formulation in Region 6 requires the use of these constraints.

3.

Constraint: Changes in harvest levels between decades in the planning period have been limited to plus or minus 25%. These are sometimes referred to as sequential upper and lower bounds.

Purpose: Where departures from nondeclining flow are permitted in an alternative by 36 CFR 219.16(a)(3), this constraint places limits on how rapidly harvest levels will be permitted to decline to long-term sustained yield capacity. It is designed to limit the negative impacts of changes in employment on the communities that process timber. It will incidentally benefit other resources by spreading out timber harvest over time.

Effects: The effect of limits on decreases in volume has not been analyzed by specific FORPLAN runs. Because of the amount of standing merchantable timber on the Forest, relaxing the nondeclining flow constraint allows harvest levels in the first few decades to be increased, without affecting long-term volumes. Benchmark analysis indicated that first decade volume in departure alternatives would be primarily limited by the need for dispersal of timber harvests. The 25% limit would not be binding in the first decade. It may affect how long levels above long-term sustained yield capacity may be maintained, because it forces relatively gradual declines in volume. Limits on increases in volume between decades did not bind any alternatives. It should be noted that these constraints do not prevent an alternative from harvesting more or less than 25% of present harvest levels in the first decade.

Rationale: While selection of any number would be arbitrary, some limit is more justifiable than none at all, in order to provide for maximum acceptable community impacts. Because the model is not sensitive to this constraint in the first decade, the choice of 25% is not particularly important.

4.

Constraint: Timber stands must have reached approximately 95% of their culmination of mean annual increment (CMAI).

Purpose: This constraint prevents the model from selecting timber stands for harvest prior to achievement of their maximum growth potential.

Effects: Benchmark analysis showed that this constraint has little effect on timber volume or PNV. The possible economic benefits of shorter rotations are offset by the increase in long-term sustained yield capacity of longer rotations, which permits more harvest of valuable timber in the early decades under nondeclining flow.

Rationale: 36 CFR 219.16(a)(2)(iii) establishes this constraint as a general standard. Exceptions are allowed where overall multiple-use objectives may be improved. Such benefits in alternatives for managing the Mt. Hood National Forest appear limited.

5.

Constraint: Harvest volume may not be less than long-term sustained yield capacity once this level has been achieved in an alternative.

Purpose: Where departures from nondeclining flow of timber have been allowed in an alternative, this constraint prevents trading off future volume for volume in earlier decades.

Effects: As explained in the discussion of benchmarks, after constraints providing for Minimum Management Requirements have been applied, this harvest floor is not binding in the first decade. While not tested, it may potentially cause some reduction in one or two alternatives in second through fourth decade volumes. This Forest supports a standing inventory sufficient to support a harvest above long-term sustained yield capacity without later requiring a reduction below this level. This is apparently accomplished by harvesting more area and less productive sites in the early decades. Replacement volume in the later decades comes from some high volume stands that are deferred, earlier second growth from the additional area harvested, and investments in cultural practices that are not economically efficient under nondeclining flow.

Rationale: NFMA regulations establish nondeclining flow as a policy standard. Exceptions are permitted under 36 CFR 219.16(3). Alternatives formulated with the nondeclining yield harvest volume as a lower limit meet the intent of the regulations, while permitting temporary achievement of higher timber volume. The negligible benefits of relaxing the harvest floor constraint do not justify future harvests below capacity.

6.

Constraint: Minimum Management Requirements will be met.

Purpose: Model constraints provide for dispersion of timber harvests, riparian habitat, and habitat for wildlife species requiring mature and old growth forests.

Effects: The effects of the individual and combined MMRs were described in detail in Section VI. They mitigate localized environmental effects of timber harvest by dispersing harvest units and activities, and maintain mature and old growth timber and riparian habitats over time. The aggregate effect on timber yield in the first decade is a 14% reduction under nondeclining flow and 20% under a departure.

Rationale: 36 CFR 219.27 includes these and other requirements. While 36 CFR 219.12(f) may require reasonable alternatives that do not comply with existing laws or policy, this does not permit alternatives inconsistent with NFMA itself or its implementing regulations. Even if it were legal to propose an alternative that violated NFMA, such an alternative would not be considered reasonable.

The results of applying all of these common constraints are limitations on the ability of the Forest to supply goods and services. The constraints have narrowed the decision space from within which alternatives may be selected. In particular, these constraints place a maximum limit on timber volume.

The maximum volume that can be sustained indefinitely under a nondeclining flow constraint is 304 mmbf/year (Benchmark TM). The maximum economically efficient level of harvest volume is 287 mmbf/year. This is Benchmark #7, which will be used as a standard of comparison for alternatives constrained by nondeclining flow. The maximum volume that can be achieved in a departure from nondeclining flow that seeks maximum volume in the first decade is 427 mmbf/year. This is Benchmark #5a, to which departure alternatives will be compared.

No minimum constraints have been placed on the achievement of market value outputs (timber). In alternatives, harvest levels will reflect the competing objectives present. Maximum attainment of other resource benefits in alternatives is therefore bounded as described in the maximum single resource benchmarks. A display of the benchmark decision space is included in Chapter II of the DEIS.

C. DEVELOPMENT OF ALTERNATIVES

1. Overview

Alternative management is proposed which differs in objectives and emphases. These differences are expressed in the FORPLAN model through the use of different combinations of discretionary constraint. These consist almost entirely of management emphasis and access constraints as described in Section III.

This section discusses which constraints were applied in each alternative, and the reasons for doing so. It ties constraints to the identified issues, concerns, and opportunities, and to information developed in the Analysis of the Management Situation. The following table provides an overview of what will be discussed, and permits a quick comparison of alternative formulations. A summary of acres constrained by each management emphasis is included at the end of the discussion of each alternative.

Table B-VII-1 MANAGEMENT EMPHASIS BY ALTERNATIVE
(Alternative NC = Alternative A minus MMRs)

MANAGEMENT EMPHASIS	ALTERNATIVES									
	A	B	C	D	E	F	G	H	I	
1. Nondecline	X					X	X	X	X	
2. MMRs	X	X	X	X	X	X	X	X	X	X
3. Current land use	X				X		X			
4. Unroaded resources										
Priority 1 (none)										
Priority 2				X	X	X	X	X	X	
Priority 3						X		X	X	
Priority 4								X	X	
Priority 5								X	X	
5. Visual resources										
Priority 1	X			X	X	X	X	X	X	
Priority 2				X	X ^{2/}	X	X ^{2/}	X	X	
Priority 3					X ^{2/}	X	X ^{2/}	X		
Priority 4						X		X	X	
Priority 5						X			X	
6. Fish & water resources										
Priority 1 (none)										
Priority 2				X ^{2/}	X	X	X	X	X	
Priority 3						X		X	X	
Priority 4						X			X	
Priority 5									X	

Table B-VII-1 MANAGEMENT EMPHASIS BY ALTERNATIVE (con't)

MANAGEMENT EMPHASIS	ALTERNATIVES								
	A	B	C	D	E	F	G	H	I
7. Wildlife resource									
Priority 1				X	X	X	X	X	X
Priority 3						X		X	X ^{2/}
Priority 4						X			X ^{2/}
Priority 5									X
Priority 6								X ^{2/}	
8. Bull Run Municipal Watershed	X	X		X	X	X	X	X	X
9. Sensitive Earth Flow Area				X	X	X	X	X	X
10. Wild & Scenic Rivers									
Clackamas River				X	X	X	X	X	X
Roaring River	X				X		X		X
Salmon River	X			X	X	X	X	X	X
White River									X
11. Research Natural Areas									
(Existing)									
Bagby	X	X	X	X	X	X	X	X	X
Bull Run	X	X	X	X	X	X	X	X	X
Mill Cr.	X	X	X	X	X	X	X	X	X
(Proposed)									
Big Bend	X				X	X	X	X	X
Bull Run Expansion	X				X	X	X	X	X
Gum Juwac-Tolo					X	X	X	X	X
12. Special Interest Areas ^{1/}									
(Existing)									
Barlow Tollgate	X	X	X	X	X	X	X	X	X
Columbia Gorge Old Wagon Road	X	X	X	X	X	X	X	X	X
Little Crater Lake	X	X	X	X	X	X	X	X	X
Olallie Lake	X			X	X		X		
Oneonta Gorge	X	X	X	X	X	X	X	X	X
(Proposed)									
Bagby Hot Springs	X			X	X		X	X	X
Barlow Road				X	X	X	X	X	X
Clackamas Lake Ranger Station									X

Table B-VII-1 MANAGEMENT EMPHASIS BY ALTERNATIVE (con't)

MANAGEMENT EMPHASIS	A L T E R N A T I V E S								
	A	B	C	D	E	F	G	H	I
12. Special Interest Areas									
Cloud Cap Inn									X
Cloud Cap - Tilly Jane									X
Face of the Columbia Gorge	X			X	X	X	X	X	X
Larch Mtn.				X	X	X	X		X
Little Crater Lake									
Expansion				X	X		X		X
Lost Lake				X	X	X	X		X
Mill Creek Buttes	X								X
Mitchell Flats				X	X		X		X
Olallie Lake Expansion				X	X		X		X
Parkdale Lava Beds				X	X	X	X	X	X
Roaring River	X			X	X		X		X
Squaw Meadows	X				X		X		X
Sugar Pine				X	X		X		X

1/ These areas have been identified as having characteristics that may merit special attention and management under 36 CFR 294. Where an alternative does not manage them as Special Interest Areas, they may still be managed under another emphasis included in this table.

2/ Specific exceptions described in the process records.

Alternative NC (No Change)

This alternative, its purpose, and assumptions are detailed in Chapter II of the DEIS. The differences between this and the other alternatives, most notably Alternative A, are also explained in Chapter II of the DEIS. The following are three aspects of this alternative which set it apart from all of the other alternatives considered in the DEIS:

1. It reflects a tentatively suitable land base which is 106,000 acres greater than the one used for the other alternatives.
2. It does not incorporate MMRs.
3. It reflects analytical techniques and data existent ten years ago when the current Timber Management Plan was constructed.

Alternative A (No Action)

Purpose:

Formulation of land management alternatives requires a thorough understanding of current management direction. This fact was recognized in the National Environmental Policy Act which requires that one of the alternatives considered be that of continuing present management. Alternative A meets the 36 CFR 219.12(f)(7) requirement to propose at least one alternative that will reflect "the most likely amount of goods and services expected to be provided in the future if current management direction continues," which is to be designated the "no action" alternative.

Assumptions:

This alternative represents the accumulation of past attempts to resolve the significant issues on the Mt. Hood. It is a compilation of knowledge gained from considerable resource analysis and public participation. It is not focused on any particular issue, but rather responds to a wide range of location-specific issues.

A standardized approach has been taken by all Forests in the Pacific Northwest Region in the development of this alternative. The following assumptions have been made in descending order of priority:

1. Requirements that are a part of current direction as established in current Multiple Use Plans, Unit Plans, and Timber Resource Plans will be followed. Interim direction, not specifically incorporated as amendments to existing plans, is not reflected in this alternative. Minimum Management Requirements for dispersion of timber harvest activities and maintenance of viable plant and wildlife populations are incorporated in such plans.

2. Current plans have been used to determine land allocation and timber management intensity. Adjustments have been made to reflect updated, improved information on the suitability of land for timber production, as described in Section II. This alternative incorporates the management direction of the following plans:

<u>Planning Unit</u>	<u>Completion Date</u>
The Larch Mtn-Bull Run Mgt Plan	11/71
The Dalles Watershed	12/72
Roaring River/Salmon River	10/74

<u>Planning Unit</u>	<u>Completion Date</u>
Eagle Creek	1/75
Huckleberry	1/76
Mt. Hood	11/77
Badger/Jordan	2/78
Bull Run	1/79
District Multiple Use Plans for areas not covered by unit plans	1970-72
Timber Management Plan	1977

3. The total Forest budget should be no more than the actual average amount expended in fiscal years 1980-1982, and should be in line with the costs of producing the levels of outputs that occurred in those years. Costs are largely a function of the level of timber volume offered for sale. Since Alternative A yields less timber than was sold in 1980-1982, its costs are less than current levels. Costs for other activities have been equated to those of current management.

4. Nondeclining flow will prevail over timber output objectives unless existing plans include an anticipated drop in future decades. Since the Timber Management Plan does not anticipate a declining harvest in future decades, a nondeclining flow constraint has been applied to the entire planning horizon in Alternative A.

5. Output and activity levels projected by existing plans have been met as closely as possible after meeting the above constraints.

6. Since both management emphasis and intensity are controlled by current plans, economic efficiency was a relatively minor consideration in this alternative.

In accordance with suggestions from the Washington Office of the Forest Service, the recreational quality aspect of this alternative does significantly vary from the current situation. This and all of the other alternatives propose the provision of Full Service Management of all recreational services and facilities. Currently, due to a long history of funding limitations, something less than a "Low Standard" of service is generally provided.

Preliminary analysis:

In the analysis of the management situation a benchmark was developed pursuant to 36 CFR 219.12(e)(2), which by definition is the same formulation required of Alternative A. Variations of these constraints were explored in the Analysis of the Management Situation. Knowledge gained by this analysis was used as a basis for developing other alternatives (see Alternatives D, E, and G).

Benchmark analysis had indicated that current timber levels cannot be maintained while meeting other constraints. They are approached as closely as possible in this alternative by maximizing the timber volume that can be obtained. Analysis of the effects of continuing to produce current levels of timber outputs is found in the discussion of alternative D.

Objective Function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

1. Common constraints were applied.
2. Timber harvest flow was required to be nondeclining in accordance with the existing Timber Management Plan.
3. A composite map was compiled from existing plans. The management direction for existing management areas was interpreted in terms of FORPLAN management emphasis and access constraints. Model approximations are shown below.

Table B-VII-2 MANAGEMENT EMPHASIS APPLIED TO PRESENT LAND USES

<u>Present Land Use</u>	<u>Management Emphasis</u>
Watershed	GENFOR, except in Bull Run, which is MINLVL
Key Wetlands	MINLVL
Roaded Recreation	No constraints. Where overlapping with scenic areas it was treated as such.
Developed Recreation	MINLVL
Unroaded Recreation	GENFOR
Scenic	Emphasis matched to the visual quality objective
Special Interest	MINLVL
Wildlife Management	GENFOR
Wilderness	MINLVL
Research Natural Areas	MINLVL

4. The only timber management intensities made available were those presently being practiced. They differ by working group and site conditions as shown below.

Table B-VII-3 CURRENT TIMBER MANAGEMENT INTENSITY CONSTRAINTS

<u>Working Group</u>	<u>Site</u>	<u>Timber Management Regime</u>
Douglas-fir	high	P,PCT,CT
	low	P,PCT
true fir	high	P,PCT
	low	P,PCT
associated species	high	P,PCT,CT
	low	P,PCT
pine/oak	low	P,PCT,CT
P = plant PCT = precommercial thin CT = commercial thin		

5. The Forest budget was required to be less than or equal to that of fiscal years 1980-1982.

Table B-VII-4 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE A

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	385	60
125ROT	60	9
250ROT	64	10
Total chargeable timber	509	79
MINLVL	138	21

Alternative B (RPA)

Purpose:

This alternative emphasizes the national perspective on timber supply and responds to national needs by attempting to meet RPA total timber volume targets for the first five decades. It is designed to meet the requirement of 36 CFR 219.12(f)(6) to provide an alternative that responds to and incorporates the RPA Program tentative resource objectives. It does so by providing a program mix that achieves more objectives than any other alternative.

Assumptions:

RPA targets for timber for the Mt. Hood National Forest in 1980 and 1985 were based on national assessments of demand for timber, and a determination of the contributions by the National Forest System, Pacific Northwest Region and Mt. Hood National Forest needed to meet this demand. The original RPA targets assigned were 376 million board feet per year.

A conversion to cubic feet was also made using a BF:CF ratio of 4.37, which resulted in a cubic foot target of 86.0 MMCF/yr. The ratio has since been revised to 5.07 BF/CF. Using this new relationship the cubic volume needed for comparison of RPA targets to alternatives is 74.2 MMCF/yr. Nonchargeable volume may be counted towards meeting this objective. The RPA planning horizon for which this volume would be needed is 50 years.

To address the timber targets, a constant BF/CF ratio of 5.07 has been assumed for 50 years. Non-chargeable (non-FORPLAN) volume has been estimated and added to the ASQ where necessary to fully achieve the targets. The assumptions underlying the estimates of the volume were discussed in Section III.

Preliminary analysis:

Benchmark #5a, maximum timber under a 10 year departure, was used as the starting point for this alternative. Preliminary analysis indicated that such targets could be met without fully utilizing the entire tentatively suitable timber base of the Forest. When estimated nonchargeable volume is included in Benchmark #7 (nondeclining flow), RPA targets can apparently be exceeded in all decades. Local concerns for domestic water were therefore also accommodated by not permitting chargeable timber harvest in the Bull Run Municipal Watershed.

Objective Function:

Maximize timber volume for 50 years, then maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. FORPLAN timber volume ≥ 54.8 MMCF/yr (278 MMBF) for 50 years. Estimated nonchargeable volume would contribute the additional 98 MMBF/yr. needed to achieve RPA targets.
3. No chargeable timber harvest permitted in the Bull Run Municipal Watershed. This is in conformance with existing agreements with the City of Portland.

Table B-VII-5 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE A

Emphasis	M acres	%
GENFOR	477	74
125ROT	0	0
250ROT	85	13
Total chargeable timber	561	87
MINLVL	86	13

Alternative C

Purpose:

This alternative addresses the planning questions of timber supply and community stability. In particular, it focuses on the concerns expressed by the State of Oregon in its planning documents associated with timber production.

The Mt. Hood targets of the Forestry Program for Oregon proposed timber harvest schedule are included in 1980 Oregon Timber Supply Assessment and are as follows:

Decade	MMCF/YR
1980	113.30 (574 MMBF/yr ¹)
1990	100.65
2000	107.71
2010	105.86
2020	105.36
2030	103.55
2040	101.12
2050	98.59
2060	96.44
2070	95.38 (approximately LRSY)

¹ Calculated at 1CF = 5.07 BF

These projections were based on a land base of 802,854 acres, yield and mortality functions as reported by Beuter, et al. in Timber for Oregon's Tomorrow, and the TREES (Timber Resource Economic Estimation System) computer simulation model.

In addition to the projections above, three general objectives for management of the national forests in Oregon can be identified in the state planning documents previously cited:

Maintain the maximum potential commercial forest land base consistent with other resource uses while assuring environmental quality.

Identify and implement the economically feasible levels of intensive Forest management required to achieve maximum cost effective growth and harvest.

Maintain community stability by remaining flexible for increases in future harvest levels that would offset projected shortages.

Assumptions:

A departure from nondeclining flow is assumed in state projections, and will be necessary for the Mt. Hood to approach such volumes. The period of interest in maintaining high volume has been established as 30 years in this alternative, which corresponds to the critical period for State of Oregon needs in light of projected private timber supplies. This would permit some increase in volume for 30 years when compared to a longer term focus, such as the 50 year objective in Alternative B.

Because of the high timber volume targets and the objective of maintaining the maximum commercial forest land base, the Bull Run Watershed would be managed for chargeable timber harvest in this alternative. The only limitation on this is a need to continue to meet water quality standards for this watershed. Risk of not meeting standards will be minimized by limiting the amount harvested to what is presently perceived to be an acceptable schedule, based on research on the watershed.

Preliminary analysis:

Benchmark analysis has indicated that meeting the quantified targets for 100 years is not possible under any conditions. The State goal for the Mt. Hood for the next 100 years is 102,800 MMCF. The greatest timber volume produced in the next 100 years in any benchmark was 71,300 MMCF (Benchmark #5b). When MMRs and other common constraints are included, the total for 100 years is 60,800 MMCF. The basis for Alternative B was the maximum timber departure benchmark which resulted in this total (Benchmark #5a). Its first decade volume of 84 MMCF/yr. is 74% of the state goal.

Objective Function:

Maximize timber volume for 30 years, then maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. A preliminary run was made to determine what the unconstrained solution would be for the Bull Run Watershed. This unconstrained solution was as follows:

Table B-VII-6 UNCONSTRAINED SOLUTION FOR ALTERNATIVE C

<u>Decade</u>	<u>MMBF/yr.</u>
1	49.0
2	40.0
3	38.5
4	34.0
5-15	21.2

The feasibility of maintaining this schedule was then checked with Columbia Gorge Ranger District specialists on Bull Run water quality. They determined that reduction of the first decade harvests to 40 MMBF/yr would significantly reduce the risk of not complying with Public Law 95-200 (Bull Run water quality law). Accordingly, the alternative was constrained to harvest not more than 40 MMBF/yr during the first decade in the Bull Run Watershed.

Table B-VII-7 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE C

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	516	80
125ROT	0	0
250ROT	92	14
Total chargeable timber	608	94
MINLVL	39	6

A comparison of this alternative to the present Timber Management Plan for the Mt. Hood National Forest will help clarify the difference between the assumptions made in this analysis and that done by the state based on that prior plan. Table VII-2 is found on the next page.

Alternative D

Purpose:

The "no-action" alternative, Alternative A, is not capable of continuing to produce present levels of timber harvest. Current levels may be achieved by relaxing constraints related to current management for other resources, and by relaxing the nondeclining flow constraint. This alternative represents the management that would be necessary to maintain approximately present levels of timber harvest for the next decade, while still providing special treatment for those other resource values that are of the most critical concern.

Assumptions:

This alternative prevents immediate change from the current level of timber supplied by the Mt. Hood National Forest. If necessary to maintain current levels, future reductions in harvest levels would be acceptable if sufficient notification is given in the Forest Plan. Highest possible timber volume in the near future was emphasized by maximizing its level for 10 years.

The objective of "current level of timber supply" has been further defined as follows, based on records of volume sold and cut by the Forest (MMBF/yr.).

Table B-VII-8 CURRENT LEVEL OF TIMBER SUPPLY

<u>Fiscal Year</u>	<u>Volume Sold</u>		<u>Volume Cut</u>	
	<u>chargeable</u>	<u>Total</u>	<u>chargeable</u>	<u>Total</u>
1975	369.2	410.2	290.2	320.9
1976	457.6	482.1	411.4	444.0
1977	350.6	381.1	283.9	311.8
1978	337.0	337.9	258.7	282.0
1979	395.8	397.2	312.0	337.8
1980	390.1	418.1	314.6	349.0
1981	366.0	420.9	256.5	277.8
1982	317.9	371.5	157.2	176.8
1983	310.3	369.6	320.7	358.2
1984	316.6	382.0	334.6	379.2
1980-1984 avg.	340.1	392.4	276.7	308.2
1975-1984 avg.	361.1	397.1	295.4	323.8

See Section VIII of this appendix for a discussion of how well Alternative C comes to meeting the Forestry Program For Oregon.

Yields calculated by FORPLAN for alternatives will represent total programmed sales offered, but the assumption must also be made that all that is offered will be sold within the planned decade. Historic volume sold should therefore be used for comparisons to planned levels. It is difficult to project when timber sold to purchasers will be harvested.

The 10 year average volume sold of 397.1 MMBF/yr. represents periods of both high and low demand for timber. This amount should roughly correspond to expectations of volume that will be available in the next decade. This average includes both chargeable and nonchargeable volume, but to purchasers this distinction is not important. FORPLAN is only used to estimate chargeable volume, so additional unchargeable volume will need to be estimated before making this comparison.

A limited amount of emphasis will be placed on resources other than timber, beyond MMR requirements. Areas have been selected through public involvement and a rigorous interdisciplinary team process. As a result, areas of critical concern will be withdrawn from the chargeable timber base or be managed for other resources in a way that reduces timber yield potential.

Preliminary analysis:

Benchmarks indicated that total current timber volume offered can be exceeded for at least the first decade under a departure from nondeclining flow even if some provisions are made for non-timber resources. This alternative was approached by incrementally adding two sets of constraints to the maximum timber departure benchmark (Benchmark #5a). Management emphasis constraints identified as first priority were applied first. As current timber harvest volume was exceeded for the first decade, a second tier of management constraints (priority 2) was added.

Objective Function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. Areas where no chargeable harvest will be permitted:
 - Bull Run Municipal Watershed
 - Columbia Gorge viewshed and special interest area
 - Timberline Lodge and Barlow Road viewsheds
 - Roaring River unroaded area and adjacent Mitchell Flats
 - Mt. Hood Meadows, Larch Mountain, Bagby, Sugar Pine, Little Crater Lake and Lost Lake special interest areas
 - Olallie Study area (small portion meeting suitability screen)
3. Areas with reduced timber yield:
 - Highway 26 and 35 visual corridors
 - Lost Lake viewshed
 - Selected key site riparian areas
 - Fifteen Mile Creek and S. Fork Mill Creek watersheds
 - Still Creek watershed
 - Sensitive earthflow areas in the Collawash and Clackamas drainages
 - Pine-oak special wildlife habitat
 - Clackamas and Salmon Wild and Scenic River candidates

Table B-VII-9 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE D

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	375	58
125ROT	42	6
250ROT	111	17
Total chargeable timber	528	81
MINLVL	119	12

Alternative E

Purpose:

The requirements of NFMA Regulations to include current direction, current direction modified to conform to NFMA, and current output levels have been met in separate alternatives (A, G, and D respectively). More timber could be produced in the next ten years from Alternative G if timber harvest were allowed to depart from nondeclining flow. Doing so would more closely meet all aspects of current management direction in a single alternative.

Because Alternative E was selected as the preferred alternative, Alternative G provides details regarding the non-declining flow policy relative to the preferred alternative. Except for the harvest flow constraint, the two alternatives have the same FORPLAN formulation. They also differ with respect to environmental effects associated with the rate of harvests, such as the number of unroaded areas roaded during the first decade. For this reason the alternative is not named G.

Assumptions:

This alternative assumes that most of the site specific management issues on the Forest have been resolved by past planning efforts and are reflected in existing plans and the no-action alternative (A). It also seeks to resolve some localized issues identified through more recent public involvement in the forest planning process by changes in management for selected areas. To be legally implementable, it will meet the Minimum Management Requirements of NFMA. An objective of maximizing timber harvest for the first decade will come closest to producing present harvest levels, given the existence of these other constraints.

Preliminary Analysis:

The no-action benchmark/alternative was selected as the starting point for this alternative, in order to include current management direction. During the benchmark analysis, the effects of adding MMRs to the no-action benchmark were examined. Departure analyses were also performed on formulations of the no-action and no-action + MMRs benchmarks, which revealed some opportunities to increase volume in the first decade without later requiring timber harvest to fall below long-term sustained yield capacity.

Alternative G added a few additional site specific constraints, and made the full range of timber management intensities available to the model. Alternative E involved only a change in the objective function from Alternative G.

Objective Function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. All site specific constraints on management in Alternatives A and G have been included. Any constraints based on the first and second priority groupings for non-timber resources that were not part of current direction were also added.

Table B-VII-10 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE E

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	312	48
125ROT	79	12
250ROT	123	19
Total chargeable timber	514	79
MINLVL	133	21

Alternative F

Purpose:

With the proximity of the Portland metropolitan area and its urban population, there is a demand for convenient outdoor recreation opportunities in a natural setting. This alternative responds to the particular social and aesthetic needs of communities in the vicinity of the Forest. It is designed to make the Forest an attractive place to visit. It also emphasizes associated fish and wildlife resources, and domestic water supply. This alternative meets regional direction to consider an alternative that provides for 30% more wildlife habitat than required to meet MMRs.

Assumptions:

Such management should directly benefit Forest users, and may indirectly benefit communities where businesses provide facilities and supplies to these visitors. It is assumed that management of visual resources can be achieved by using timber harvest on a chargeable basis as a tool to maintain desired forest characteristics. There will be timber harvest in all scenic viewsheds unless more restrictions on timber management are required for other reasons. Techniques will include smaller harvest units and longer rotations which will reduce overall timber volume. Harvest in unseen areas will generally be permitted to achieve maximum economically efficient timber management. Recreational use of the Forest's backcountry is not strongly emphasized in this alternative.

Preliminary analysis:

The Mt. Hood National Forest has the capability to provide opportunities for recreation in a natural setting, and the maximum potential to respond to this

need has been evaluated in Benchmark VQ. One way to respond to this issue, as required by 36 CFR 219.12(f)(4), is by providing this maximum potential. To convert this single purpose benchmark into a more reasonable multiple use alternative, constraints have been added to provide management consideration for other amenity resources.

Objective Function:

Maximize PNV for 150 years.

Constraints:

1. All common constraints have been applied.
2. Harvest scheduling will be nondeclining flow. The objectives of this alternative do not require a departure. The opportunity to depart was evaluated as part of Alternative F, described later.
3. All of the first and second priority location specific constraints for nontimber resources are applied to this alternative.
4. All recommended visual quality objectives will be met in this alternative by applying the appropriate management emphasis constraints to all priority areas.
5. Two-thirds of the areas important as fish and wildlife habitat will be managed for these purposes by applying management emphasis constraints to areas with priority 1-4.
6. The highest priority areas (1-3) for unroaded, primitive, or semi-primitive non-motorized recreation will be managed explicitly for this purpose in this alternative by permitting no chargeable harvest in these areas.

Table B-VII-11 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE F

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	114	18
125ROT	220	34
250ROT	154	24
Total chargeable timber	488	75
MINLVL	159	25

Alternative G

Purpose:

From a land allocation standpoint, the purpose of this alternative is the same as that for Alternative E. The two alternatives differ in their rates and, therefore, quantities of harvests during the first fifty years. Alternative G's rate and quantity is less because its purpose is to provide a non-declining flow of timber during this and all other periods.

Assumptions:

This alternative assumes that most of the site specific management issues on the Forest have been resolved by past planning efforts and are reflected in existing plans and the no-action alternative (A). It also seeks to resolve similar localized issues identified through public involvement in the Forest planning process by changes in management for selected areas.

Alternative G was formulated by adding minimum management requirements and allowing flexibility in timber management intensity. Economic efficiency was the objective function expressed in this alternative, rather than timber volume maximization. This is more consistent with the prevailing emphasis expressed in NFMA.

Preliminary analysis:

Benchmark analysis identified the effects of changing current management direction in order to comply with the law regarding Minimum Management Requirements. Significant changes in management occur on 65,000 acres, and timber volume is reduced 12%. It also compared the effects of managing timber under current intensities to those based upon maximum economic efficiency. This permits an increase of about 30 MMBF/yr. A benchmark formulated with these two changes from the no-action alternative was the basis for Alternative G. Other constraints added are included in the discussion below.

Objective function:

Maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. Harvest scheduling will be in accordance with nondeclining flow, which is consistent with the current Timber Management Plan.
3. Constraints based on current management plans used in Alternative A were applied to this alternative.
4. Management of the following areas was constrained by management emphasis in order to address issues that have arisen since the completion of existing plans. These are part of the first priority resource groups that were not included in existing plans.

Portions of the Columbia Gorge and Timberline viewsheds
Pine/oak special wildlife habitat
Sensitive earth flow areas
Clackamas and Salmon Wild and Scenic River candidates
Proposed Special Interest Areas: Face of the Columbia Gorge,
Barlow Road, and Parkdale Lava Beds

Table B-VII-12 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE G

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	310	48
125ROT	85	13
250ROT	131	20
Total chargeable timber	526	81
MINLVL	121	19

Alternative H

Purpose:

The public perception of the need for undeveloped areas has manifested itself as an interest in preserving existing unroaded areas, and it may also underlie part of the concern for preserving old growth forest stands in partly developed areas. Because both issues result in a need to preserve existing undeveloped areas, these objectives have been combined in this alternative.

Assumptions:

This alternative recognizes the existence of substantial values in those portions of the Forest remaining in a natural condition. Such areas include wilderness and unroaded areas large enough to provide opportunities for unroaded, primitive, or semi-primitive non-motorized recreation, and also smaller undisturbed stands of old growth timber. The primary premise of this alternative is that no further development of such undeveloped areas can be allowed.

A moderate level of concern for the visual quality of the Forest is also reflected in this alternative. Wildlife and fisheries management outside of the undeveloped areas in this alternative will not be emphasized. In this alternative, timber management will continue only where it has occurred in the past.

Preliminary analysis:

Benchmark analysis has demonstrated that the Mt. Hood National Forest will not be able to meet estimated demand for primitive and semi-primitive non-motorized recreation opportunities. Benchmark RD has come closest to meeting this objective, and has been used as a starting point for this alternative. That portion of Benchmark AM dealing with old growth has also been incorporated.

Objective function:

Maximize PNV for 150 years.

Constraints:

1. All common constraints have been applied.
2. Harvest scheduling will be nondeclining flow. The objectives of this alternative do not require a departure, and opportunities to depart without harvesting old growth are not likely to exist.

3. All of the first and second priority location specific management emphasis constraints for all non-timber resources are applied in this alternative.

4. Inventoried roadless areas, and other partially developed areas needed to protect adjacent primitive or semi-primitive non-motorized recreation opportunities will be withdrawn from future chargeable timber harvest. These include all five priority groups for unroaded areas and these recreation opportunities. These constraints provide the maximum amount of such opportunities without disinvestment in existing facilities.

5. All existing old growth timber may be managed only under an emphasis that does not permit chargeable timber harvest. This represents the inclusion of all six wildlife priorities in this alternative.

6. Management emphasis constraints will also be added to meet the visual quality objectives for the top three priority groups of seen areas on the Forest. Travel to and from the protected areas will be made more pleasurable by modifying timber management along roads and near heavy use areas.

Table B-VII-13 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE H

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	130	20
25OROT	76	12
125ROT	73	11
Total chargeable timber	279	43
MINLVL	368	57

Alternative I

Purpose:

Several issues have been identified that relate to maintenance and or enhancement of wildlife and fish habitat. This alternative was formulated primarily to address them.

Assumptions:

Because management of habitat for most fish and wildlife species is generally very compatible, an alternative was developed which jointly emphasizes these resources. With the present level of development of the Forest, fish and wildlife benefits will primarily be achieved by preserving and managing old growth forest and riparian habitat in amounts greater than required to meet MMRs. Investment programs will also be used to improve habitat for these species.

This alternative does not attempt to improve forage for browsing species such as deer and elk by timber harvest. It is being assumed that the forage needs of species dependent on early successional vegetation will be met by continued timber harvest on unrestricted suitable acres and by specifically designed habitat improvements, which may include unchargeable harvest of timber. These animals should benefit overall from the increased quantity of cover and from its improved distribution.

Preliminary analysis:

Benchmarks WL and FW explored the opportunities to maximize wildlife and fish benefits respectively. One way to respond to these issues, as required by 36 CFR 219.12(f)(4), is by providing the maximum potential. These benchmarks were initially combined.

It had been observed in Benchmark AM that preserving old growth and deferring timber management activities Forest-wide to protect all watersheds on the Forest at the same time made almost all merchantable timber unavailable for timber harvest in the first few decades. Because of the extreme impact on timber volume, and the fact that old growth is specifically addressed in Alternative H, a different approach was taken in this alternative. Areas of existing and potentially suitable old growth and mature timber were selected and distributed in a manner similar to that managed for MMRs. This land will provide 60% more habitat for management for spotted owls, pine martens, and pileated woodpeckers.

It was found that after meeting all fish, water, and wildlife objectives, the remaining visual quality and unroaded recreation needs could also be satisfied with very little additional impact on commodity production. This alternative attempts to meet all of the visual quality objectives of Alternative F, and all of the unroaded recreation objectives of Alternative H. Some old growth may still be harvested, however, in this alternative.

Objective function:

Maximize PNV for 150 years.

Constraints:

1. All common constraints are applied.
2. Harvest scheduling will be nondeclining flow. The objectives of this alternative do not require a departure, and opportunities to do so are likely to be small.
3. All of the first and second priority location specific constraints are applied in this alternative.
4. Management emphases on providing old growth and mature forest for wildlife will occur on 60% more area than is required to meet MMRs. There will be no chargeable timber harvest in the pine/oak habitat type. This incorporated the top five priorities for wildlife resources.
5. All identified riparian resources will be managed under a riparian management emphasis by including all five priorities.
6. Preservation of all unroaded areas and associated recreation opportunities will be achieved in this alternative, by including all priorities.
8. Visual quality will generally be a by-product of management for other resources. However, constraints have been applied to insure that all seen areas do meet their recommended visual quality objective.

Table B-VII-14 SUMMARY OF MANAGEMENT EMPHASIS CONSTRAINTS
ON TENTATIVELY SUITABLE ACRES FOR ALTERNATIVE I

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	87	13
125ROT	182	28
250ROT	157	24
Total chargeable timber	262	40
MINLVL	385	60

Alternatives Considered, but Eliminated from Detailed Study

The following alternatives were proposed, but were eliminated from consideration after initial analysis showed that they could not reasonably be implemented or that their objectives had been adequately addressed in another alternative. Unlike the alternatives already described, the analysis performed on these alternatives did not include a complete interdisciplinary review and estimation of outputs and effects. Some alternatives were eliminated from detailed study without FORPLAN analysis.

All of the alternatives eliminated are described in the discussion below, and the specific reasons for rejecting each as an alternative are included. Where comparisons of timber harvest volume are made between alternatives, only the chargeable harvest volume has been described. Section VIII of this Appendix does not address these alternatives further.

Alternative F-departure:

Purpose:

This alternative attempts to emphasize the management of nonmarket objectives on significant portions of the Forest, while at the same time increasing the intensity of timber management on the remaining areas. The nonmarket objectives include meeting the demand for maintaining roadless areas in their present condition, and as well as providing visual quality and providing other nonmarket benefits.

Assumptions:

The timber objective of this alternative is the achievement of the same first decade harvest volume as that in the Maximum Economic Efficiency Benchmark (#7), in accordance with Region 6 planning direction. Alternative F-departure differs from Alternative F in its emphasis on timber management, to be achieved primarily by permitting a departure from nondeclining flow.

The objectives of Alternative F-departure are the same as Alternative F for resources other than timber. They include managing the most important of the remaining unroaded areas as roadless. These areas were selected through an interdisciplinary team approach which considered public interest in the areas, and they comprise 80% of the inventoried, unroaded acres. Alternative F-departure would meet all visual quality objectives, and most fish and wildlife resource objectives.

Preliminary analysis:

Benchmark analyses determined that there is little opportunity to recoup timber management opportunities when large provisions are made for nonmarket resource management. This would be the case if either of the alternatives that managed 100% of the unroaded areas as roadless (Alternative H or I) were used in this analysis. This analysis was therefore performed on Alternative F.

Objective Function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

Same as those applied to Alternative F, except that the nondeclining flow constraint was removed.

Table B-VII-15 SUMMARY OF MANAGEMENT EMPHASIS ACRES IN BENCHMARK F-departure

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	114	18
125ROT	220	34
250ROT	154	24
Total chargeable timber	488	75
MINLVL	159	25

Reasons for eliminating from detailed study:

First decade timber volume in this alternative would be 191 MMBF/yr. (37.8 MMCF/Yr.). This is 25 MMBF/yr. (15%) more than in Alternative F. The volume is still significantly less than the 287 MMBF/yr. (56.6 MMCF/Yr.) achieved in the Benchmark #7. Because the timber objective cannot be achieved simultaneously with the objective of a high level of nonmarket outputs, this alternative has not been developed further. An objective of offsetting the effects of reduced commodity production in some areas by managing other areas more intensively is represented by Alternative E.

Alternative J:

Purpose:

This alternative would maximize benefits derived from nonmarket resources. All uncertainty regarding the effects of timber management on these resources would be resolved by prohibiting chargeable timber harvest. As a result it would manage certain resources differently than in any other alternative.

Assumptions:

This alternative would be most similar to Alternative I in its joint emphasis on high production of nonmarket benefits. In addition, all old growth would be preserved as in Alternative H. It would also impose restrictions on development that exceed those present in any other alternative. No provisions have been made for wildlife that requires early successional stages of vegetation.

The viewsheds seen from the Mt. Hood Loop (Highways 26 and 35 and I-84), the Lower Clackamas River, and Lost Lake would have no chargeable timber harvest. Neither would any of the 39 special emphasis watersheds. Timber harvest in these areas would be allowed only to maintain or improve scenic views or water quality. Portions of the Forest available for chargeable timber harvest would be managed with restrictions on rate of harvest in order to reduce the risk of damage to water resources not in the selected watersheds.

Preliminary analysis:

The Maximum Nonmarket Opportunities Benchmark (AM), was considered as an alternative without further changes.

Objective function:

Maximize PNV for 150 years.

Constraints:

Same as Benchmark AM.

Table B-VII-16 SUMMARY OF MANAGEMENT EMPHASIS ACRES IN BENCHMARK AM

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	0	0
125ROT	72	11
250ROT	18	3
Total chargeable timber	90	14
MINLVL	557	86

Reasons for eliminating from detailed study:

This alternative was eliminated from further study because it could not reasonably be implementable and because its objectives are sufficiently addressed in other alternatives. The impact on market values, as indicated by timber volume, is a first decade chargeable harvest of 8 MMBF/yr (1.5 MMCF) and a long-term sustained yield capacity of 6.5 MMCF/yr. achieved in 140 years. The socioeconomic impacts of essentially eliminating the timber program on the Mt. Hood National Forest would be extreme. There would be an estimated loss of 6,000 total jobs in the four-county region in the next decade under this alternative, many of these being in small communities dependent on the forest products industry.

Alternative I provides equally well for most of the issues that this alternative would address. The old growth issue is addressed more completely in Alternative H and the unroaded area issue nearly as well. According to the respective resource specialists on the ID Team, the unroaded area, visual and watershed objectives in Alternative J exceed what are necessary to address these issues.

Alternative K-departure:

Purpose:

This alternative would provide the greatest timber benefits possible for the short run. It would also attempt to meet Forestry Program for Oregon objectives.

Assumptions:

All tentatively suitable land would be available for unrestricted timber management. Highest possible volume obtainable would be harvested in the first decade. The limit of 25% to changes of harvest volume between decades would provide some degree of predictability to timber based economies. There would be no minimum volume required in any decade, and volume could be harvested in some decades at levels below the long-term sustained yield capacity. All management of other resources would be subordinate to the production of timber. There would be no assurance that minimum management requirements would be met.

Preliminary analysis:

This was a benchmark that was used in exploring the potential decision space for timber management (Benchmark #5c). It was the only FORPLAN run that achieved any of the timber volume objectives of the Forestry Program for Oregon.

Objective function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

All common constraints were applied, except those that ensure that Minimum Management Requirements will be met.

Table B-VII-15 SUMMARY OF MANAGEMENT EMPHASIS ACRES IN BENCHMARK K-departure

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	647	100
125ROT	0	0
250ROT	0	0
Total chargeable timber	647	100
MINLVL	0	0

Reasons for eliminating from detailed study:

First decade chargeable volume would be 765.9 MMBF/yr. (150.9 MMCF). Harvest levels would fall below long-term sustained yield capacity in the fifth through twelfth decades, reaching a minimum of 24.6 MMCF/yr. in the eighth decade. Forestry Program for Oregon goals would be met for only the first twenty years, though further adjustments in the timber schedule could have been made which probably would have achieved target volumes for a slightly longer period of time (especially if unchargeable volume were taken into account).

The failure to meet Minimum Management Requirements would render this alternative impossible to implement under the current laws and regulations. This alternative would probably not meet State objectives for assuring environmental quality. The immediate socioeconomic effects on the local tourism industry would probably be considerable, as would be the socioeconomic effects on timber-dependent communities of declining volume in later decades. In addition, the needs that this alternative is designed to address are substantially satisfied by Alternative C.

Alternative L-departure:

Purpose:

This alternative was prepared in order to produce the highest possible timber volume in the first decade, while accommodating the needs of selected nonmarket resources in addition to those related to Minimum Management Requirements.

Assumptions:

The resource priorities described earlier were developed using an interdisciplinary process. This alternative included only those lands with the highest priority for management for resources other than timber. At the same time, this alternative would provide the maximum possible timber harvest for the first ten years, given the opportunity to depart from nondeclining flow.

Preliminary analysis:

The maximum timber departure benchmark (#5a) was the starting point for the development of this alternative.

Objective function:

Maximize timber volume for 10 years, then maximize PNV for 150 years.

Constraints:

1. All common constraints were applied.
2. Areas where no chargeable harvest will be permitted:
 - Bull Run Municipal Watershed
 - Columbia Gorge viewshed and special interest area
 - Mt. Hood Meadows, Larch Mountain, Bagby, Sugar Pine, Little Crater Lake and Lost Lake special interest areas
 - Olallie Study area (small portion meeting suitability screen)
3. Areas with reduced timber yield:
 - Timberline Lodge viewshed
 - Selected key site riparian areas
 - Sensitive earthflow areas in the Collawash, Clackamas drainages
 - Pine/oak special wildlife habitat
 - Clackamas and Salmon Wild and Scenic River candidates

Table B-VII-17 SUMMARY OF MANAGEMENT EMPHASIS ACRES IN BENCHMARK L-departure

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	436	67
125ROT	7	1
250ROT	105	16
Total chargeable timber	542	84
MINLVL	105	16

Reasons for eliminating from detailed study:

All nonmarket objectives in L-departure have been met in D-departure as well as the second priority objectives for resources other than timber. Initial analysis of alternative L-departure indicated that it could provide a first decade allowable sale quantity of 308 MMBF/yr. (60.7 MMCF/yr.), and a long-term sustained yield capacity of 47.9 MMCF/yr. This was compared to Alternative D, which was fully developed and yielded 287 MMBF/yr. (56.6 MMCF/yr.) in the first decade and 45.6 MMCF/yr. long-term sustained yield capacity. The roughly 5% difference in timber volume was not considered sufficient to justify further development of both of these alternatives.

Alternative M:

Purpose:

The Pacific Northwest Region Regional Guide requires that an alternative be considered that exceeds Minimum Management Requirements by 30%. This alternative exceeds this requirement, by providing for 60% more of such habitat. It broadens the range of alternatives considered for wildlife management.

Assumptions:

This alternative would provide the best response to the issues and concerns related to fish and wildlife. In all aspects related to fish, water, and wildlife resources, this alternative is the same as Alternative I.

It does not seek maximum benefits from other resources, however, as does Alternative I. Alternative M was designed to improve the range of alternatives considered for unroaded recreation and visual quality by providing intermediate levels of emphasis for these resources. This alternative would manage approximately 75% of the remaining non-wilderness roadless areas in an unroaded condition and would preserve the scenic quality of the highest priority viewsheds.

Preliminary analysis:

Alternative M was based on Maximum Wildlife and the Maximum Fish and Water benchmarks (WL and FW).

Objective Function:

Maximize PNV for 150 years.

Constraints:

1. All common constraints are applied.
2. Harvest scheduling will be nondeclining flow.
3. All of the first priority location specific management emphasis constraints will be applied in this alternative.
4. Management emphasis on providing old growth and mature forest for wildlife will occur on 60% more area than is required to meet MMRs. There will be no chargeable timber harvest in the pine/oak habitat type.
5. All identified riparian resources will be managed under a riparian management emphasis.
6. Preservation of all but the lowest priority unroaded areas and associated recreation opportunities will be achieved in this alternative. Priorities 1-4 are included.
7. Inventoried visual quality objectives will be obtained on the three highest priority viewshed groups.

Table B-VII-18 SUMMARY OF MANAGEMENT EMPHASIS ACRES IN BENCHMARK M

<u>Emphasis</u>	<u>M acres</u>	<u>%</u>
GENFOR	130	20
125ROT	153	24
250ROT	146	23
Total chargeable timber	429	67
MINLVL	218	33

Reasons for elimination from detailed study:

Chargeable timber volume in this alternative would be 144 MMBF/yr. (28.5 MMCF/yr.) in the first decade, and 34.9 MMCF/yr., long-term sustained yield capacity. This yield would be from an area of 428,000 acres managed for timber. These results are very similar to that of Alternative I. Alternative I eliminates timber management on 2,000 more acres, and reduces levels of timber management on 43,000 additional acres. Timber volume between the two alternatives differs by less than 5%.

All of the nonmarket objectives in Alternative M have been met in Alternative I. Additional ones have also been provided with little effect on market benefits. For this reason, Alternative M does not constitute a significantly different proposal and has not been developed further as an alternative.

Alternative N:

Purpose:

There is a concern that national forests be managed to produce timber only where the economic benefits of doing so exceed the costs. Economic efficiency of timber production on a forest-wide basis results from maximizing PNV in FORPLAN in all other alternatives. Alternative N would consider the economic efficiency of timber management on a per-acre basis.

Assumptions:

Land could only be managed for timber on a given acre when the benefits of management would exceed its costs. Since there is no backlog remaining of areas requiring reforestation, there are no areas on the Forest where per-acre value is based on the costs and benefits of managing a timber stand beginning with stocking and continuing through final harvest. The present net values of all existing stands have been calculated at the present intermediate point in their life cycles. The value of the standing timber has thus been included.

Preliminary analysis:

FORPLAN was used to maximize the PNV of individual analysis areas. It identified 7,000 acres which will produce a negative present net value when managed for timber. They support immature timber stands growing on poor sites with high development costs. If they were average sites, they would contribute approximately 3.7 MMBF/yr. (0.7 MMCF) in the first decade. This is an estimate based on relationships in Benchmark #7. FORPLAN was not used to optimize management in this alternative.

Reasons for elimination from detailed study:

An alternative that incorporated this objective would be unique only in the management of these 7,000 acres. It would not significantly differ from other alternatives in timber volume produced, and overall PNV would be slightly reduced. This alternative has therefore not been developed further.

Alternative 0:

Purpose:

Two approaches to further increasing primitive and semi-primitive non-motorized dispersed recreation opportunities have been considered. One is to manage for recreational benefits in the Bull Run Municipal Watershed. The other is return developed portions of the Forest to their natural primitive character.

Assumptions:

The Analysis of the Management Situation concluded that recreational use of the Forest is expected to increase. The probability of a shortage of primitive and semi-primitive non-motorized dispersed recreational opportunities is particularly apparent. The Regional Guide requires the Mt. Hood to evaluate the ability of the Forest to provide such opportunities in amounts equal to 12 to 16 percent of the total recreation provided by the Forest.

This issue has been addressed to varying degrees in other alternatives, particularly H and I which emphasize management for dispersed recreation. However, these alternatives do not meet this projected demand for such opportunities.

Preliminary analysis:

The Bull Run Watershed could offer recreation experiences if the area were available for public use. Managing the Bull Run for recreation would result in increases of 61,000 dispersed unroaded, 350,000 dispersed roaded, and 34,000 developed RVDs per year for the first decade. The present net value of these benefits over the 150 year planning horizon would be about eight million dollars. The costs of building and operating a water treatment plant to guarantee potable drinking water to the City of Portland are included. With a treatment plant, timber harvest in the Watershed could be either chargeable or unchargeable. FORPLAN was not used in this analysis.

Disinvestment would be required on about 143,000 acres to create semi-primitive non-motorized recreational opportunities in developed areas on the Forest. This would include the elimination of about 570 miles of road at a cost of \$6.3 million. Although the estimated net benefits of the recreation would increase by \$13.4 million because the higher value per day of this kind of recreation, the total capacity of the Forest to support recreation use would decrease by over 100,000 RVDs per year. With the loss in timber benefits, the net increase in present net value would be about \$0.2 million.

Reasons for eliminating from further study:

To implement the first part of this alternative would constitute a violation of

existing agreements with the City of Portland for management of the Watershed. For this reason, opening the Bull Run for recreation is not being proposed as part of any Forest management alternative. Disinvestment appears to offer limited benefits in face of uncertain projections and estimated values, and was also not considered further. Alternatives H and I do take the approach of "freezing" levels of development in some areas with past capital improvements in order to maintain primitive and semi-primitive non-motorized recreation opportunities in adjacent areas.

Alternative P:

Purpose:

This alternative was designed by a citizen interest group. Its purpose was the preservation of a system of large, undeveloped areas, linked by a network of corridors of old growth timber stands. Other areas would be managed for timber.

Assumptions:

The following description is taken from the introduction to this proposal. The plan:

is designed to provide for the multiple uses of water, timber, wildlife, recreation, and if demand arises, grazing. Objectives of the Plan are to maintain and improve water quality, maintain and enhance fisheries, maximize diversity of plant and animal communities and gene pools, maintain wildlife populations, maintain recreation resources, provide for a large sustained-yield timber harvest in different log sizes, and promote economic efficiency. These objectives would be achieved through designation of three major forest components: general forest lands comprising about 51% of the forest; old growth lands made up of 23% of the forest; and wilderness composed of 26% of the forest. The old growth component would be arranged in corridors one-eighth to two-miles-wide (depending upon topography), along river valleys or ridgetops. Old growth corridors would form a web of old growth throughout the forest and serve as connections between wilderness areas.

Preliminary analysis:

The Oregon Wilderness Act was passed in 1984, which resulted in 65% of the area proposed for wilderness in this alternative being managed as wilderness. This law also concluded that the suitability of remaining unroaded areas for wilderness had been adequately reviewed, and that it need not be reconsidered in analysis for this Forest Plan.

The implementation of The National Forest Management Act has reduced the amount of the Forest that is suitable for timber management, and defined the minimum habitat requirements of wildlife species dependent on old growth forest stands. These changes bear upon the amount of land to be managed for general forest and old growth respectively.

Reasons for elimination from detailed study:

Because of these significant changes in the issues central to this alternative after its inception, it was not analyzed by FORPLAN or developed further. It is also likely that the concerns addressed in this alternative have been adequately resolved in alternatives that were fully developed. Alternative H retains all presently unroaded resources and old growth. Alternative F appears to be most similar to Alternative P in the distribution of management activities across the Forest.

D. SUMMARY OF FORPLAN RUNS

Following is a listing of the identification codes assigned to each of the FORPLAN runs made on the alternatives. I.D. Team members based their analysis work and development of alternatives on these FORPLAN runs for a given Alternative.

Table B-VII-19 FORPLAN RUN IDENTIFIERS CORRESPONDING TO ALTERNATIVES

<u>Alternative</u>	<u>RUN-ID</u>
A	47ROLL
B	B5OYRS
C	C3OYRS
D	DRRPNV
E	GRRPNV
F	ALTERF
G	GNUNDY
H	ALTHHH
I	ALTERI
F-departure	FDPART
J	16AMEN
K-departure	21RMTH
L-departure	MIRDPT
M	ALTERG
N	N/A
O	N/A
P	N/A

VIII. ESTIMATING EFFECTS OF BENCHMARKS, DISCRETIONARY CONSTRAINTS, AND ALTERNATIVES

A. Introduction

This section provides a comparative analysis of alternatives as the basis for evaluating alternatives and selecting a proposed action, planning steps 7 and 8. Present net value analysis is also described for major benchmarks.

The effects of discretionary constraints are summarized for each alternative. This discussion highlights the changes in present net value, discounted costs, and discounted benefits associated with these constraints, as well as nonpriced effects on net public benefit.

B. Process for Evaluating Significant Constraints

Management objectives of benchmarks and alternatives were modeled in FORPLAN by applying the assumptions and constraints listed in Sections VI and VII of this appendix. Opportunity costs of constraints were determined by comparing FORPLAN runs with a constraint and without it. Most discussion of opportunity costs focuses on changes in present net value. Changes in other outputs and effects (i.e., timber volume or old-growth habitat) can also be considered.

Legal and policy constraints and economic assumptions are analyzed in Section VI of this Appendix. Opportunity costs of constraints associated with meeting resource objectives are analyzed in Section VII under each alternative.

C. Major Trade-offs Among Alternatives

This section summarizes the relationships among economic values, community effects, and the differing responses among alternatives to selected issues, concerns, and opportunities (ICOs). The purpose is to highlight major economic and noneconomic trade-offs, or differences between alternatives, that can be quantified as indicators of response to ICOs among alternatives. However, a complete understanding of differences among alternatives requires reading Chapters II and IV of the DEIS. Appendix A discusses the ICOs in greater detail.

1. Economic Values and Responses to Major Issues, Concerns, and Resource Use and Development Opportunities

The major reason that alternatives differ is that each responds to the issues, concerns, and resource use and development opportunities (ICOs) identified for this Forest in different ways.

In addition, the nation as a whole has an interest in ensuring that the Forest is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced. Indicators of national interest include:

- Present net value (PNV)
- First and fifth decade net receipts (cash flows)
- First and fifth decade noncash benefits

PNVs, cashflows, noncash benefits, and discounted benefits and costs by resource group (timber, recreation, range, and engineering) are also presented in Chapter II of the DEIS and not repeated here.

The Washington Office of the USDA, Forest Service has devised a checklist of items which are to be addressed in the DEIS and/or this Appendix. In terms of that checklist, the following items are noted as having already been presented in Chapter II of the DEIS:

1. Defines the consequences of each alternative with respect to:
 - responses to each major ICO or groups (Public Issues) of ICOs
 - resource outputs
 - environmental consequences (Chapter IV of the DEIS)
 - social effects including civil rights (Chapter IV of the DEIS)
 - economic effects
2. Lists alternatives in order of increasing discounted costs and in order of decreasing PNV. The cost above the next lower cost alternative must be displayed along with the associated change in total discounted benefits and change in PNV.
3. Displays benchmarks and explains reasons for PNV change (in addition to Chapter II of the DEIS, see Section VII of this Appendix).
4. The following is determined and displayed for each benchmark and alternative (again, see also Section VII of this Appendix):
 - PNV
 - total discounted costs
 - total discounted benefits
 - the contribution to total discounted benefits of each priced output
 - the distribution of discounted costs by major input cost categories
 - the specific reasons accounting for significant differences in the PNV assigned value benchmark and the alternatives

5. Compares each alternative and displays:
 - difference in total discounted benefits
 - reasons for differences in discounted costs
 - differences in the achievement of goals and objectives, or nonpriced benefits, not fully reflected in PNV
6. Discusses the factors primarily responsible for differences in the resolution of the ICOs:
 - lists and describes each effect estimated
 - references the appropriate tables and graphs for each effect

D. Analysis of Constraints Within Alternatives

1. Introduction

Section VII-B of this Appendix addresses constraints common to all alternatives. Appendix G addresses the sensitivity of the individual alternatives' ASQs to changes in individual and collective allocations to the following MMR management areas: Riparian (key site and general), Pileated Woodpecker, and Pine Marten. This accounts for all of the wildlife MMRs except for the Spotted Owl MMR, which is the subject of a Regional SEIS. The effect of the preferred alternative, as it now appears in the draft Regional SEIS, is the subject of Appendix F.

Section VII-C of this Appendix addressed the development of alternatives. Table 6-A of that section listed "packages" of constraints, based on resource priorities, which varied by alternative and were modeled in FORPLAN. Nondeclining yields (NDY) was the only other modeled constraint which varied by alternative.

Part 2. of this section will address constraints which were not modeled.

Part 3. will discuss the effects of each of the constraints which varied within the Alternatives considered.

2. Constraints Imposed Outside the Model

a. Scheduling of Harvests Within Unroaded Areas

Within the model, unroaded areas were identified for potential harvesting in accordance with Table 6-A (Section VII-C of this Appendix). FORPLAN indicated a harvest report which usually called for "nibbling" at each of the available roadless areas during the first decade (usually less than the full amount of each area was entered during the first decade). This result followed from the fact that the spatial juxtaposition of suitable and unsuitable areas could not be adequately modeled, thus FORPLAN lacked the knowledge that some acres within a given unroaded area were more easily accessible than others.

Next, the total of all of the acres and volume harvested during the first decade in all of the available unroaded areas was noted from the applicable FORPLAN report. Given the inadequacy of the model to reflect spatial relationships, it was then decided by the Forest Management Team representatives that it was easier from a management standpoint to harvest the same amount by entering whole areas at a time. By completely harvesting some areas, harvests in other areas (which the model reported as being partially harvested during the first decade) were deferred until later decades.

Finally, the Management Team representatives decided that available roadless areas should be harvested in the following order during the first decade (until the total FORPLAN unroaded quantities are met):

First to be harvested, if available, is the Badger unroaded area. Next, Salmon/Huckleberry. Then (in order) Mount Hood Additions, Bull of the Woods, Twin Lakes, Wind Creek, Olallie, Roaring River, Larch Mt., and (last to be harvested during the first decade) Eagle.

Given these priorities and given the total amount of first decade harvests in unroaded areas reported in FORPLAN, the roading schedule shown in the following table resulted. (See Appendix C for details.)

Table B-VIII-2 DISPOSITION OF UNROADED AREAS

UNROADED AREA	A L T E R N A T I V E									
	C	B	D	E	G	A	F	I	H	
Eagle.....	A15	A15	N	N	N	N	N	N	N	N
Larch Mountain...(Half).....	W15	W15	W15	W15	A15	N	A15	N	N	N
...(Other Half).....	W15	W15	N	N	N	N	N	N	N	N
Roaring River.....	W15	W15	N	N	N	N	N	N	N	N
Olallie.....	W15	W15	N	N	N	N	W15	N	N	N
Wind Creek.....(Half).....	W15	W15	W15	W15	A15	A15	A15	N	N	N
...(Other Half).....	W15	W15	W15	N	N	A15	A15	N	N	N
Twin Lakes.....	W15	W15	W15	W15	A15	A15	W15	N	N	N
Bull of the Woods.....	W15	W15	W15	W15	W15	A15	N	N	N	N
Mt. Hood Additions.....	W15	W15	W15	W15	W15	W15	W15	N	N	N
Salmon/Huckleberry.....	W15	W15	W15	W15	W15	W15	W15	N	N	N
Badger/Jordan.....	W15	W15	W15	W15	W15	W15	W15	N	N	N
Total "W15" areas.....	9	9	6.5	6.0	4.0	3.0	5.0	0	0	
Total "A15" areas.....	1	1	0	0	2.0	3.0	1.5	0	0	
Total "N" areas.....	0	0	3.5	4.0	4.0	4.0	3.5	10	10	

Key: W15 = Roaded within 15 years
 A15 = Roaded after 15 years
 N = No roading planned

The "A15" designation indicates instances where roading is deferred for 15 years. If this roading is done to facilitate harvesting, then it would seem that by immediately harvesting, and not waiting 15 years, these areas would increase ASQ. However, for the following reasons, this is not the case.

DEPARTURE ALTERNATIVES (Alternatives B, C, D, and E)

There is only one "W15" area involved, and this only pertains to Alternatives B and C. Passage of legislation regarding the Columbia River Gorge National Scenic Area, which largely encompasses the Eagle unroaded area, can be interpreted as emphasizing the unroaded characteristics of this single area.

NONDEPARTURE ALTERNATIVES (Alternatives A, F, G, H, and I)

Harvesting this extra volume in the first decade would necessitate a departure in a subsequent decade. This would not be in keeping with the nondeparture emphasis of the alternative. A "swap" could be made (harvest the areas but leave an equivalent amount of volume outside these areas standing which would otherwise be cut), but this would not increase the ASQ.

IN EITHER CASE: A swap would be costly in terms of net revenues. The economics of getting "X" volume from "Y" unroaded areas are not as good as getting "X" volume from areas which are already roaded.

The result of this process is that the harvests in the AGGREGATION of unroaded areas is the same as reported in FORPLAN, but the schedule of entering the individual areas is changed to that shown in Table VIII-2.

b. Investments in Recreational Facilities

As also documented in the DEIS, the quality of the types of recreational opportunities provided is an issue: currently most recreational facilities (including trails) are substandard. The opportunity exists to upgrade these facilities to levels defined by the Forest Service as "Standard" or "High Standard." It has been determined that investments in these upgrades have a greater positive effect on marginal PNV than do any other types of investments the forest might make. This is because of the large perceived difference in the value of a substandard experience and a high standard experience.

Since FORPLAN was not used to apply budget constraints to any of the alternatives considered, FORPLAN solutions regarding other types of management areas would not have been sensitive to management decisions regarding investments in recreation. For this reason, such decisions were made by the Management Team representatives without use of the model. However, the representatives were fully aware of the economic, political, and other pertinent aspects of these decisions. These aspects are addressed in the DEIS.

3. Constraint Analysis

a. In Terms Of PNVs

This section addresses the effects of the constraints in terms of total (timber plus recreation plus other components) PNVs. The following section will address effects in terms of timber (MMBF and PNV) only. MMBF and total PNV effects are not always correlated because constraints related to recreational investments do not affect timber yields. In fact, it will be demonstrated that these investment decisions can cause the total PNV of relatively low harvest alternatives (such as Alternatives F, G, and I) to be higher than that of alternatives (such as Alternatives D and E) which harvest more.

Table VIII-3 is a judgmental listing of the constraints which had the greatest impact on PNVs. Reference is made to the six public issues (see the introduction to Section VIII for a listing of these questions and a discussion of how well the alternatives respond to these questions). The alternatives have been listed in PNV order, with Alternative C having the highest PNV and Alternative A having the lowest. In order to help explain the relationship of the constraints to the PNV, the constraints have been listed in the order that they are PERCEIVED to affect PNV. Due to the overlapping nature of constraints when they are packaged to form an alternative, this ordering of constraints is subject to judgment.

Table B-VIII-3 SUMMARY OF CONSTRAINTS WHICH SIGNIFICANTLY AFFECTED PNVs

C O N S T R A I N T	Planning Question		A L T E R N A T I V E								
	Pro	Con	C	B	G	I	F	D	E	H	A
Bull Run Municipal Watershed	2	1,6	x	x	x	x	x	x	x	x	x
Less Than 9 Of 10 Unroaded Areas Harvested First Decade	5	1,6		x	x	x	x	x	x	x	x
Less Than 9 Of 10 Unroaded Areas Suitable For Harvests	5	1,6				x	x			x	
All Types Of Rec Facilities Not At Highest Standard	4	\$	x	x	x	x	x	x	x	x	x
More Than 11 Of 48 Viewsheds Maintained Naturally Appearing	4	1,6		x	x	x		x		x	x
More Than The MMR Number (51) Of Spotted Owl Habitat Areas	3	1,6				x	x				x

Other than the period of departure (50 years for Alt B versus 30 years for Alt C), it is noted that the only difference between Alternatives B and C is that the Bull Run Municipal Watershed is open to chargeable harvesting under Alternative C. The effect on PNV of this constraint is \$85 MM, or 4% of Alternative C's PNV.

Due to the overlapping nature of the constraints, it is not possible to explicitly quantify their individual PNV effects. However, a general relationship seems apparent:

Holding the recreational component of total PNV constant, it appears that constraints which reduce the amount of acres suitable for harvesting tend to reduce the timber component of total PNV.

The following discussion supports this conclusion.

b. Effects of Constraints on Timber PNV and Harvests

Appendix B of the Analysis of the Management Situation (AMS) listed 13 benchmark runs, ranging from 100% of the 647,200 acre land base being harvested to 21%, and the corresponding long term sustained yield capacity (LTSYC). It also described a regression analysis, having a correlation coefficient of .939, in which these data were used to derive the following predictive equation:

$$\text{LTSYC} = 131 \text{ MMBF/Year} + (1.47 \text{ MMBF/Year})(\% \text{ GENFOR})$$

where % GENFOR = the percent of the 647,200 acres which are managed for general forest (now called management area C1).

The high correlation coefficient associated with this analysis indicates that there is a high correlation between the number of acres in the suitable land base and LTSYC. A general conclusion is that ANY constraint which effectively shrinks the suitable land base will have a similar effect on LTSYC. Since the source of the constraint does not matter, the following discussion will not be constraint specific. Instead, the combined effect of all allocation constraints will be examined with respect to their effect on specific alternatives' PNVs. Alternative NC is not included in this analysis because it was not included in the AMS.

(1) The Effect of Land Management Decisions on Timber PNVs

Chapter II (DEIS) lists acreages suitable for timber management by alternative. These management areas are governed by the management direction in the Forest Plan and Appendix D. As shown in Chapter II and the AMS, a general rule is that other types of management tend to limit timber production by either restricting silvicultural methods or by restricting the acre base. This results in reduced benefits from harvests and reduced timber PNVs. The reduced timber PNVs are one indication of the costs of the corresponding nonmarket values which result from reduced harvests. The costs of maintaining these nonmarket values by foregoing timber harvest are called opportunity costs. The benefits gained include those related to the preservation of old growth, visual, unroaded, wildlife, and riparian values.

Even without special management direction for a given management area, the "dispersion" direction required as a MMR (36 CFR 219.27(d)) still pertains: In order to meet legal requirements pertaining to the size of harvest openings and their respective distances apart, not more than about one third of an area can be harvested per decade.

If there were no restrictions on timber harvests, a total of 647,200 acres could be harvested at any one time. Given the management areas shown in Chapter II (DEIS), under Alternative C this is limited to 168,800 suitable acres per decade. Table VIII-4 shows that there are fewer acres available for harvest under the other alternatives considered:

Table B-VIII-4 NET EFFECT OF OTHER MANAGEMENT CONSTRAINTS ON THE TIMBER BASE

<u>Alternative</u>	<u>Maximum Amount Of Suitable Acres That Can Be Harvested During Any One Decade</u>		<u>Acres Harvested First Decade</u>
	<u>Acres</u>	<u>Percent Of The 647,200 Acre Land Base</u>	
I	48,700	7.5%	27,000
H	50,600	7.8%	13,000
F	60,300	9.3%	33,000
G	111,000	17.2%	45,000
E	111,000	17.2%	58,000
D	125,900	19.5%	65,000
A	151,200	23.4%	50,000
B	156,000	24.1%	68,000
C	168,800	26.1%	81,000

Note the acres which FORPLAN actually reported as subjected to chargeable harvesting during the first decade. This is about half of those available because (a) not all of the available land has stands old enough to harvest, and (b) the alternatives are required to maintain harvest levels at or above LTSYC for all decades.

As described in the previous section on PNVs, timber PNV can be determined from Chapter II (DEIS) by subtracting the timber cost from the timber benefits. This has been done in deriving the following data:

Timber PNVs (measured in millions of dollars)

<u>Alt H</u>	<u>Alt I</u>	<u>Alt F</u>	<u>Alt G</u>	<u>Alt E</u>	<u>Alt D</u>	<u>Alt A</u>	<u>Alt B</u>	<u>Alt C</u>
244	570	678	848	873	931	1,063	1,100	1,252

Figure B-VIII-1 comprises a plot of these timber PNVs with respect to the acres shown in Table B-VIII-4. The vertical axis is delineated as MACRES. This term means thousand acres. This is the amount of acres which are available for harvest under the respective alternative. The horizontal axis is delineated as TPNV. This is the timber PNV corresponding to the alternatives considered. The equation of the line shown in Figure B-VIII-1 is:

$$\text{TPNV} = 5.26 (\text{MACRES}) + 311.11$$

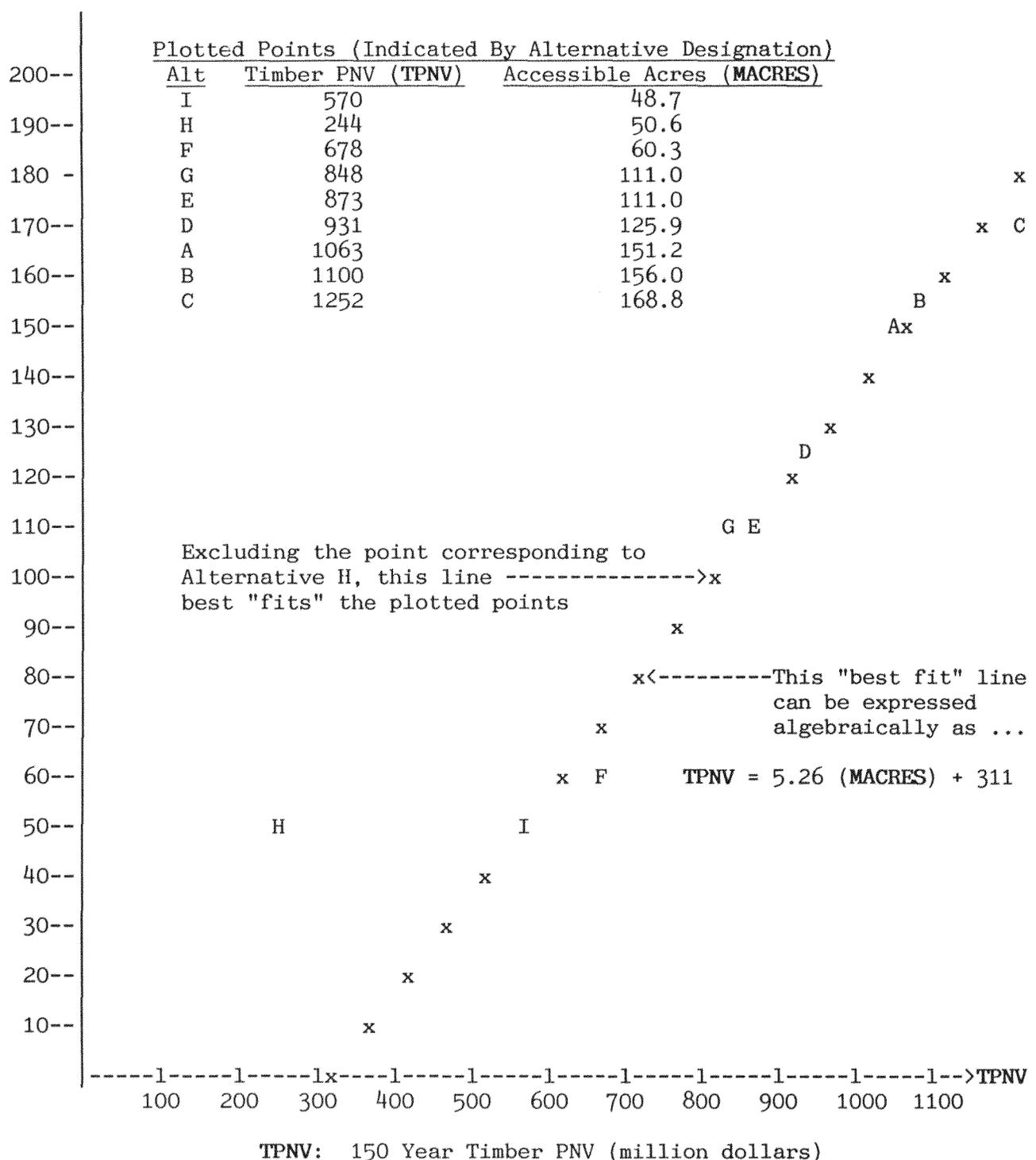
(2) Conclusions Regarding the Costs of Constraints Which Restrict Harvests

In the equation shown as best fitting the points on Table B-VIII-4, TPNV is expressed in millions of dollars and MACRES is expressed in terms of thousands of acres. By substituting a number for MACRES in this equation, one can predict the corresponding timber PNV. For example, if the 48.7 MACRES of Alternative I are multiplied by 5.26 and the resulting product is added to 311.11 then a total predicted TPNV of \$567 MM is determined. This is very close to the actual Alternative I timber PNV of \$570 MM.

Marginal Value of Timber Land: The factor of 5.26 in the predictive equation indicates that the marginal PNV of an additional 1,000 acres in the timber base is on the order of \$5,000,000.

Figure B-VIII-1 RELATIONSHIP BETWEEN TIMBER PNV AND HARVESTABLE ACRES

MACRES: Thousands of acres which can be harvested during the first decade.



This graph shows the correlation between MACRES (the number of acres which can be harvested during the first decade) and TPNV (the 150 year timber PNV). Since the number of MACRES is limited by the number of acres to be managed for less than maximum timber values, this demonstrates the cost, in terms of reduced timber PNV, of managing areas other than for maximum timber production.

Old Growth: The predictive line in Figure B-VIII-1, on the previous page, does not come as close to point H as it does to the other plotted points (alternatives). This is because Alternative H is the only alternative which precludes harvesting of all old growth. This policy to preserve old growth has the effect of lowering the average age of the trees in the 50,600 acres shown in Table VIII-4 pertaining to Alternative H. Since younger trees have less volume, and less volume per acre results in less PNV per acre, Alternative H has a lower PNV than Alternative I, which does not preserve old growth.

Policy of Nondeclining Yields (NDY): This policy is another reason why the points in Figure B-VIII-1 do not all fall right on the predictive line. NDY is a management policy of not allowing each decade's harvest volumes to decrease over time. This is a constraint which does not affect individual management areas per se, but it nevertheless limits the total acres that can be harvested per decade. This is because the NDY policy requires that acres be held out of production in earlier decades in order to be used to defray what would otherwise be harvest shortfalls in later decades. The effect of NDY can be seen in Figure B-VIII-1 by comparing Alternatives G and E. Since G is subject to the NDY policy, its timber PNV is lower than E's even though the land base is the same in both alternatives. This is because the NDY policy forces a more even balance of harvest volume and value per acre per decade. Alternative G cannot have a decade of harvest in stands with a relatively high volume per acre (i.e. old growth) without eventually having lower average harvest volumes and values per acre later on. The cost of maintaining this balance is reflected in the difference in Alternative G and Alternative E timber PNVs and the 40 MMBF/year difference in the two Alternatives' first decade total harvest volumes.

E. FORPLAN Determination of Economically Suitable Timber Lands

FORPLAN scheduled all available acres for timber harvest in Alternatives B, C, and D. The model did not schedule the following amounts available:

Acres: Alt E = 100 acres, Alt G = 600 acres, Alt I = 700 acres,
Alt F = 800 acres, Alt H = 13,100 acres, Alt A = 17,400 acres.

Comparison of Alt G and Alt A (No Action) reveals the following:

Both alternatives had Max PNV objective functions which were constrained by the policy of Nondeclining flow and MMRs. Both also had suitable land bases with a surplus of old growth.

Under these conditions, the model always found a solution in which EVERY decade's harvest equalled LTSYC. This volume, LTSYC, was thus a limiting factor throughout the planning horizon. Given the harvest prescriptions available, FORPLAN sought to produce the LTSYC volume as economically as possible. This was common to both runs. The difference is as follows:

Available prescriptions include those that are less costly (they call for natural regeneration instead of planting, no thinning, and no fertilization) but result in less contribution to LTSYC per acre.

In modeling Alternative A, the No-Action alternative, FORPLAN was forced to choose prescriptions with high investments and yields, regardless of economic efficiency. On the other hand, FORPLAN was allowed to choose from the full range of harvest prescriptions for determining Alternative G's harvest schedule.

The LTSYC and acre INPUT TO FORPLAN is roughly the same for both alternatives. When faced with the choice of either not harvesting or of only harvesting in a Max Volume mode, the model found that it was not economically efficient to include the 17,400 acres of inefficient management in A, but was economically efficient to include them in G, where their contribution to PNV is higher. However, given the additional choice of increasing PNV while getting less LTSYC per acre, the model chose to put 16,800 of these acres back into the Alternative G solution (with Max PNV prescriptions).

F. Analysis of Prescriptions for Regenerated Stands and Growth

1. Factors Affecting Selection of Management Intensity

In choosing timber management regimes, the Mt. Hood FORPLAN model faces three kinds of choices. Existing mature stands are ready for harvest, and it must only choose when to harvest them. After a stand is cut, the model must select an intensity from among as many as five choices. This section of Appendix B describes the factors affecting the model's choice of intensity for these regenerated stands. A third kind of choice exists for existing stands that have not yet reached merchantable size. Depending on the stand age, the model may select practices like thinning or fertilization prior to final harvest. The basis for this choice is similar to that for regenerated stands.

a. Age structure of Forest's timber base

The Mt. Hood National Forest has an abundance of mature, or older, stands. The following data indicates the age class distribution in the Maximum PNV Benchmark (with MMRs) at the beginning of the planning horizon. The proportion of timber available in the first decade is lower in alternatives that withdraw areas from the timber base that include high proportions of older timber, such as unroaded areas.

age 0-90 (not available for harvest in the first decade) 243,000
acres age 100+ (available for harvest in the first decade)
365,000 acres

This characteristic of the Forest has two effects on growth. First, such stands have low rates of growth relative to young managed stands, and considerable harvest and regeneration will be necessary for the average growth on the Forest to approach that of a fully regulated forest. Second, the large amount of timber now available for harvest, in conjunction with other factors described below, reduces the incentive for the model to select management for regenerated stands which produces rapid growth.

b. Prescription characteristics

The model has a choice of up to five timber management intensities available for selection. Each intensity is a combination of silvicultural prescriptions. Practices which may be included in various combinations in prescriptions are listed below:

- planting
- precommercial thinning/release
- fertilization (Douglas-fir stands only)
- commercial thinning

Application of these practices will increase the amount of growth. Low intensity prescriptions generally rely on natural regeneration, where feasible, and do not include significant investments in other practices. High intensity prescriptions generally include practices which require significant investments, and also produce higher future timber volumes. The alternatives do include a level of planting for regeneration beyond that specified by the FORPLAN solution. This is necessary to ensure regeneration on certain sites where vegetative competition or other factors are a significant barrier to natural regeneration, and to assure that the yields projected for the site will actually be achieved.

c. Yield tables for regenerated stands

Yield tables for regenerated stands show only volume that meets utilization standards. Volume is first entered into the yield tables when the minimum stand diameter is 7.6 inches. Therefore, the yield tables do not show any volume in the decades immediately following harvest, when trees have not yet reached this size. Utilizable volume first occurs, on some sites under some prescriptions, in the fourth decade following harvest. This includes most prescriptions for Douglas-fir sites. Otherwise, regenerated volume does not appear in the yield tables until the fifth decade after harvest or later. The following table shows the ages at which volumes first appear in FORPLAN's regenerated yield tables. The age varies by intensity within each working group.

Table B-VIII-5 AGE WHEN STANDS REACH MINIMUM DIAMETERS

Age (in decades) When
Minimum Stand Diameter = 7.6"

Douglas-fir	4-5
True fir	4-7
Associated species	4-7
low site (above 3 groups)	6-11
Pine/oak	5

The contributions to growth from two yield tables for regenerated stands are reproduced below. The columns from which growth in the fifth decade is calculated, between decades 5 and 6, are highlighted. The table shows that only some management regimes following harvest in the first decade will result in growth by the fifth decade, and that harvests after the second decade will not lead to any growth appearing in the yield table by the fifth decade.

Table B-VIII-6 GROWTH PATTERN OF SELECTED REGENERATED STANDS
(volume in MCF/acre)

HARVEST SCHEDULE	DECADE FROM START OF PLANNING HORIZON							
	1	2	3	4	5	6	7	8
<u>Harvest occurs in first decade:</u>								
Age of new stand (Decades)	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Yield - Douglas-fir sites								
maximum volume prescription	0	0	0	0	1.1	3.5	5.0	6.5
Yield - true fir sites								
maximum PNv prescription	0	0	0	0	0	0	2.3	3.5
<u>Harvest occurs in third decade:</u>								
Age of new stand (Decades)	N/A	N/A	0-9	10-10	20-29	30-39	40-49	50-59
Yield - Douglas-fir sites								
maximum volume prescription	N/A	N/A	0	0	0	0	1.1	3.5
Yield - true fir sites								
maximum PNv prescription	N/A	N/A	0	0	0	0	0	0

d. Model structure

The Mt. Hood National Forest FORPLAN model may select different intensities of timber management for the same timber stand over time (Model II formulation). Prescriptions selected for stands regenerated in the first few decades will contribute harvest volume in the later decades of the

planning horizon (approximately decades 7-15). One basis for the model's selection of intensities for stands harvested in the early decades will be the need for timber volume in those later decades. This need is determined by harvest flow constraints, as explained below.

e. Objective function

If the model is maximizing economic efficiency, this objective will discourage selection of high cost, intensive prescriptions in the early decades even if they produce high growth rates. High early costs are not offset by later, more discounted benefits. If the model is maximizing timber volume, however, it will not be affected by such considerations in the early decades. Moreover, maximizing volume will create a need for volume in the later decades, and the model is likely to select more intensive prescriptions in the early decades in order to provide this volume.

f. Harvest flow constraints

Under a nondeclining flow constraint, timber harvest volume can never decline from one decade to the next. On a forest with large amounts of timber immediately available for harvest, the factor which limits timber volume in the early decades is the amount that will be available in later decades. The model thus has an incentive to select prescriptions that produce high yields in the later decades, and in particular to produce a high long-term sustained yield capacity. This incentive is commonly referred to as the allowable cut effect.

If the model structure required that the same prescriptions for regenerated stands be used for each rotation (as in a FORPLAN Model I formulation), this effect would lead to high investments in timber stand management in the first decade. However, in this Forest's formulation, the model does not have the same incentive to select high intensity prescriptions in the earlier decades. As long as the existing inventory, plus low intensity prescriptions, can provide sufficient volume to meet the nondeclining flow constraint in later decades, high intensity management of acres harvested in the early decades is not needed. The model does select high intensity prescriptions in later decades in order to achieve LTSYC, as described earlier.

A departure from nondeclining flow, by itself without a harvest floor, would provide no incentives for the model to manage timber intensively in the earlier decades. There would be no need for a high long-term sustained yield capacity, and no particular level of timber harvest needed in later decades. Under these circumstances, there would be no allowable cut effect and minimum investments in management practices would suffice. These are not the circumstances in the Mt. Hood National Forest departure alternatives, however.

Departure Alternatives B, C, D and E developed for this Forest combine a departure in the early decades with a harvest floor equal to the long-term sustained yield capacity. The floor acts like a nondeclining flow constraint after about the fifth decade. It provides an incentive for the model to select high intensity prescriptions in the early decades to provide the volume needed to reach this level in the later decades. Also, because more of the existing inventory would be harvested in the first few decades (during the departure), it would no longer be available in decades 7-15. The model will apply more intensive management to the stands harvested in the first few decades in order to replace this volume.

Departures affect growth in another way, too. They permit more acres to be harvested in the early decades (see table below). This means that conversion of slow-growing old-growth to managed stands will occur more quickly under a departure. Growth in young stands is greater than in old stands, even under the least intensive management regime. The result should be greater growth in the fifth decade under a departure. However, because of the yield table structure described previously, an increase in the acres harvested may also mean an increase in the number of acres for which yield tables will show an inventory of zero, and therefore no growth.

Table B-VIII-7 PROPORTION OF SUITABLE LAND BASE HARVESTED AND REGENERATED FIRST 50 YEARS

<u>Alternative</u>	<u>Suitable Acres</u>	<u>Harvested by Fifth Decade</u>	<u>% Harvested</u>
NC	656,500	not estimated	
C	608,300	301,200	50%
B	561,200	271,300	48%
D	521,200	235,700	45%
E	513,900	218,200	42%
G	513,400	206,900	40%
A	508,800	203,400	40%
F	488,300	157,900	32%
I	425,900	129,800	30%
H	278,600	71,500	26%

g. Average rotation length

Alternatives vary in the amount of land managed under long rotations, based on the need to address issues related to non-timber resources. As the amount of time until harvest increases, the economic benefits of additional timber volume produced by intensive management practices are discounted further, and the model is less likely to select as many high intensity prescriptions.

2. Selection of timber prescriptions in alternatives

The following table compares the prescriptions chosen by FORPLAN in alternatives in the first decade, and over the long run. One result of this prescription selection in the first decade is represented by growth in the fifth decade, as a percent of the long-term sustained yield capacity. The alternatives are arrayed in order of decreasing area managed for timber.

Table B-VIII-8 FORPLAN SELECTION OF PRESCRIPTIONS FOR REGENERATED STANDS

BENCHMARK OR ALTERNATIVE	PERCENT OF ACRES REGENERATED				GROWTH IN FIFTH DECADE AS A PERCENT OF LTSYC
	FIRST DECADE		AVERAGE FOR 150 YRS		
	LOW	HIGH	LOW	HIGH	
Maximum Timber Benchmark	5	95	10	90	96%
Maximum PNV Benchmark	100	0	36	64	81%
Alternative NC	Not Estimated				
Alternative C (departure)	5	95	15	85	99%
Alternative B (departure)	15	85	21	79	97%
Alternative D (departure)	73	27	46	54	95%
Alternative E (departure)	100	0	58	42	91%
Alternative G	100	0	69	31	85%
Alternative A	1	99	3	97	101%
Alternative F	100	0	75	25	89%
Alternative I	100	0	77	23	94%
Alternative H	100	0	94	6	113%

FORPLAN's selection process is described below for three groups of benchmarks/alternatives.

Maximum Timber Benchmark, Alternatives A, B and C

These FORPLAN runs share a strong timber objective. In all of them, the objective function was maximizing timber; for 150 years in the Benchmark and Alternative A, for 50 years in Alternative B, and for 30

years in Alternative C. In addition, Alternative A was constrained to select currently used management prescriptions, which are essentially all high intensity. The proportion of high intensity prescriptions is high in all of them because of the need to meet timber objectives. In addition, the departure Alternatives B and C exhaust the harvestable surplus, and investments are needed to meet the harvest floor constraint in the later decades. Except for Alternative H, explained below, these alternatives and this benchmark have the greatest growth in the fifth decade.

Maximum PNV Benchmark and Alternatives F, G, H and I

These alternatives and the benchmark all maximize PNV, subject to a nondeclining flow constraint. Surplus harvestable existing inventory is available in the later decades. It is more economical to meet the nondeclining flow constraint by using this surplus than by increasing volume from managed stands with high intensity prescriptions in the early decades. Timber growth is therefore not maximized.

In the long run, alternatives which have the most land managed under extended rotations, such as H and I have the fewest acres under high intensity management. The long rotations postpone the economic benefits of additional investments and make them less economically efficient. Growth in the fifth decade, as a percentage of long-term sustained yield capacity, is highest in these same alternatives. One reason is because the long-term sustained yield capacity resulting from the low intensity prescriptions is low. A second reason is that these alternatives remove relatively large amounts of mature forest from the timber base, and the remaining younger trees have higher growth rates. The Forest average growth is therefore higher.

Alternatives D and E

The objectives of these two alternatives are primarily timber, but this emphasis is not as strong as in the first group discussed. Both allow departures from nondeclining flow, however timber was maximized for only 10 years (as in all alternatives, a second FORPLAN run maximized PNV). Sufficient surplus inventory remains available and discourages some investments in timber stand management. The additional volume that would be obtained by such investments is neither economically efficient nor necessary to meet harvest flow constraints.

Both alternatives manage more land on extended rotations than Alternatives B and C. Alternative E manages considerably more land on extended rotations than Alternative D. Because of the deferred benefits, fewer intensive management prescriptions are economically efficient in Alternative E, especially for selection in the first decade. Alternative E is a departure schedule on the same land base as Alternative G, and it indicates that such a schedule does promote the use of more intensive practices in the long run.

G. Analysis of the Ability to Meet State Timber Harvest Goalsh

National and regional targets have been calculated in a manner such that they can be compared with FORPLAN timber outputs. A similar comparison of this alternative to stated targets in the Forestry Program for Oregon is complicated by several factors. These include differences in land base, yield and mortality functions and model formulation and other assumptions. The major differences are described below.

1. Different Land Bases

The assumption that the 1980 Timber Supply Assessment made for the National Forests was, "additional acres will enter the timber management base from lands now classified as Marginal or Deferred and from roadless areas which will be returned to lands eligible for commercial timber harvest".

The 1980 Oregon Timber Supply Assessment lists the following for the Mt. Hood:

<u>Standard</u>	<u>Special</u>	<u>Marginal</u>	<u>Unregulated</u>	<u>Total</u>
325,068	343,371	20,441	113,974	802,854

This total is reasonably similar to the Mt. Hood National Forest Timber Management Plan in effect at about the time that the state projections were made - 824,204 acres. In the present planning process, however, the FORPLAN model does not include marginal and unregulated categories, but responds to NFMA requirements for suitability determination when calculating acres available for commercial timber production. The tentative suitable acre base resulting from this process and used in this model is 647,118. The process is detailed below:

	<u>ACRES</u>
Forest lands	832,241
A. Withdrawn from production	
1. Wilderness	118,650
2. Research Natural Areas	1,194
3. Other (Wild & Scenic etc)	7,487
	127,340
B. Irreversible resource damage	28,200
C. Regeneration Difficulties	28,177
D. Growing less than 20 ft 3/Ac/Yr available or Not suitable	1,386 185,123
Tentative suitable lands	647,118

2. Yields

Comparison of forest-wide yields from the two models requires that at least the assumed land base be comparable. For this purpose, all 647,118 tentatively suitable acres were considered available for the full range of timber management options in the two planning models of the different agencies. Comparisons are presented below for long-term sustained yield capacity, and for ten decade volume under a departure from nondeclining even flow.

	Timber Volume (MMCF/yr.)	
	TREES	FORPLAN
long-term sustained yield capacity	73	69
average volume per year for 100 years under a departure	77	71

Possible explanations of this difference include the following. The TREES model assumed a minimum rotation of 55 years, whereas FORPLAN is constrained to at least 95% CMAI, which results in a minimum rotation of 70-160 years. Also, average yields per acre for the North Willamette Timbershed (of which the Mt. Hood is only a part) used in the TREES model should be higher than the average yields on the Mt. Hood used in FORPLAN. Green wood not meeting sawlog standards, and thus not in FORPLAN yield tables, may be included as part of the TREES volume. A comparison of state goals to total volume may therefore be more appropriate than a comparison to FORPLAN volume. The State used sequential even-flow constraints with a minimum change of 10% per decade in its departure, whereas the Forest Service uses a departure of up to 25% per decade.

The above comparisons of land base and yields may account for 25% to 30% of the difference between the biological potential of the Mt. Hood National Forest and the projections developed for the Forest by the 1980 Oregon Timber Supply Assessment. The results of Alternative C, developed in part to try to meet this estimated demand, are shown below. State estimates have been averaged between decades in order to match the FORPLAN analysis time periods. They have also been converted to board foot yields. Reliability of extrapolations of board foot and non-FORPLAN volumes beyond the first decade is undoubtedly lower than for first decade estimates.

Table B-VIII-9 ABILITY OF ALTERNATIVE C TO MEET RPA TARGET FOR TIMBER

Decade	TARGET	FORPLAN	TOTAL	% OF TARGET	
	MMCF/YR	MMBF/YR	MMBF/YR	FORPLAN	TOTAL
1980	542	402	504	74%	93%
1990	528	360	454	68%	86%
2000	541	365	460	67%	85%
2010+	486-535	286	365	54-59%	68-75%
100 yr avg	521	314	397	60%	76%

The only additional restriction on timber harvest in this alternative on the present suitable acre base is meeting minimum management requirements. This accounts for the remainder of the difference shown above.

Alternative C comes within 7% of meeting timber volume targets of the Forestry Program for Oregon in the first decade, and within 15% during the next 20 years. This alternative represents the best effort to achieve high timber volume while also meeting the other stated objectives of the State of Oregon listed earlier. There is no apparent legal opportunity to increase the area managed for regulated timber harvest. There is likewise no opportunity to increase yields from the Mt. Hood, as the most intensive management possible has already been selected. While harvest flow constraints could be relaxed further to allow lower minimum volumes and greater change in volume between decades, any resulting increase in volume would be small, short lived, and would not serve the needs expressed by the State of Oregon in its long run timber objectives.

H. Analysis of the Ability to Meet RPA Goals

The following table compares timber volume outputs to RPA targets in MMBF/yr at 5.07 BF/CF.

Table B-VIII-10 COMPARISON OF TARGET TO FORPLAN OUTPUTS

Decade	Target	FORPLAN	Total
1	376	335	444
2	376	304	406
3	376	278	376
4	376	278	376
5	376	278	376

The timber objectives of the alternative will be met in each of the first five decades if assumptions about volume that is not included in FORPLAN yield tables, and about conversion ratios are correct. In providing direction for formulation of this alternative, the Regional planning guide states that RPA targets should not be exceeded. Because the excess volume indicated in the first two decades is not part of the ASQ, this alternative could be adjusted during implementation to provide less total volume.

I. Supplemental Information

The information presented on the two following tables supplements that which is presented in Chapter II of the DEIS. Due to its lack of variability or reliability this information added little to the resolution of the Public Issues. For this reason it is included in this Appendix instead of in Chapter II of the DEIS.

Table B-VIII-11 SUPPLEMENTAL QUANTITATIVE INFORMATION

Outputs/Effects	Unit of Measure	A	B	C	D	E	F	G	H	I	Max. PNV Benchmark
Water Yield	M Acre	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446
1986	Feet	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446
2000		5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446
2030		5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446	5,446
Sediment Delivery Index	M Tons/yr										
1986		25.9	37.8	44.1	37.1	34.8	26.2	31.7	21.1	24.7	44.1
2000		29.2	35.9	42.2	33.1	31.7	27.4	31.0	21.7	25.9	42.2
2030		32.1	29.7	31.3	25.9	25.9	22.6	25.7	23.0	21.8	31.3
Wildlife Habitat Improvement Non-Structural	Acres										
1986		2,225	2,550	2,700	2,400	2,400	1,900	2,250	1,750	1,900	2,700
2000		1,750	2,550	2,900	2,400	2,250	1,600	1,900	950	1,450	2,900
2030		1,450	1,450	1,300	2,850	1,100	950	1,100	1,300	800	1,300
Structural	Number of Structures										
1986		125	142	15	133	133	107	125	98	107	151
2000		98	142	160	133	125	89	107	53	80	160
2030		80	80	71	214	62	53	62	171	44	71
Total-National Forest System: Non-Appropriated	Million \$										
1986		13.1	18.1	21.4	16.7	15.0	9.5	12.8	5.2	8.1	*
2000		11.9	14.5	17.8	12.4	10.4	8.2	10.9	3.5	6.8	*
2030		10.9	13.0	12.8	9.4	9.4	6.1	8.7	4.7	6.3	*
Appropriated	Million \$										
1986		14.5	18.9	21.4	17.5	16.9	15.9	15.9	13.3	16.8	*
2000		16.2	18.7	22.0	17.4	16.8	15.2	16.5	12.8	14.8	*
2030		16.3	20.6	21.8	18.4	18.2	18.9	18.3	14.4	17.5	*
High Clearance Vehicle Only	Miles										
1986		1,797	1,835	1,857	1,825	1,812	1,769	1,791	1,735	1,759	1,857
2000		1,962	2,078	2,131	2,023	1,989	1,882	1,942	1,778	1,850	2,131
2030		2,675	2,818	2,907	2,516	2,460	2,246	2,383	1,995	2,154	2,907
Operational Costs	Million \$										
1986		25.4	32.9	37.7	30.8	28.9	22.9	26.0	17.1	21.9	*
2000		25.7	30.3	35.5	27.4	24.8	21.6	25.2	15.7	20.4	*
2030		24.3	32.6	30.5	26.0	25.7	23.5	25.1	18.4	22.4	*
Capital Investment Costs	Million \$										
1986		2.2	4.1	5.2	3.4	3.0	2.5	2.7	1.4	2.9	*
2000		2.4	3.0	4.3	2.5	2.4	1.8	2.2	.6	1.3	*
2030		2.7	2.8	4.2	1.8	1.9	1.4	1.9	.7	1.4	*
Improved Watershed Condition	Index										
1986		-240	-350	-420	-165	-150	85	-120	35	140	-420
2000		-220	-300	-350	-130	-120	90	-110	35	140	-350
2030		-210	-130	-120	0	0	75	0	40	130	-120
Energy Minerals Produced	Billion BTU's										
1986		0	0	0	0	0	0	0	0	0	0
2000		3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800	3,800
2030		33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000	33,000
Non-Energy Minerals Produced	Million \$										
1986		.115	.233	.258	.219	.197	.105	.130	.041	.091	.258
2000		.140	.221	.218	.169	.151	.110	.125	.041	.091	.218
2030		.195	.157	.156	.096	.096	.063	.110	.082	.091	.156

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	A	B	C	D	E	F	G	H	I
Historic/Cultural Resources	77% of Forest inventoried by year 2000. 33% of sites evaluated would require mitigation or protection from project impacts. 10% of eligible sites listed on National Register.	81% of the Forest inventoried by year 2000. 43% of the sites evaluated would require mitigation or protection from impacts. 7% of eligible sites listed on National Register.	Resource conflicts highest. 81% of the Forest inventoried by year 2000. 50% of sites evaluated would require mitigation/protection. 6% of eligible sites listed.	75% of the Forest inventoried by year 2000. Approx. 30% of sites evaluated would need mitigation/protection. 8% of eligible sites listed.	75% of forest inventoried by 1999. 32% of sites evaluated would require mitigation/protection. 8% of eligible sites listed.	75% of forest inventoried by 1997. 21% of sites would require mitigation/protection. 12% of eligible sites listed.	75% of forest inventoried by 2000. 28% of sites evaluated would require mitigation/protection. 10% of eligible sites listed.	Rate of inventory slowest in this alternative. 76% of forest inventoried by 2040. 8% of sites would require protection/mitigation. 17% of eligible sites listed.	75% of the forest inventoried by 2010. 17% of sites evaluated would require mitigation/protection. 12% of eligible sites listed.
Diminishing Traditional Resources used by Native Americans (e.g. huckleberries)	Availability would decrease, demand may increase.	Opportunities for increasing the availability of traditional resources would be greatly increased.	Opportunities for increasing the availability of traditional resources would be greatest in this alternative.	Opportunities for increasing availability of traditional resources would be greater than at present.	Some opportunities for increasing availability of traditional resources would be present	Availability of resources would be significantly less than current supply.	Same as E	Availability of traditional resources would be the lowest of and alternative supply.	Availability of traditional resources would be low.
Small Hydro Development	50-55% of potential sites could be developed with little conflict. Other sites may not be economical due to high costs of mitigation.	90% of potential sites developed with little conflict. Costs due to mitigative measures are low.	Same as Alternative B	20-40% of potential sites developed with little conflict. In remainder of sites, mitigation costs would be increased with some sites economically infeasible.	Same as Alternative D.	Development of any potential site would require mitigation. High potential for sites to be economically feasible.	Same as Alternative D.	Same as Alternative F.	Same as Alternative F.
Utility Corridors	No conflicts with potential expansion.	Same as A	Same as A	No conflicts. Higher costs associated with mitigation measures.	No conflicts. Higher costs associated with mitigation measures.	Same as Alt. E	Same as Alt. E	Same as Alt. E	Same as Alt. E
Rock Resource	In all alternatives (based on present practices), there is adequate rock in eastside drainages to meet long term needs. In certain westside drainages, potential shortages may occur in the following decades:								
	Oak Fork 2nd Collawash 3rd Lower Clackamas 3rd Upper Clackamas 4th	Lower Clackamas 2nd Oak Grove 3rd Collawash 3rd Upper Clackamas 3rd Hot Springs 4th	Lower Clackamas 1st Oak Grove 2nd Collawash 3rd Upper Clackamas 4th Hot Springs 7th	Lower Clackamas 3rd Oak Grove 3rd Collawash 3rd Hot Springs 5th	Oak Grove 3rd Lower Clackamas 3rd Collawash 3rd Upper Clackamas 4th Hot Springs 5th	Lower Clackamas 3rd Oak Grove 4th Collawash 4th Upper Clackamas 5th Hot Springs 7th	Oak Grove 3rd Lower Clackamas 3rd Collawash 3rd Upper Clackamas 4th Hot Springs 5th	Lower Clackamas 4th Oak Grove 6th Upper Clackamas 6th	Lower Clackamas 4th Oak Grove 4th Collawash 4th Upper Clackamas 5th
Game Population/Distribution	Potential greatest for habitat distribution. Populations expected to increase during second decade followed by a continuing decline through fifth decade.	Populations of deer/elk are expected to initially increase and then decline during second decade. Distribution declines substantially in some drainages.	Populations of deer/elk show greatest increase not associated with enhancement funding. Second decade populations decline substantially. Habitat distribution poor in some drainages.	Similar to Bc. Some improvement in distribution should result from increased protection of riparian habitat	Initially high populations, with rapid decline in future years. 10% of pine/oak managed for wildlife.	Very high populations, associated with enhancement projects and riparian habitat maintenance. 50% of pine/oak habitat managed for wildlife.	Initially high populations with good habitat distribution. 10% of pine/oak managed for wildlife.	Initially very high populations with good distribution due to habitat enhancement funding.	Highest population estimated.
Non-Game Populations/Distribution	Populations expected to rapidly decline through fifth decade. Viable populations may not be maintained.	Minimum population and habitat distribution will be maintained. Decline in present population and distribution.	Same as Bc	Similar to Bc except populations and distribution should improve due to increased protection of riparian habitat.	Good population levels with good habitat distribution. Some enhancement funding, pine/oak management and riparian habitat management.	Very high populations and distribution associated with maintenance of minimum habitats, increased enhancement funding, pine/oak management and riparian habitat management.	Same as E.	Highest level of old growth management. High levels of enhancement funding and riparian habitat management.	Greatest number of areas dedicated to mature and old growth management. Highest level of enhancement funding, and riparian habitat management.
Plant Community Diversity	Lowest plant diversity of all other alternatives after 50 years.	Minimum level of plant diversity.	Same as B:	Moderate diversity attributed to minimum protection of plant and animal indicator species. Additional protection for riparian habitat.	Moderate diversity attributed to protection of plant and animal indicator species and additional protection for riparian habitat.	Highest level of plant diversity. High levels of protection for a variety of plant and animal indicator species including riparian habitat.	Same as E.	High levels of plant diversity. All old growth maintained along with high levels of protection for riparian habitat and some pine/oak habitat.	High levels of plant diversity attributed to near maximum protection of plant and animal indicator species.

Table B-VIII-12 SUPPLEMENTAL QUALITATIVE INFORMATION

APPENDIX C

APPENDIX C

UNROADED AREAS

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APPENDIX C - UNROADED AREAS

INTRODUCTION

The purpose of this Appendix is to present a detailed and site-specific analysis of the areas of the Mt. Hood National Forest that are in an unroaded and essentially undeveloped condition. It includes a description of the resources, physiographic and biologic features, and the present management situation for each area. In addition, it specifically indicates how each area would be affected by the alternatives proposed in this DEIS. Map II-10 (Chapter III of DEIS) shows the vicinity of all ten unroaded areas. Individual maps are included in this Appendix.

The first Roadless Area Review and Evaluation (RARE I, FEIS 10/73) identified eleven roadless areas on the Mt. Hood National Forest. Four of these areas were studied for wilderness through the unit planning process: Roaring River, Salmon-Huckleberry (in the Salmon River/Roaring River FEIS, 1/74), and Eagle, Larch (in the Eagle Creek Planning Unit FEIS, 1/75). Roaring River was allocated to special interest - scenic and portions of Salmon-Huckleberry were recommended for backcountry and landscape management. In the Eagle Creek Planning Unit FEIS, Larch was allocated to special interest - scenic and landscape management and portions of Eagle were recommended as a study area for wilderness suitability.

The 1979 roadless area inventory (RARE II) required reevaluation of roadless areas by less stringent criteria and eliminated the need to consider areas evaluated for wilderness in the unit Plans. On the Mt. Hood, eleven roadless areas were identified. The Larch and Roaring River roadless areas were not considered because of completed unit plans while the Mt. Jefferson (small portion on the Mt. Hood - bulk of the area on the Willamette National Forest) and Wind roadless areas were added. The Salmon-Huckleberry area was expanded beyond the area considered in the original Unit Plan and included in RARE II. The RARE II process recommended portions of Bull of the Woods, Eagle, and Salmon-Huckleberry for wilderness and proposed Olallie for further planning. The remainder of the areas were recommended for nonwilderness.

The Oregon Wilderness Act of 1984 designated portions of five of the eleven RARE II areas for wilderness: Badger, Bull of the Woods, Eagle, Mt. Jefferson, and Salmon-Huckleberry. The passage of the Act eliminated the need for the remaining roadless areas, with the exception of Olallie Further Planning Area, to be studied for wilderness during the first generation of Forest Plans. For areas remaining in an unroaded condition, wilderness options will be reviewed when this plan is revised. The full text of this portion of the Act is found in Section 7., parts (a), (b), and (d).

This appendix does present information about the unroaded areas to disclose the environmental effects of allocating each area to continued unroaded status or to some level of development (of all or a portion) of each area. To do this, this appendix presents a description of the environment, presents the proposed management allocation for each of the alternatives, and discloses the

environmental consequences of those alternatives for each area. If roads, timber harvest, or other development occurs in these areas, they will no longer be eligible for consideration for wilderness. This itself may be a significant environmental consequence. For this reason, we are considering each area's attributes as a wilderness, such as its capability, availability, and need, so that any decision to designate the area for particular uses will be made with full knowledge of its environmental consequences.

Table C-1 on the following page lists the current status of the original RARE II areas. The column titled "Present Roadless Acres" represents the number of acres which (a) were originally included in the larger more contiguous RARE II areas, (b) were not assigned wilderness status under the Oregon Wilderness Bill, and (c) are of sufficient size, location, and character as to warrant consideration for roadless management. Also included are the Larch and Roaring River roadless areas which will be evaluated for unroaded management. The small roadless portion of Mt. Jefferson not designated as wilderness will be analyzed with Olallie. Two of the RARE II areas, Big Bend and Lake, are within the Bull Run Watershed and are to be managed in accordance with the Bull Run Planning Unit FEIS (1/79). That plan recommends the areas be allocated to watershed management and research. Thus, ten roadless areas are to be analyzed in this appendix.

Table C-2 is presented after Table C-1 and shows, by alternative¹, which areas will remain unroaded during the entire 150 year planning horizon. Following Table C-2 is an area-by-area discussion. The following information is presented for each area:

1. The specific description of each unroaded area including a map.
2. Tables which indicate for each unroaded area the proposed management allocation by alternative.
3. Tables which present the first decade timber harvest and roading schedule for each alternative.
4. A discussion of environmental consequences associated with each area.

¹NOTE: Alternative NC was formulated after this Appendix was completed and therefore does not appear in this Appendix. However, Alternative NC is identical to Alternative A inasmuch as they both eventually harvest in the same unroaded areas (Salmon/Huckleberry, Badger/Jordan, Wind Creek, Twin Lakes, and Bull of the Woods). Alternatives NC and A both leave the same areas unroaded for the entire 150 year planning horizon: Eagle, Olallie, Larch, and Roaring River. The alternatives do differ with respect to deferring harvests in the Mt. Hood Additions, Salmon/Huckleberry, and Badger/Jordan areas for the first 15 years of the Forest Plan: Alternative A defers harvests in these areas whereas Alternative NC does not.

Table C-1 CHANGES SINCE RARE II

<u>Area</u>	<u>RARE II Unroaded Acres</u>	<u>Present Unroaded Acres</u>	<u>Acreage Change</u>	<u>Reason for Change</u>
Badger Creek 06097	27,300	1,700	-900 -300 -100 -24,300	Cabin Timber Sale Highland Timber Sale More accurate mapping Oregon Wilderness Act of 1984
Big Bend 06092	10,200	0	-10,200	Allocated in Bull Run Planning Unit FEIS, 1/79
Bull of the Woods 06098	34,300	11,400	+1,500 +2,000 -26,400	Additional unroaded areas More accurate mapping Oregon Wilderness Act of 1984
Eagle 06090	40,600	16,800	+13,900 +1,800 +900 -38,900 -1,500	Addition of Gorge Face to eastern forest boundary Additional unroaded acres on southeast boundary More accurate mapping Oregon Wilderness Act of 1984 Allocated in Bull Run Planning Unit FEIS, 1/79
Lake 06091	9,000	0	-9,000	Allocated in Bull Run Planning Unit FEIS, 1/79
Larch Mountain	0	13,900	+13,900	Not part of RARE II, considered in unit planning process.
Mt. Hood Additions 06093	10,800	16,000	+5,200	More accurate mapping
Mt. Jefferson Additions <u>1</u> / 06101	1,100	300	+100 -900	More accurate mapping Oregon Wilderness Act of 1984
Olallie <u>1</u> / 06099	8,700	7,800	-900	More accurate mapping
Roaring River	0	29,600	+29,600	Not part of RARE II, considered in unit planning process

Table C-1 CHANGES SINCE RARE II (con't)

<u>Area</u>	<u>RARE II Unroaded Acres</u>	<u>Present Unroaded Acres</u>	<u>Acreage Change</u>	<u>Reason for Change</u>
Salmon-Huckleberry 06095	68,200	20,300	-2,000 -1,500 -44,800 +400	Salmon Timber Sale units resulted in inability to manage entire Salmon River Meadow extension Sci-Fi, Crowfoot and Baldy Timber Sales Oregon Wilderness Act of 1984 More accurate mapping
Twin Lakes 06096	5,400	6,500	+1,100	More accurate mapping
Wind Creek 06094	6,200	5,700	-400 -100	Extension of permit boundary for Multitorpor/Ski Bowl Ski Area More accurate mapping

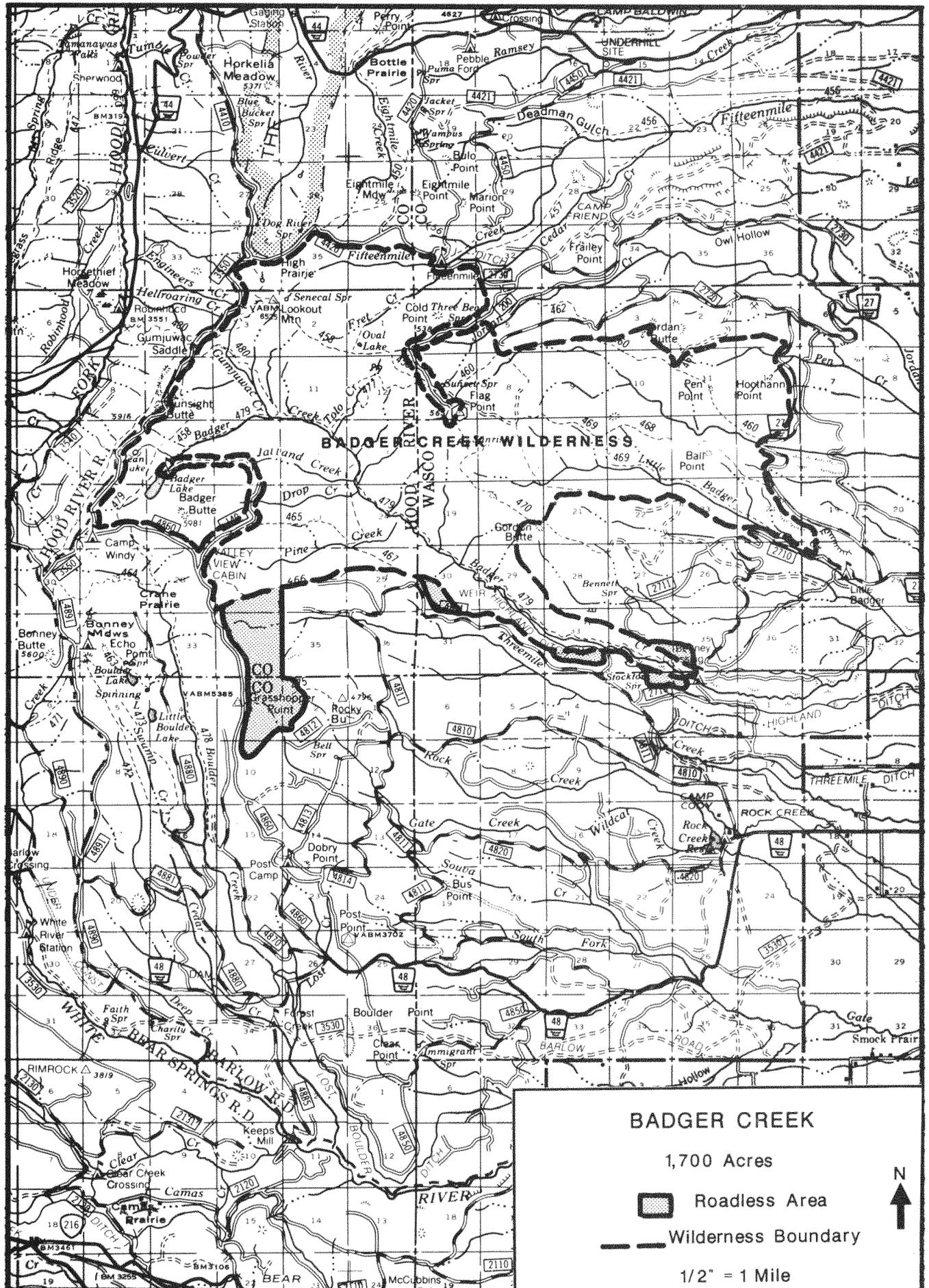
1/ Mt. Jefferson Additions and Olallie are part of the 12,400 acre Olallie Further Planning Area. They will be considered together in the Appendix C analysis.

Table C-2 UNROADED AREAS MANAGED AS UNROADED FOR AT LEAST 20 YEARS

<u>UNROADED AREA</u>	<u>ALTERNATIVES</u>								
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>	<u>I</u>
Badger Creek								X	X
Bull of the Woods						X		X	X
Eagle	X			X	X	X	X	X	X
Larch	X							X	X
Mt. Hood								X	X
Olallie	X			X	X		X	X	X
Roaring River	X			X	X	X	X	X	X
Salmon-Huckleberry								X	X
Twin Lakes								X	X
Wind Creek								X	X

BADGER CREEK

Map C-1



I. DESCRIPTION

History

The Badger Creek unroaded area was inventoried through both the RARE I and II processes. The area was allocated to dispersed unroaded recreation and multiple-use management in the Badger Jordan Planning Unit FEIS (2/78) although not implemented until the RARE II allocation of the area to non-wilderness use.

Fourteen thousand acres of Badger Creek were proposed for wilderness in the Oregon Wilderness Bill of 1979 (S-2031) with the whole area included in the Oregon Wilderness Bill of 1983 (HR-1149). The vast majority of the area (24,300 acres) became wilderness under the Oregon Wilderness Act of 1984.

Location and Access

The Badger unroaded area is located on the Barlow Ranger District within Hood River county. It is located approximately 15 miles southwest of The Dalles and 30 miles east of Portland.

With the exception of the unroaded piece north and east of Grasshopper Point, the small remaining unroaded portions are the results of establishing the wilderness boundary on topographic features above Badger Creek. Their small size and location combine to eliminate them from further description and analysis. The larger piece will, however, be described and analyzed as a potential unroaded area.

Specifically, access to Grasshopper Point is via a primitive Forest road (4860). A trail within the wilderness provides hiking access from the north with Trail 475 (Rocky Butte) traversing the roadless area in the south and open to hikers and motorized bikes.

Physiography and Soils

The unroaded area slopes east from a dominant ridge. The headwaters of Three Mile Creek and several smaller drainages are within the area. Elevation ranges from approximately 5000 feet to 5360 feet near Grasshopper Point.

Soils are deep glacial deposits with areas of shallower soils and rock outcrops. The soil profile is gravelly, sandy loam.

Vegetation

The area is primarily forested with scattered small stringer meadows. The primary species at this upper elevation are western hemlock, Pacific silver fir, noble fir, lodgepole pine, western white pine, Douglas-fir, and grand fir. The understory contains beargrass, huckleberry, sedge, and other shrubs/forbs.

Current Uses

Management direction for the area is general forest (Badger-Jordan Planning Unit FEIS, 2/78). The management goals are to produce timber and forage.

The primary use is dispersed roaded recreation associated with Forest Road 4860 that defines the western boundary. The area is used by hunters and recreationists viewing scenery. Grasshopper Point affords excellent views of both the agricultural land to the east and Mt. Hood. There is motorcycle and four-wheel drive vehicle use along the road and motorbike use on Trail 475.

The area is a part of the Grasshopper Cattle allotment and affords some use particularly in the stringer meadows.

Surroundings and Attractions

The northern boundary is the Badger Creek Wilderness with the remaining boundaries a forest road and lands managed for timber emphasis.

The primary attraction is the excellent view and opportunity to travel on a primitive road.

II. CAPABILITY

Manageability and Boundaries

This area adjoins the Badger Creek Wilderness with its capability to be managed as an unroaded area a function of this relationship. The wilderness/unroaded interface is a broad east-west ridge. Forest Road 4860 forms the western boundary. The southern boundary contours off the ridge with the eastern boundary following a section line, back to the wilderness boundary. The area is exposed to activities occurring on the road and those associated with nearby timber harvest (both sights and sounds). It does not appear to provide a logical extension, nor act as a buffer to the wilderness.

Natural Integrity and Appearance

The overall development of the Grasshopper piece is low consisting of a trail. There is evidence of recreation and grazing use. Past and present harvest activities are observable from the area. These features affect less than 10% of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

There would be little sense of solitude and recreation challenge because of the proximity to roads, trails, and timber harvest activities.

Special Features

There are no known sensitive plant or animal species identified in the remaining unroaded area.

III. AVAILABILITY

Recreation

The primary forms of recreation use are associated with Road 4860 and Trail 475. An unroaded prescription would eliminate motorized vehicles on the trail. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	1000
RM	4265

Wildlife and Fish

The unroaded area has the capability of providing habitat for deer, elk, and turkey as well as a variety of non-game species. There are no fish bearing streams present.

Water

The area is located in the White River basin and forms the headwaters of Three Mile and Gate Creeks. Though ephemeral in these upper reaches, the creeks do provide water for irrigation of the agricultural lands to the east.

Livestock

The unroaded area falls within the Grasshopper Cattle Allotment. The potential of the area for forage production is low as is the estimated current use.

Timber

In aggregate, the five discrete areas contain approximately 875 acres of land suitable for timber production. There is a current standing volume of 9.9 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 0.13 million cubic feet per year. Specific to the Grasshopper piece, primary species are western hemlock, Pacific silver fir, and noble fir in unevenaged stands. There are also inclusions of mature evenaged noble, Pacific silver fir and western hemlock.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	L	L	-	L	L

The potential for geothermal exploration and development is low. There have been lease applications available for oil and gas in the past. However, the potential for exploration and development of oil and gas is low.

There is some evidence of locatable mining activity in adjacent areas. The potential for exploration and development within the unroaded area is, however, low.

Fire

Due to fire exclusion ladder fuels in this area present a potentially serious wildfire situation. Management considerations include the use of scheduled and prescribed fire to help return stands to a more natural condition.

Insects and Disease

The area was included in a forest level Western Spruce Budworm Study in 1983-84. There is a high probability for the area to develop epidemic populations of spruce budworm. In the past, small areas located along the upper Badger Creek drainage have been subject to mountain pine and fir engraver beetle outbreaks.

IV. NEED FOR UNROADED AREAS

Directly north of the Grasshopper piece is the Badger Creek Wilderness. Other nearby wilderness includes the Mt. Hood and Salmon-Huckleberry to the west. There are also two areas that have been managed as unroaded to the west: Twin Lakes and Wind Creek areas. The ecosystems present in the Grasshopper piece (or any of the other pieces) are represented in the adjacent wilderness.

There has been no expression of public sentiment for maintaining these pieces of land in unroaded management since passage of the Oregon Wilderness Act.

V. ENVIRONMENTAL CONSEQUENCES

Table C-3 indicates the different management allocations, by alternative, for the Badger unroaded area. TABLE C-4 presents the first decade timber harvest and roading schedule by alternative.

Table C-3 Management Acres for Badger Creek by Alternatives

Management Areas:	A	B & C	D	E & G	F	H	I
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	0	1700	1700
B2 Scenic Viewshed	0	0	0	0	100	0	0
B6 Special Emphasis Watershed	0	0	0	0	1000	0	0
C1 Timber Emphasis (see note)	1700	1700	1700	1700	600	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-4 First Decade Harvest and Rooding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Rooded/Harvested	28	28	26	26	11	26	0
MMBF Harvested	1.4	1.4	1.3	1.3	0.6	1.3	0
Rooding Cost (\$MM)	0.04	0.04	0.04	0.04	0.02	0.04	0

All of the remaining areas though the following discussion is focused on the Grasshopper piece. Alternatives H and I allocate the area to unroaded dispersed recreation. This would perpetuate the unroaded character of the area and allow future addition to the Badger Creek Wilderness.

Alternative F proposes allocation of approximately 60% of the area to special emphasis watershed. Within this management allocation, timber rotation age is extended to meet riparian management objectives. The southwestern portion of the area is to be managed for timber emphasis. These allocations allow timber harvest (with entry in the first decade) and would eliminate the unroaded character of the area and the opportunity to add to the Badger Creek Wilderness.

There are six alternatives that allocate the entire Grasshopper piece to timber emphasis (with the exception of the areas needed to meet minimum management requirements): A, B, C, D, E, and G. Timber harvest of the suitable acres would, over time, require development of the road system eliminating the unroaded character of the area. Harvest would occur in the first decade in all alternatives. The present recreation opportunity (ROS) class is rooded modified due to the proximity to management activities (roads and timber harvest). In these six alternatives, there would be no opportunity to add "Grasshopper" or the other unroaded areas to the wilderness.

BULL OF THE WOODS

I. DESCRIPTION

History

Bull of the Woods was studied in both the RARE I and RARE II processes. It was not included in the final list of candidate Wilderness Study Areas by RARE I. In the RARE II inventory, the Bull of the Woods Roadless Area was expanded to 34,300 acres, including the Opal Creek area on the Willamette National Forest. With completion of RARE II, 23,700 acres of the area was recommended for wilderness including the long-established recreation area: Bull of the Woods Scenic Area.

Bull of the Woods was evaluated under the Clackamas Planning Unit Environmental Statement. This unit plan was discontinued before completion of a final document because of the phase into the current Forest planning process.

Bull of the Woods was proposed for a wilderness suitability study under the Oregon Omnibus Wilderness Act of 1977 (S-658). Twenty-six thousand acres were proposed for wilderness in the Oregon Wilderness Bill of 1979 (S-2031) and 47,000 acres in the Oregon Wilderness Bill of 1983 (HR-1149). The vast majority of the area (26,400 acres) became wilderness under the Oregon Wilderness Act of 1984.

Location and Access

Bull of the Woods is located on the Estacada and Clackamas Ranger Districts within Clackamas and Marion Counties. There are three separate pieces that remain after the passage of the Oregon Wilderness Act. Piece A is east of Schreiner Peak and Janus Butte, bounded on the north by Road 6340 (6340140), and on the east and south by Roads 6300, 6380, and 6370. The second piece, piece B, is east of Burnt Mountain, bounded by the Forest boundary on the west and south, and Roads 7040 and 7030 on the north and east. The final piece, C, is the Bagby Hot Springs area, north of Spray Creek to Road 70. The eastern and western boundaries are Roads 6841 and 7020, respectively. There are several small unroaded areas that are the results of establishing the wilderness boundary on topographic features. Their size and location combine to eliminate them from further description and analysis.

Primary access is Road 63 to piece A, and Roads 7040 and 7030 to piece B and Road 70 to piece C. Generally, the area is 70 miles southeast of Portland and 65 miles west of Salem. Trail access is limited in pieces A and B.

Physiography and Soils

The portion east of Schreiner Peak/Janus Butte, (piece A), is a northeast facing slope. The slopes are highly dissected with tributaries into the Collowash and East Fork Collowash Rivers. Elevations range from approximately

2200 feet near the Collowash to 5540 feet at Schreiner Peak. Piece B is a northwest-southeast ridge sloping northeast from Burnt Mountain with a prominent north-south ridge located in the approximate middle of the area. Elevation ranges from 3080 feet to 4796 feet at Burnt Mountain. The last piece, C, is divided by the Hot Springs fork of the Collowash River with resulting east and west facing slopes. Elevation ranges 2272 feet at Bagby Hot Springs to 3600 feet.

Generally, soils are sandy or silt loams associated with steep, glaciated sideslopes. In the Bagby area soils tend to gravelly loam. Unvegetated talus slopes and rock outcrops occur in pieces A and B.

Vegetation

Vegetation is varied for the three areas. In area A, lower elevations support tree species including Douglas-fir, western hemlock, and western red cedar. Higher elevations support noble fir, Pacific silver fir, and mountain hemlock. There is some sugar pine in the area. The area near Burnt Mountain, piece B, supports tree species that include Douglas-fir, western hemlock, mountain hemlock, noble fir and Pacific silver fir. There is Alaska yellow cedar in this area. The Bagby piece, C, is predominantly Douglas-fir, western hemlock, western red cedar and red alder. Understory across the three areas varies, but includes rhododendron, huckleberry, salal, and other shrub and forb species.

Current Uses

Primitive and semi-primitive recreation opportunities exist in a predominantly natural environment. Current use of piece A is recreation: hiking and fishing. This use is localized and associated with the existing trails and Collowash River. The recreational use of piece B is very limited with perhaps some activity on the abandoned Burnt Mountain Trail. The Bagby piece, however, receives heavy recreational use. The Bagby Hot Springs provides opportunities to hike and bathe with use estimated at 8,000 RVDs per year. In addition to the recreation use, a Research Natural Area exists in piece C.

Surroundings and Attractions

The remaining unroaded areas are surrounded by general Forest land and, excepting piece B, the Bull of the Woods Wilderness. Piece B is adjacent to the wilderness but does not share a common boundary. It also adjoins other ownership: BLM and private lands.

The primary attractions in the areas are the Bagby Hot Springs and the rivers: Hot Springs Fork of Collowash, Collowash, and East Fork of Collowash. Schreiner Peak is a popular hiking destination.

II. CAPABILITY

Manageability and Boundaries

All three areas could be managed in an undeveloped condition in compliment with the Bull of the Woods Wilderness. The Schreiner/Janus area is of a size to be managed as an unroaded area independent of the wilderness. The Burnt Mountain piece is not a logical extension of the wilderness and its small size and proximity to other ownership and management activities make it a marginal candidate for unroaded management. The Bagby piece, while it could be managed as an unroaded area, is highly developed near the Hot Springs. Access, via roads, is adequate for each of the areas.

Natural Integrity and Appearance

The overall development of the Bull of the Woods unroaded area is low for pieces A and B, and high for piece C. Development in A and B is limited to trails (unmaintained in piece B). In piece C there is a development in the form of trails, a guard station, and bathhouses serving Bagby Hot Springs. These features affect less than 10% of pieces A and B, and more than 25% of piece C. Natural ecological processes have not been greatly altered in any of the areas.

Opportunities for Solitude, Primitive Recreation and Challenge

The opportunity for solitude is moderate for piece A. This opportunity is decreased in piece B because of size and proximity to off site intrusions including roads and harvest activities. Travel off the existing trail systems would be physically demanding and offer some challenge in pieces A and B. There are limited opportunities for solitude away from the Hot Springs in piece C. The Hot Springs provides a rural recreation experience with other visitor contact nearly guaranteed.

Special Features

A log Ranger Station is located at Bagby Hot Springs. Current renovation of the Springs has retained some of the original tubs and is perpetuating the architectural style of the earlier era. The area is eligible for designation to the National Register of Historic Places. There are mines, preating the 1900's, in piece A. One prehistoric site has been located in the unroaded area with a high probability that others exist. The Bagby Research Natural Area is located in piece C.

There are no known sensitive plant or animal species identified in the area.

III. AVAILABILITY

Recreation

These remaining three pieces provide a diversity of recreational opportunities: from primitive off trail hiking to bathing at the popular Bagby Hot Springs. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capability in RVDs/Year</u>
RN	1,152
RM	21,531
SPNM	8,587

Wildlife and Fish

The area has the capability of providing wildlife habitat for the following management indicator species: spotted owl, pine marten, ruffed grouse, pileated woodpecker, and deer/elk. Though habitat diversity is increased by rivers and meadows, habitat quality is decreased by poor soil, steep slopes and high elevations.

The Bull of the Woods area provides high quality fisheries habitat. The larger streams in the area support major runs of steelhead, spring chinook and coho salmon. Maintenance of self-sustaining fish populations and downstream water quality are management issues in the area.

Water

Tributaries and streams on the east side of Schreiner/Janus flow into the East Fork and Collowash Rivers. The area near Burnt Mountain drains into Hugh and Nohorn Creeks. The Bagby area feeds the Hot Springs fork of the Collowash River. Each of the pieces is in the Collowash river drainage.

Timber

The area contains approximately 5,162 acres of land suitable for timber production. Species are Douglas-fir, western red cedar, western (mountain) hemlock, noble fir and Pacific silver fir. There is a current standing volume of 58.2 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 0.8 million cubic feet per year.

Minerals and Energy

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
200	-	M	L	2	M	L

The "Geothermal Leasing - Clackamas Area Environmental Assessment Report (3/81)" analyzed existing lease applications near the Bull of the Woods unroaded area. The results of this study, and the proximity to the Breitenbush Known Geothermal Resource Area (KGRA) indicate a moderate potential for geothermal exploration and development. There is low potential for oil and gas exploration and development.

Historically, the area has been explored and mined for precious metals. There are two claims within the unroaded area and a moderate potential for prospecting and development.

Fire

Fuels in the area are predominately sparse undergrowth with a thin layer of ground fuels. Fires burning in these fuels would generally be of low intensity with low spread rates except in patches where down woody material is concentrated.

Insects and Disease

There have been no significant insect or disease outbreaks in the area. There is evidence of spruce budworm activity. The potential is low for extensive damage or significant outbreaks of insects or disease.

IV. NEED FOR UNROADED AREAS

The Schreiner/Janus and Bagby pieces have a boundary shared with the Bull of the Woods Wilderness. The Burnt Mountain piece adjoins the wilderness at one corner. The Mt. Jefferson Wilderness is nearby as is the Ollalie Scenic Area. The ecosystems present in the Bull of the Woods unroaded area are similar to those in the wilderness. The Bagby Research Natural Area provides ecosystem representation for Douglas-fir forests approximately 250 years old.

The public involvement process during RARE II, development of the Clackamas Unit Plan, and project level analyses indicated an interest in ensuring primitive recreation opportunities. The Bagby area, in particular, has had continued public support for management in an undeveloped condition.

V. ENVIRONMENTAL CONSEQUENCES

Table C-5 indicates the different management allocations, by alternative, for the Bull of the Woods unroaded area. A second table C-6 presents the first decade timber harvest and roading schedule by alternative. (The Bagby Research Natural Area is common to all alternatives.)

Alternatives F, H, and I allocate the entire area to management prescriptions that maintain unroaded qualities. The vast majority of the area will be managed as dispersed unroaded recreation in alternatives H and I with 4% allocated as a special interest area (SIA). The SIA has been designed to maintain Bagby Hot Springs at a moderate level of development as an unroaded area. Alternative F allocates the entire area to dispersed unroaded recreation. Therefore, all three alternatives maintain the unroaded qualities and allow for future addition to the wilderness.

Alternatives A and D propose greater than 90% of the areas as timber emphasis, scenic viewshed or earth flow. Both would manage the Bagby Hot Springs as an SIA. Harvest would occur in the first decade for D and be deferred until the second decade in Alternative A. The level of timber harvesting associated with these alternatives would eliminate the unroaded condition of the areas, change the recreation opportunity (ROS) class to roaded natural/roaded modified, and eliminate any future opportunity to propose for wilderness designation.

Table C-5 Management Acres for Bull of the Woods by alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A3 Research Natural Area	600	600	600	600	600	600	600
A4 Special Interest Area	400	0	400	1100	0	400	400
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	10,800	10,400	10,400
B2 Scenic Viewshed	100	0	0	0	0	0	0
B8 Earthflow	0	0	300	1400	0	0	0
C1 Timber Emphasis (see note)	10,300	10,800	10,100	8,300	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

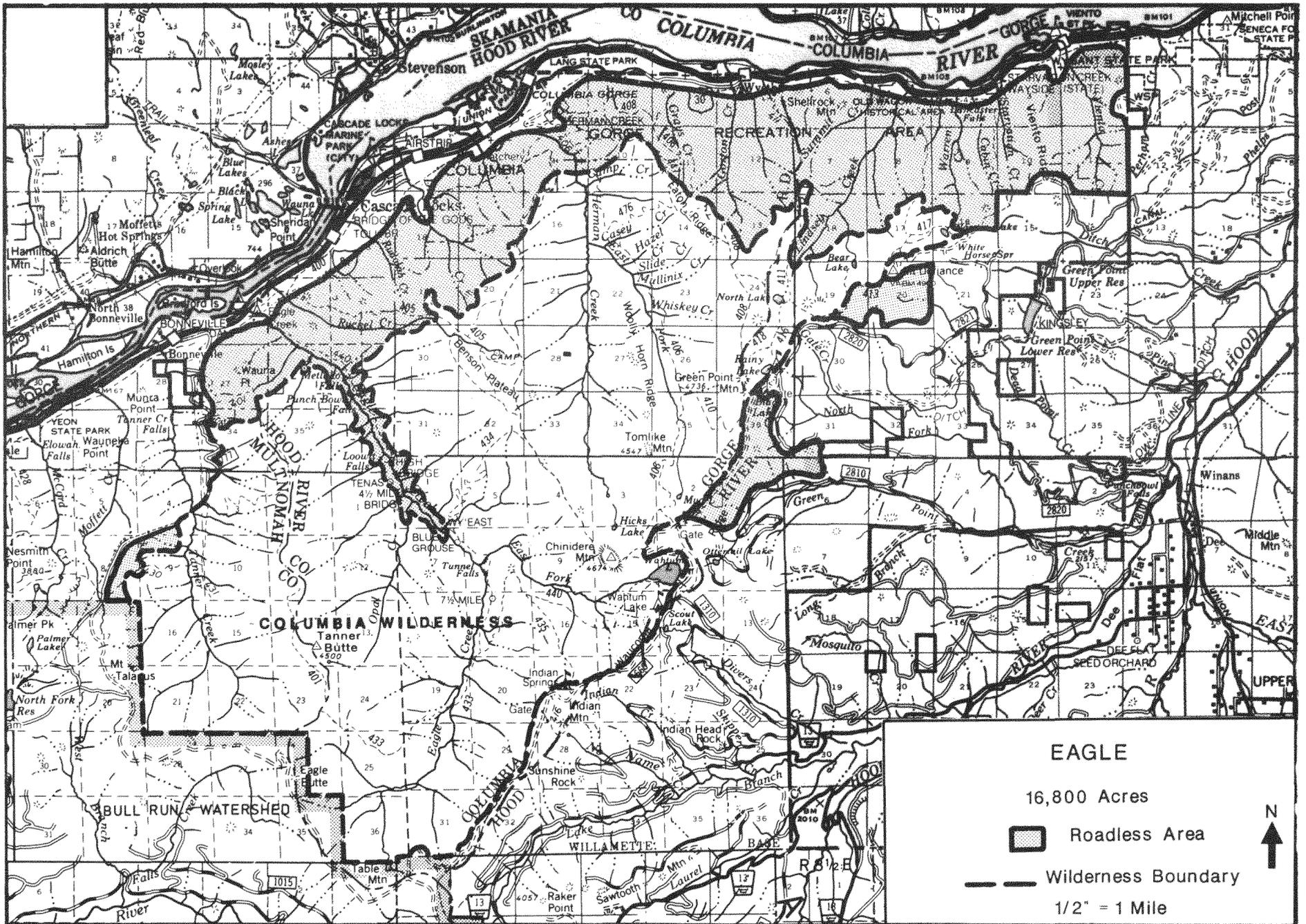
Table C-6 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Roded/Harvested	0	145	144	142	7	142	0
MMBF Harvested	0	8.4	8.3	8.2	0.4	8.2	0
Roding Cost (\$MM)	0	0.26	0.26	0.25	0.01	0.25	0

In alternatives E and G, 85% of the area will be available for timber harvest in timber emphasis and earth flow allocations. The boundary of the SIA is expanded, and in conjunction with the Research Natural Area, would maintain the majority of piece C in an unroded condition. However, the other two pieces will be harvested in the first decade, changing the ROS class to roded natural/roded modified, and eliminating the opportunity to propose for wilderness designation.

Alternatives B and C propose allocation of the entire area (with exception of RNA) to timber emphasis with the exception of the areas needed to meet minimum management requirements. Harvest will occur in the first decade and eliminate the unroded character of the area. The ROS class would tend to roded modified. There would be no potential for future addition to the wilderness.

E A G L E



I. DESCRIPTION

History

Through the RARE I inventory process two major acreages in the Columbia Gorge were identified as unroaded, Gorge (#608) and Eagle (#607). The Eagle Roadless Area met the criteria for designation as a new Wilderness Study Area. However, it was not included in the final recommendations because of the near completion of the Eagle Creek Planning Unit FEIS (1/75).

This unit plan aggregated the two RARE I areas and established management direction for some 69,200 acres. The final environmental statement recommended 40,900 acres as a Wilderness Study Area. This study area was a portion of the original Eagle Roadless Area. The remaining acres (portions of Eagle and all of Larch Roadless Area) were classified for scenic and landscape management.

The RARE II process inventoried only the recommended wilderness study area. As a result of this process, 41,200 acres were allocated for wilderness uses.

The Eagle area was included in the Oregon Wilderness Act of 1979 (S-2031), and in the Oregon Wilderness Bill of 1983 (HR 1149). The area that remains unroaded after passage of the Oregon Wilderness Bill (1984) is predominantly the face of the Columbia Gorge with two small pieces on the eastern boundary.

Location and Access

The Eagle area is located on the Columbia Gorge and Hood River Ranger Districts almost entirely within Hood River County. It is 40 miles east of Portland and 15 miles west of Hood River.

The northern perimeter extends from Eagle Creek campground near Interstate 84, eastward along the Gorge to Viento State Park. The southern boundary, with the exception of a corridor along the Eagle Creek Trail, follows steep topography one to one and one-half miles from the Columbia River. One of the pieces on the eastern boundary is located southeast of Mt. Defiance and the other is south of Black Lake.

Primary road access is via Interstate 84 and Forest Roads 2820, 2821, and 2810. A variety of horse and hiker trails access the area including Eagle Creek and the Pacific Crest Trail.

Physiography and Soils

The face of the Columbia Gorge is characterized by spectacular basalt cliffs, rocky toeslopes and rock outcroppings. The Mt. Defiance/Black Lake area is nearly level to sloping glaciated uplands. The majority of the topography is

very steep and rugged ranging from 800 feet to 4960 feet at Mt. Defiance. Soils on the steep north facing slopes are of igneous formation and are extremely stony, cobbly loams. Soils in the Mt. Defiance/Black Lake area are unconsolidated glacial till forming sandy and silt loams.

Vegetation

The majority of the area is forested. Douglas fir, western hemlock, western red cedar, red alder, noble fir and Pacific silver fir characterize the face of the Gorge. The understory shrub/forb layer is extremely diverse: vine maple, huckleberry, salal, Oregon grape, Oxalis, swordfern, bracken fern, trillium, vanilla leaf and others. At the upper elevation of Mt. Defiance/Black Lake, species include mountain hemlock, Pacific silver fir, noble fir, and lodgepole pine. The understory contains more mesic species such as service berry, rhododendron, and beargrass.

Current Use

General management policy (Eagle Creek FEIS, 1/75) established a Special Interest Zone - Scenic for the majority of the Eagle unroaded area. This zone is managed to preserve and protect special scenic values and unique natural features.

Activities along the Gorge face include hiking, picnicking, viewing scenery, and automobile touring. Mt. Defiance and Black Lake afford excellent opportunities to view scenery.

Surroundings and Attractions

The northern boundary of the area, the Gorge face, approaches the freeway, frontage roads, railroads, communities, and powerlines. The southern boundary is the Columbia Wilderness. To the east is non-National Forest land. Adjacent to the western boundary (Eagle Creek) are lands managed for scenic qualities. The Defiance/Black Lake areas are bounded by the Columbia Wilderness and general forest lands.

Major attractions include the Eagle Creek Trail and associated waterfalls, other trail systems, and a variety of historic sites. The unique geology and scenery couple to make the face of the Gorge a much visited area.

II. CAPABILITY

Manageability and Boundaries

The larger face of the Gorge area could be managed in an undeveloped condition. The boundaries, inherited from wilderness designation to the south and development (roads) to the north, form a manageable unit. The two smaller areas on the eastern boundary could be managed in undeveloped condition though they will be exposed to adjacent management activities (electronic site, roads, timber harvest). All of the remaining Eagle unroaded area provide a buffer to the Columbia Wilderness.

Natural Integrity and Appearance

The overall development of Eagle unroaded area is low. Development includes trails, recreation facilities, power lines and past timber harvesting. These features affect less than 10% of the area. The Eagle area, away from locations of concentrated use, is natural appearing with ecological processes not greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

Opportunities for solitude and primitive recreation for the face of the Gorge portion is moderate to high with the exception of popular hiking trails. The vegetation and terrain effectively screen users from one another and create recreation challenge off of established trails. Off-site intrusions are observable, particularly at the lower elevation along the northern boundary. The Mt. Defiance/Black Lake area provides little opportunity for solitude, primitive recreation or challenge.

Special Features

Adjacent to the area, there are several historic features that have been listed on the National Register of Historic Places. These are the Eagle Creek campground, Columbia Gorge Work Center, and Columbia Gorge Old Wagon Road. In addition, Mt. Defiance is a former fire lookout site. Since little of the area has undergone surveys, other sites, especially prehistoric ones, probably occur in the area.

Biologically, the area is very diverse providing habitat for endemic animal and plant species such as the Larch Mountain Salamander. There are more than ten plant species currently on the Region's sensitive list found in the Columbia River Gorge.

III. AVAILABILITY

Recreation

The Eagle unroaded area provides a range of recreation opportunities. The popular trail systems are heavily used with the steep, timbered slopes largely unexplored. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	36370
RM	5695
SPNM	10465
R	3655

Wildlife and Fish

The area has the capability to provide habitat for the following management indicator species: spotted owl, pine marten, pileated woodpecker, ruffed grouse and deer/elk. A wintering population of bald eagles is sometimes present along the northern boundary. At elevations below 2400 feet, the area may provide critical winter range for deer and elk.

The Columbia River Gorge is the southern limit of many northern plant and animal species and the northern limit of typically southern species. Also, the sea level passage through the Cascades allows mingling of eastern and western elements. These influences provide great habitat diversity.

The area encompasses quality fish habitat that supports populations of anadromous fish and resident trout. Fisheries objectives include maintenance and enhancement of water quality for self-sustaining fish populations and for two hatchery facilities on Eagle and Herman Creeks.

Water

The area is within the Columbia River Basin. Eagle Creek, Herman Creek, and a variety of other tributaries drain the area. The Mt. Defiance/Black Lake pieces drain east into the Hood River. There is a small hydroelectric project proposed for Gorton Creek. The potential for further exploration and development in the area is moderate.

Timber

The area contains approximately 8020 acres of land suitable for timber production. Species include Douglas-fir, western hemlock, western red cedar, noble fir, and Pacific silver fir.

There is a current standing volume of 83.2 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 1.0 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	L	L	10	L	M

The potential for geothermal and oil and gas exploration and development is low. There have been a number of claims filed for locatable materials. However, the potential for continued exploration or development is low.

Fire

Fuels in the area generally are thin ground fuels with occasional areas of concentrated woody material. Fires burning in these fuels would be generally of low intensity with low spread rates.

Insects and Disease

There have been outbreaks of balsam woolly aphid in the past. There is evidence of spruce budworm activity in the Mt. Defiance/Black Lake area. The potential is low for further damage or significant insect and disease outbreak.

Land Use

There is a 120 acre inholding of private land near Viento State Park (T2N, R9E, Sec. 3). This piece is part of an ongoing land exchange and should be acquired by the end of the calendar year.

Though excepted from the unroaded area, there is an electronic site on Mt. Defiance.

IV. NEED FOR UNROADED AREAS

Directly south of Eagle unroaded area is the Columbia Wilderness. Other nearby wildernesses are: Indian Heaven, Trapper Creek, Mt. Hood, Salmon-Huckleberry, and Badger Creek. In addition, there are several sizeable areas to the south that have historically been managed as dispersed unroaded recreation: Wind Creek and Twin Lakes. The ecosystems within Eagle are represented in the adjacent wilderness.

The Eagle Creek Planning Unit, a unit plan completed in 1975 analyzed public response pertinent to land allocations in the area. There was divided opinion on wilderness and Special Interest - Scenic classification.

V. ENVIRONMENTAL CONSEQUENCES

Table C-7 indicates the different management allocations, by alternative, for the Eagle unroaded area. Table C-8 presents the first decade timber harvest and roading schedule by alternative.

Alternatives F, H, and I maintain the current unroaded character of the entire area through allocation to a special interest area (SIA) or dispersed unroaded recreation area. The SIA is designed to retain the current level of development. These three alternatives therefore, maintain unroaded qualities and allow for future addition to the Columbia Wilderness.

Three alternatives, D, E, and G, maintain the majority of the unroaded area by allocation as an SIA or dispersed unroaded recreation. Alternative D allocates approximately 94% of the area to management prescriptions that would perpetuate

unroaded character. The area allocated to timber emphasis is in the southern and eastern portions of the Mt. Defiance and Black Lake pieces, respectively. For alternatives E and G, 91% of the area will be managed by prescriptions that protect the unroaded qualities. The area available for timber harvest through either dispersed roaded recreation with timber harvest or timber emphasis allocations is located in the Mt. Defiance, Black Lake areas. In all alternatives, timber harvest is deferred until the second decade. In addition, the face of the Gorge would be available for addition to the wilderness or continued unroaded management.

Alternative A allocates approximately 87% of the area as an SIA. The Mt. Defiance and Black Lake pieces are proposed for management as scenic viewshed

Table C-7 Management Acres for Eagle by alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A4 Special Interest Area	14,700	0	14,600	14,600	14,600	14,600	14,600
A5 Unroaded Recreation, No Timber Harvest	0	0	1200	800	2200	2100	2200
A7 Old Growth	0	0	0	0	0	100	0
B2 Scenic Viewshed	700	0	0	0	0	0	0
B3 Roaded Rec., Reduced Timber Harvest	0	0	0	300	0	0	0
C1 Timber Emphasis (see note)	1400	16,800	1000	1100	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-8 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Roaded/Harvested	0	0	0	0	0	0	0
MMBF Harvested	0	0	0	0	0	0	0
Roding Cost (\$MM)	0	0	0	0	0	0	0

(extended rotation) and timber emphasis. Both management areas allow timber harvest and would eliminate the unroaded qualities of these two small areas. Entry for timber harvest is deferred until the second decade. The face of the Gorge would be available for addition to the wilderness or continued unroaded management.

For alternatives B and C the entire unroaded area, excepting the areas needed to meet minimum management requirements is allocated to timber emphasis. Harvest is proposed in the second decade. The suitable acres are scattered throughout the face of the Gorge, the Mt. Defiance, and the Black Lake portions of the unroaded area. The area would no longer have semi-primitive nonmotorized recreational opportunities. There would not be potential to add any of the unroaded area to the Columbia Wilderness or manage in unroaded condition in the future.

L A R C H

C-30

I. DESCRIPTION

History

Through the RARE I inventory process two major acreages in the Columbia Gorge were identified as unroaded, Gorge (#608) and Eagle (607). The Eagle Roadless Area met the criteria for designation as a new Wilderness Study Area. However, it was not included in the final recommendations because of the near completion of the Eagle Creek Planning Unit FEIS (1/75).

This unit plan aggregated the two RARE I areas and established management direction for some 69,200 acres. The Larch Roadless Area was classified for special interest - scenic and landscape management.

Location and Access

The Larch area is located on the Columbia Gorge Ranger District within Multnomah County. It is 30 miles east of Portland and 25 miles west of Hood River.

The northern perimeter extends from Benson State Park on Interstate 84, eastward along the Gorge to Bonneville Dam. The southern perimeter follows the Bull Run Watershed boundary.

Primary road access is via Interstate 84 and Forest Roads 15 and 1520. There is no access to the south through the Bull Run Watershed. The area is well accessed by trails including the popular Multnomah Falls Trail.

Physiography and Soils

The face of the Columbia Gorge is characterized by spectacular basalt cliffs, waterfalls and rocky outcroppings. The upper elevations are predominantly sloping ridges. The topography is steep and rugged ranging from 200 feet near Multnomah Falls to 3880 feet at Nesmith Point.

Soils on the steep north facing slopes are of igneous formation and are gravelly to cobbly gravelly loam.

Vegetation

The majority of the area is forested. Douglas-fir, western hemlock, western red cedar, red alder, and rocky mountain maple characterize the lower elevations intergrading to Pacific silver fir and noble fir at upper elevations. Understory vegetation is more diverse than at any other location on the forest, rich in both the shrub and forb components.

Current Use

General management policy (Eagle Creek FEIS, 1/75) established a special interest zone - scenic and landscape management for the unroaded area. The SIA is managed to preserve and protect the special scenic values and unique natural features.

The Larch area contains some of the most popular locations to view scenery on the Forest. Activities along the face of the Gorge include hiking, picnicking, viewing scenery, and automobile touring. Multnomah Falls receives more than 2 million visitors per year.

Surroundings and Attractions

The northern boundary of the area, the Gorge face, approaches the freeway, frontage roads, railroads, communities, and powerlines. The southern boundary is the Bull Run Watershed (closed to public entry).

Major attractions include spectacular waterfalls (Wahkena, Horsetail, and Multnomah), the Oneonta Gorge Botanical Area, Larch Mountain and Multnomah Falls Lodge (adjacent).

II. CAPABILITY

Manageability and Boundaries

The Larch area could be managed in an undeveloped condition. The boundaries, Bull Run Watershed to the south and roading/development to the east, north and west are logical and well defined.

Natural Integrity and Appearance

The overall development of Larch unroaded area is low. Development includes trails and recreation facilities. These features affect less than 10% of the area. Away from areas of concentrated use, the Larch area is natural appearing with ecological processes not greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

Opportunities for solitude and primitive recreation is moderate to high with the exception of popular hiking trails. The vegetation and terrain effectively screen users from one another. Off-site intrusions are observable particularly at the lower elevation along the northern boundary.

Special Features

Adjacent to the area, and listed on the National Register of Historic Places, is the Multnomah Falls Lodge. The western end of the unroaded area contains logging camps and railroad grades left from activities of the Bridal Veil

Lumbering Company, dating from the 1880's. The same area was comparatively well settled at the turn of the century and more developed improvements such as Bell's Camp, several cabins, trails, and old roads remain. Since little of the area has undergone surveys, other sites, especially prehistoric ones, probably occur in the area.

Biologically, the area is very diverse providing habitat for endemic animal and plant species such as the Larch Mountain Salamander. There are more than ten plant species currently on the Region's sensitive list found in the Columbia River Gorge.

III. AVAILABILITY

Recreation

The Larch unroaded area provides a range of recreation opportunities. The popular trail systems are heavily used with the steep, timbered slopes largely unexplored. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	13285
RM	3580
SPNM	19835

Wildlife and Fish

The area has the capability to provide habitat for the following management indicator species: spotted owl, pine marten, pileated woodpecker, ruffed grouse and deer/elk. A wintering population of bald eagles is sometimes present along the northern boundary. At elevations below 2400 feet, the area may provide critical winter range for deer and elk.

The Columbia River Gorge is the southern limit of many northern plant and animal species and the northern limit of typically southern species. Also, the sea level passage through the Cascades allows mingling of eastern and western elements. These influences provide great habitat diversity.

The area encompasses quality fish habitat that supports populations of anadromous fish and resident trout. Fisheries objectives include maintenance and enhancement of water quality for self-sustaining fish populations and for three hatchery facilities on Tanner Creek.

Water

The area is within the Columbia River basin. Multnomah, Oneonta, Tanner, and a variety of other tributaries drain the area.

Timber

The area contains approximately 11,475 acres of land suitable for timber production. Species include Douglas-fir, western hemlock, western red cedar, noble fir, and Pacific silver fir. There is a current standing volume of 101.1 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 1.1 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	L	L	-	L	L

The potential for geothermal, oil and gas, and locatable exploration and development is low.

Fire

Fuels in the area generally are thin ground fuels with occasional areas of concentrated woody material. Fires burning in these fuels would be generally of low intensity with low spread rates. Fire suppression in the area would be an important management consideration as the potential exists for fire to spread from the Larch area into the Bull Run Watershed.

Insects and Disease

There were a few outbreaks of balsam woolly aphid identified in the area in the past. The potential is low for further damage or significant insect and disease outbreak.

Land Use

There are five parcels of private (or State) inholdings. Two of the parcels will be acquired in the next year or two (20 acres in Sec. 18 of T.2N, R.6E and the State land in Section 28 of T.2N, R.6E). The owners of the remaining parcels of private land, in Sections 12, 14, and 15 of T.2N, R.6E, are not interested in exchange or sale at this time.

IV. NEED FOR UNROADED AREAS

Directly south of Larch unroaded area is the Bull Run Watershed which is closed to public entry. Nearby wilderness are: Indian Heaven, Trapper Creek, Mt. Hood,

Salmon-Huckleberry and Badger Creek. In addition, there are several sizeable areas that have historically been managed as dispersed unroaded recreation: Wind Creek and Twin Lakes. The ecosystems within Larch are represented in the adjacent wilderness.

The Eagle Creek Planning Unit, a unit plan completed in 1975 analyzed public response pertinent to land allocations in the area. There was divided opinion on wilderness and Special Interest - Scenic classification.

V. ENVIRONMENTAL CONSEQUENCES

Table C-9 indicates the different management allocations, by alternative for the Larch unroaded area. Table C-10 presents the first decade timber harvest and roading schedule by alternative.

Alternatives H and I maintain the current unroaded character of entire area through allocation to a special interest area (SIA) or dispersed unroaded recreation area. The SIA is designed to retain the current level of development. These two alternatives, therefore, maintain unroaded qualities and allow for future consideration of the area for wilderness designation.

Alternative A maintains approximately 91% of the unroaded area by allocation as an SIA. The area to be managed for timber emphasis is concentrated to the west: south of the road above Multnomah Creek, and north and west of Sherrard Point. This small area will not be entered for timber harvest until the second decade. The majority of the area that remains would be available for future consideration as wilderness and continued unroaded management.

In alternatives D, F, E, and G, the size of the SIA is reduced (small dispersed unroaded recreation area remains constant) and the area allocated for timber emphasis or as a scenic viewshed increases proportionately. The scenic emphasis allocation does allow timber harvest at a reduced rate. In Alternative F, the area allocated as a scenic viewshed is concentrated in the southern and western portions of the unroaded area. Timber harvest would be deferred until the second decade and increase the areas of roaded natural recreational opportunity (ROS). The SIA will limit development of more than one-half of the unroaded area in a contiguous block, and would be available for future consideration as wilderness.

Alternatives E and G are similar to Alternative F with the area west of Oneonta Creek remaining in scenic emphasis. However, the area in the southern portion of unroaded area (near Nesmith Point, Yeon Mountain, and upper reaches of Horsetail Creek) is allocated to timber emphasis. Harvest would occur in the first decade in Alternative E and be deferred until the second decade in Alternative G. These areas would be eliminated from unroaded management and roaded natural/roaded modified ROS classes would be increased. The SIA would be available for future consideration as wilderness.

Alternative D proposes the area as described in Alternatives F, E, and G be allocated as timber emphasis. Harvest would occur in the first decade,

eliminating these areas from unroaded management and increasing the roaded modified ROS class. The SIA would be available for future consideration as wilderness.

Lastly, Alternatives B and C propose allocation of the entire unroaded area excepting the areas needed to meet minimum management requirements to timber emphasis. Harvest would occur in the first decade with suitable land available throughout the unroaded area. The area would no longer have semi-primitive nonmotorized recreational opportunities but, rather, would tend to a roaded modified experience. In addition, the area would be eliminated from future consideration as a wilderness area or for continued unroaded management.

Table C-9 Management Acres for Larch by Alternatives

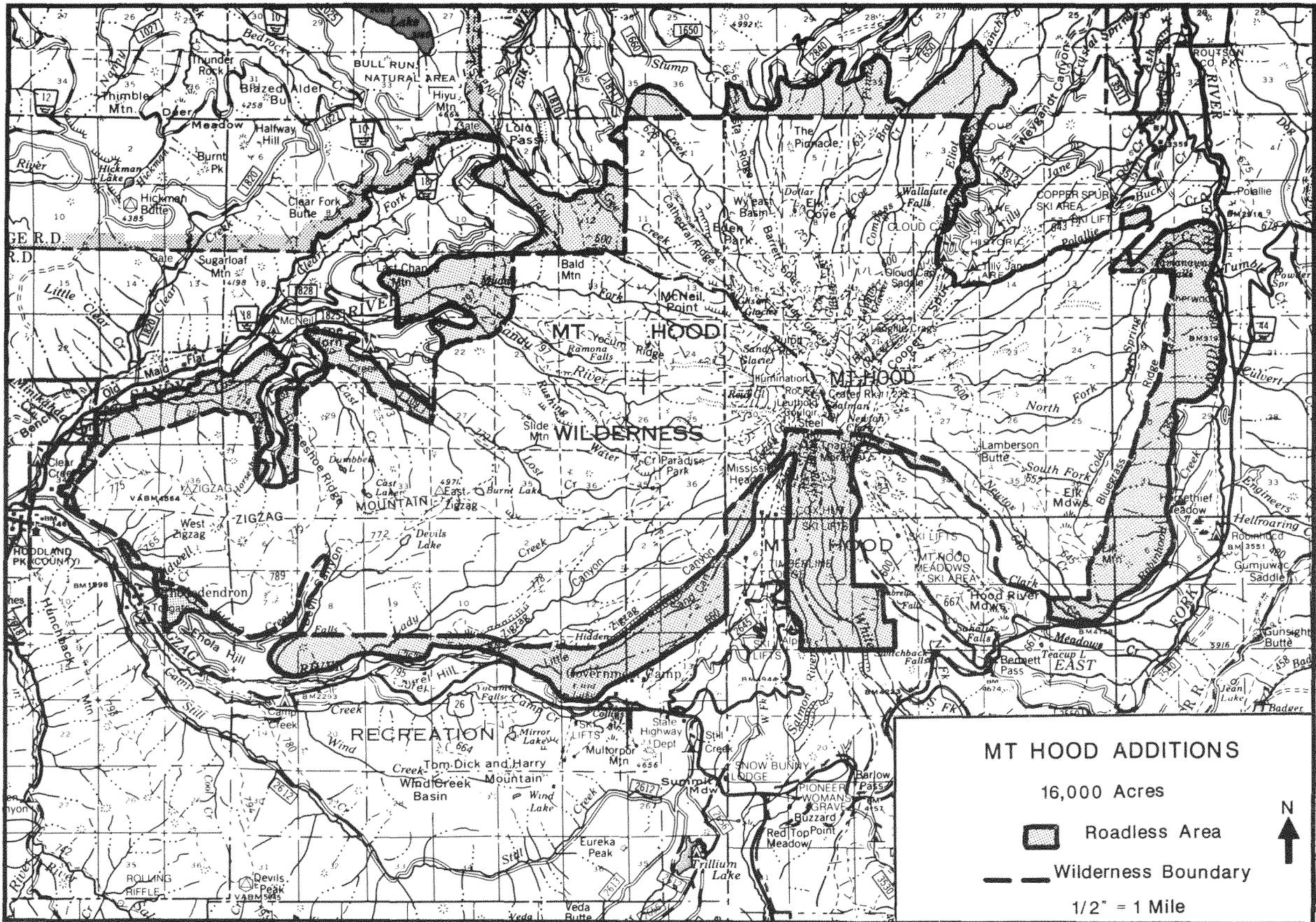
Management Areas:	A	B & C	D	E & G	F	H	I
A4 Special Interest Area	12,700	0	7800	7800	7800	7800	7800
A5 Unroaded Recreation, No Timber Harvest	0	0	400	400	400	6100	6100
B2 Scenic Viewshed	0	0	0	3800	5700	0	0
C1 Timber Emphasis (see note)	1200	13,900	5700	1900	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-10 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B	C	D	E	F & G	H & I
Suitable Acres Roded/Harvested	0	297	332	167	66	0	0
MMBF Harvested	0	10	11	5	2	0	0
Roding Cost (\$MM)	0	0.5	0.6	0.3	0.1	0	0

MT . HOOD ADDITIONS



I. DESCRIPTION

History

In 1964, the Mt. Hood Wilderness encompassed 14,100 acres. Ten years later, the RARE I process identified over 33,000 acres surrounding the wilderness as a Wilderness Study Area. These acres were included in Senate Bill S-658, addressed in the Mt. Hood Interagency Planning Unit, and added to the wilderness system through the Endangered American Wilderness Act of 1978. This made the Mt. Hood Wilderness a total of 47,160 acres.

RARE II identified and inventoried additional unroaded acres surrounding the 1978 wilderness boundary, the Mt. Hood Additions. These areas were allocated for nonwilderness uses.

Location and Access

The Mt. Hood Additions are located on the Hood River and Zigzag Ranger Districts in Clackamas and Hood River Counties. The areas are 40 miles southeast of Portland and 20 miles southwest of Hood River.

The additions are bounded by: Forest Roads 2639, 2645, Highway 26 and ski area development on the south; Road 2520 and Highway 35 on the east; Roads 3512, 2840, 1650 and 1810 on the north, and Roads 1828, 1825 and Lolo Pass Road (18) on the west.

Over 18 trails access the area, almost all leading through the additions into the existing wilderness. The Pacific Crest National Scenic Trail traverses about 2.5 miles of the section that forms the headwaters of White River.

Physiography and Soils

The area is contiguous with the Mt. Hood Wilderness. Topography is varied, characterized by glacial outwash plains, moderate to steep glaciated uplands and mountain slopes. Steep valley sideslopes and the deeply cut tributary of the White River are other features. Elevations range from 1,600 feet near Clark Creek to about 8,000 feet below Triangle Moraine on Mt. Hood.

Soils located on the steep east and west slopes are gravelly loam. Sandy/silt loams characterize the uplands of the northern portions of the additions. Unweathered sands, gravels and silt deposits are found in the Sandy, Zigzag and White River drainages.

Vegetation

The majority of the additions are forested with the exception of the area that forms the headwaters of White River. The southern portion of the area is

comprised of western hemlock, Douglas-fir, noble fir, and Pacific silver fir. The forested land in the White River area is largely mountain hemlock, Pacific silver fir, and subalpine fir. The area east of Bluegrass Ridge is a compliment of Douglas-fir, grand fir, noble fir and some western larch. The northern and western portions of the additions are predominantly western hemlock, Pacific silver fir, noble fir, Douglas-fir and lodgepole pine. The understory species are quite varied with areas of wet and mesic forb and grass land, alpine cushion plant communities, and krumholz.

Current Use

Management direction for the majority of the additions is roaded recreation. Concentrated recreation use is associated with the three developed ski areas that are adjacent to the additions boundary.

Major activities include hiking, camping, fishing, and cross-country skiing. Recreation use for the area is influenced by the trails through the unroaded area that provide access to the wilderness.

Surrounding and Attractions

The unroaded area is bounded by road systems and, on one or more sides, by the wilderness. Three ski areas have a common boundary with the additions. They are: Timberline Lodge, Mt. Hood Meadows, and Cooper Spur. The community of Government Camp is directly south of the area.

Major attractions include parts of the White River and Newton Clark Glaciers and the White River drainage. Fairly extensive alpine meadows are found adjacent to the Mt. Hood Meadows Ski Area.

II. CAPABILITY

Manageability and Boundaries

All portions of the additions could be managed in an undeveloped condition in compliment with the Mt. Hood Wilderness. However, all of the areas are influenced by the sights and sounds of adjacent development. This is particularly true of the White River piece which is influenced by adjacent ski areas, and the piece east of Bluegrass Ridge influenced by Highway 35 and adjacent timber harvest activities. These potential additions do not provide more maneageable boundaries for the Mt. Hood Wilderness.

Natural Integrity and Appearance

The overall development of the Mt. Hood additions is low confined to the trail system. There is evidence of recreation use. These features affect less than 10% of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

Opportunities for solitude are low. However, vegetation and terrain create the potential for recreation challenge.

Special Features

The additions contain portions of the Timberline Trail, built by the CCC in 1934. The west end of the area contains the Creighton Homestead of 1898 and the northeast portion contains the Harmon Homestead of 1898. Sites of prehistoric occupation are likely to exist.

There are no known sensitive plant or animal species identified in the area.

III. AVAILABILITY

Recreation

These remaining unroaded pieces have the potential to provide a variety of recreation activities. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	26039
RM	14718
SPNM	8400
R	3655

Wildlife and Fish

The area has the capability of providing habitat for the following management indicator species: spotted owl, pine marten, pileated woodpecker, ruffed grouse and deer/elk. The limited portions of the area less than 2400 feet in elevation have the potential of providing critical deer/elk winter range. The quality of wildlife habitat is limited by the areas high elevations, steep slopes and poor soil conditions.

A number of glacial-fed streams support populations of anadromous fish and resident trout. Fisheries objectives focus on maintenance of self-sustaining fish populations.

Water

The additions fall within three major river basins: Sandy, White River, and Hood River. Intakes for proposed hydroelectric projects occur on the Coe and Elliott branches of the Middle Fork Hood River. Others occur on the Salmon River and Devils Canyon, a tributary of the Zigzag River. The potential for additional hydroelectric exploration in this area is moderate, though the

probability of development is low. Powerlines, a key consideration in a small hydroelectric project, exist on the western boundary of the additions along the Sandy River.

Timber

The area contains approximately 10,771 acres of land suitable for timber production. Species are western hemlock, Douglas-fir, noble fir and Pacific silver fir. There is a current standing volume of 100.9 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 1.2 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
200	-	M	L	-	L	M (along White Riv)

The Mt. Hood area was included in a study prepared by the U. S. Geological Survey (Professional Paper 1300). Their study identified three geothermal-resource potential areas. Two of the areas fall within the eastern and western portions of the existing wilderness and the adjacent Mt. Hood Additions. The third, the Mt. Hood Known Geothermal Resource Area (KGRA), surrounds the summit and includes the upper reaches of the White River drainage. Three deep development geothermal gradient holes were drilled; two in the Old Maid Flat area and one at Timberline. The results were unsatisfactory and no development followed. The potential for continued exploration and development is moderate.

While there have been lease application areas for oil and gas near or within the additions, the potential for exploration and development is low.

The U. S. Geological Survey study recognized an area of substantiated mineral resource potential near the unroaded area: Lady Creek - Laurel Hill. However, the potential for prospecting and development is low.

There is potential for development of saleable minerals in the White River area. An active quarry currently operates in the White River area adjacent to the additions boundary.

Fire

Fuels in the area are generally thin ground fuels with occasional concentrations of heavy woody material. Fires burning in these fuels would be generally of low intensity with low rates of spread.

Insects and Disease

Isolated outbreaks of mountain pine beetle have occurred in the eastern portions of the Mt. Hood Wilderness and the adjacent additions. Small acreages of trees damaged by Douglas-fir beetles have been identified in the extreme western portions of the area. There is some evidence of spruce budworm activity. The potential is low for extensive damage or significant outbreaks of insects or disease.

IV. NEED FOR UNROADED AREAS

To the south and southeast of the Mt. Hood Additions are the Wind Creek and Twin Lakes unroaded areas. Nearby wilderness includes Columbia to the north, Salmon-Huckleberry and Badger to the south and southwest, respectively. The ecosystems present in the Mt. Hood unroaded area are similar to those in the wilderness.

During the development of the Mt. Hood interagency Planning Unit, the public was involved in the process to determine land allocations for the general area. There was a desire expressed to have unroaded areas available for recreation.

V. ENVIRONMENTAL CONSEQUENCES

Table C-11 indicates the different management allocations, by alternative, for the Mt. Hood unroaded area. Table C-12 presents the first decade timber harvest and roading schedule by alternative. (Within the existing unroaded area boundary, there is a small portion of the permit area for the adjacent developed ski area. This is common to all alternatives.)

Alternative H allocates the entire area (exclusive of the developed recreation-ski areas) to dispersed unroaded recreation. Alternative I manages the Cloud Cap - Tilly Jane area as a special interest area (SIA). The SIA will perpetuate the historic features of the area. The rest of the unroaded area is to be managed as dispersed unroaded recreation. Therefore, both alternatives maintain unroaded qualities and allow for future addition to the wilderness.

Five alternatives, A, D, F, E and G, propose management of the additions for timber or scenic emphasis. Alternatives D, F, E, and G allocate the Salmon River as a proposed Wild and Scenic River (recreational segment). In Alternative A, the timber emphasis area occurs in the northern portion of the additions (from approximately Tilly Jane to McGee Creek, and also in the southern portion (the area south of Zigzag Canyon and Triangle Moraine). The area south of Triangle Moraine has only a small area of suitable timber land. The areas on an extended rotation as scenic viewsheds occur east of Bluegrass Ridge, along the western boundary (south of McGee Creek) and on the southern boundary (north of Laurel Hill). Harvest will occur in the first decade. The area will not maintain unroaded qualities or be available as future wilderness additions. In Alternatives D, E, and G, the northern and western portion of the additions is proposed as timber emphasis. The areas along the southern and eastern boundary

are to be managed for scenic emphasis. (The wildlife/visual emphasis is in the southern portion of the Bluegrass area in Alternatives E and G.) Harvest will occur in the first decade. The unroaded qualities of the area will be eliminated as will be the potential for additions to the wilderness. Alternative F allocates the additions to scenic emphasis with harvest proposed for the first decade. The unroaded qualities and potential for wilderness will be eliminated. Alternatives B and C allocate the majority of the unroaded area to timber emphasis with the exception of the areas needed to meet minimum management requirements. The suitable timber lands are located throughout the unroaded area with the exception of the area south of the Triangle Moraine. Harvest is planned for the first decade. This intensity of harvest would eliminate the unroaded character of Mt. Hood Additions. The semi-primitive nonmotorized recreational opportunities would also be changed to roaded natural/roaded modified. There would be no opportunity for future additions to the wilderness.

Table C-11 Management Acres for Mt. Hood Additions by Alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A4 Special Interest Area	0	0	0	0	0	0	600
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	0	15,100	14,500
A10 Developed Rec. Ski Areas	900	900	900	900	900	900	900
B1 Wild/Scenic/Rec. River	500	0	500	500	500	0	0
B2 Scenic Viewshed	8300	0	7800	7700	14,600	0	0
B9 Wildlife/Visual Area	0	0	0	1000	0	0	0
C1 Timber Emphasis (see note)	6300	15,100	6800	5900	0	0	0

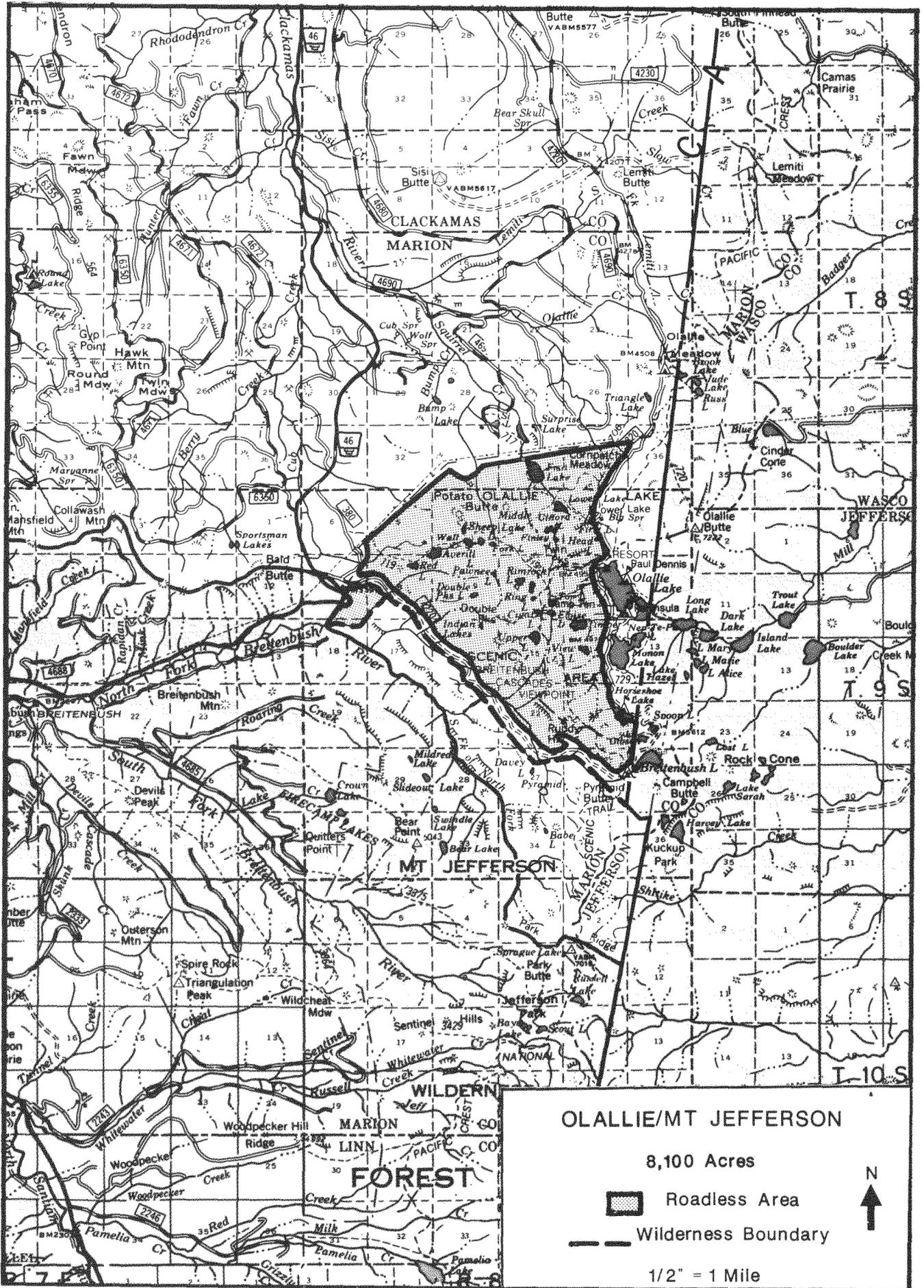
NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-12 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Roaded/Harvested	0	333	222	161	91	161	0
MMBF Harvested	0	10.1	6.7	4.8	2.7	4.8	0
Roding Cost (\$MM)	0	0.56	0.37	0.27	0.15	0.27	0

OLALLIE / MT. JEFFERSON

C-46



I. DESCRIPTION

History

The Olallie area was studied during both the RARE I and RARE II processes. It was not included in the final list of candidate Wilderness Study Areas by RARE I. RARE II allocated the area to further planning. As a result, a Forest level environmental analysis report was developed in 1983 displaying a variety of management alternatives. These alternatives will be analyzed within the framework of the Mt. Hood Forest Plan.

Location and Access

The Olallie area is located on the Clackamas Ranger District within Marion and Jefferson Counties. It is 85 miles southeast of Portland and 70 miles northeast of Salem.

The area is bounded on the north by the BPA McNary - Santiam Powerline and on the east and west by Forest Road 4220 (with a small exception west of 4220 and east of State Highway 46: the Mt. Jefferson addition).

Over 44 miles of interconnecting trails traverse the area including 8-1/2 miles of the Pacific Crest National Scenic Trail.

Physiography and Soils

The area is mostly gently rolling plateau land with lake filled depressions. Cone-shaped buttes and peaks dot the terrain. The north half is a gentle glacial outwash area while the southern portion is characterized by rock cliffs and talus slopes. The Mt. Jefferson addition is a steep, southwest facing slope. Elevation ranges from 2800 feet near the Breitenbush River to 5998 feet at the top of Double Peaks.

The unroaded area is covered with glacial till. It ranges from a thin veneer on ridges and sideslopes to greater depths in morainal deposits and depressions. Soil textures range from sandy loam to a fine sandy loam. Stones, cobbles, and gravels make up 50% or more of the soil volume. The soil structure is weak and offers little resistance to erosion.

Vegetation

The majority of the area is forested. Major tree species include noble fir, Pacific silver fir, mountain hemlock and lodgepole pine. The understory is comprised of huckleberry, including grouse huckleberry, bear grass, and a variety of other shrubs, forbs, and sedges. The volcanic history of the area has produced an extensive system of wetlands (lakes and meadows).

Current Use

The area has long been managed as the Olallie Lake Scenic Area, noted for its high elevation forests, lakes, and meadows. Major use of the area is recreation. Activities include fishing, camping, hunting, berry picking, hiking, photography and snowmobiling. Recreation use totals 106,000 RVDs, with over 70% of the use occurring at the lakes.

Surroundings and Attractions

The area is bordered on the north by general forest land and on the south, southwest by the Mt. Jefferson Wilderness. To the east is a portion of the Olallie Special Interest area. The Warm Springs Indian Reservation is also east of the unroaded area and is managed to protect recreation values.

The Olallie area is a high elevation plateau with many lakes, numerous small ponds, and hundreds of meadows and wetlands. Several outstanding cinder cones and unique geologic landforms add scenic value and provide viewpoints of the surrounding area and Mt. Jefferson. Adjacent to the eastern boundary of the unroaded area is the popular Olallie Lake and resort.

II. CAPABILITY

Manageability and Boundaries

The powerline to the north and Road 4220 form logical boundaries and are adequate to manage the unroaded area in an undeveloped condition. The topography and vegetation combine to screen the visitor from the sights and sounds of development along the eastern boundary. The present roading provides adequate access for both management activities and a variety of recreation uses.

Natural Integrity and Appearance

The overall development of Olallie is low away from the developed recreation sites and low standard Skyline Road (4220). Development within, or adjacent to the area, includes campgrounds, a picnic ground, boat ramps, and a small resort store with cabins. Other features include trails, roads, evidence of recreation use, and administrative cabins. These features affect less than 10% of the area. Thus, visitors find the unroaded area natural in appearance with developments present not perceived to affect the natural ecological processes of the area.

Opportunities for Solitude, Primitive Recreation and Challenge

Opportunities for solitude and primitive recreation, in the Olallie area, are moderate. The topography and vegetation provide a level of screening of users from one another. Diversity in terrain, vegetation, water resources, and fish and wildlife provide some potential for primitive recreation.

Special Features

Although at high elevations, the area has the potential for prehistoric sites. At present, several sites have been inventoried.

There are no known sensitive plant or animal species found in the area.

III. AVAILABILITY

Recreation

The Olallie unroaded area has historically provided a variety of unroaded types of recreation activities. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Carrying Capacity in RVDs/year</u>
RN	11955
RM	129
SPNM	7885
SPM	2650

Wildlife and Fish

Extensive lodgepole stands in the area provide optimum habitat for black-backed and three-toed woodpeckers and potentially the great gray owl. The area also has the capability of providing habitat for the following management indicator species: pine marten, pileated woodpecker, ruffed grouse, spotted owl and deer/elk.

The entire area is devoted to trout production with high recreation use. Fisheries objectives focus on habitat quality for wild and introduced trout populations.

Livestock

Current use of the area is recreation stock only, though domestic use occurred in the past. Available forage is concentrated in scattered meadows and undergrowth in the lodgepole pine stands.

Timber

The area contains approximately 235 acres of land suitable for timber production. Species are noble fir, Pacific silver fir, mountain hemlock, and lodgepole pine. There is a current standing volume of 2.6 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 0.03 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	M	L	-	L	M

The "Geothermal Leasing - Clackamas Area - Environmental Assessment Report (3/81)" analyzed existing lease applications near the Olallie unroaded area. The results of this document, the proximity of Olallie to the Breitenbush Known Geothermal resource Area (KGRA), and the recent drilling of a thermo gradient well adjacent to the area indicate a moderate potential for geothermal exploration and development.

The Olallie area was included in a study prepared by the U. S. Geological Survey (Professional Paper 1300). Their results indicate no evidence of fossil fuels which suggest a low rating for oil and gas exploration and development.

The U.S. Geological Survey study also states the area is devoid of mines and mineral prospects. There are no existing claims and the potential for exploration and development is, subsequently, rated low.

Rock material for activities such as road building is available in the area (U.S. Geological Survey study). However, similar material is abundant in accessible, nearby areas.

Fire

Fuel loadings in the area is predominately sparse undergrowth with a thin layer of ground fuels. Fires burning in these fuels would burn with low intensity and low rates of spread where down woody material is concentrated.

Insects and Disease

A few isolated areas of mountain pine beetle have been identified in the unroaded area as well as some evidence of spruce budworm. The potential is low for further damage or significant outbreaks of insects or disease.

IV. NEED FOR UNROADED AREAS

Directly south of the Olallie area is the Mt. Jefferson Wilderness. The Bull of the Woods Wilderness is to the west. The Olallie unroaded area provides a less rigorous, unroaded experience available for day use by individuals of varying backcountry abilities. There are unique geologic landforms and scenic qualities associated with this area.

A public involvement process was begun during formulation of the Clackamas Unit Plan (1977). The Unit Plan was discontinued in 1980 with the beginning of the current Forest planning. Public sentiment suggested that the area continue to be managed for its scenic and recreational qualities.

V. ENVIRONMENTAL CONSEQUENCES

Table C-13 indicates the different management allocations, by alternative, for the Olallie unroaded area. Table C-14 presents the first decade timber harvest and roading schedule by alternative.

Table C-13 Management Acres for Olallie/Mt. Jefferson by Alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A2 Wilderness	0	0	0	0	0	0	8100
A4 Special Interest Area	7800	0	8100	8100	0	0	0
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	0	8100	0
A6 Roaded Recreation, No Timber Harvest	0	0	0	0	8100	0	0
C1 Timber Emphasis (see note)	300	8100	0	0	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C14 First Decade Harvest and Roading Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Roaded/Harvested	0	8	0	0	0	0	0
MMBF Harvested	0	0.6	0	0	0	0	0
Roading Cost (\$MM)	0	0.01	0	0	0	0	0

Alternative H proposes to manage the entire area as dispersed unroaded recreation. As required in the RARE II process, Olallie is considered for wilderness management in Alternative I. Both of these allocations will maintain the unroaded character of the area and, in Alternative H, allow for future classification as a wilderness.

Alternatives A, D, E, and G also retain the unroaded character of the area by allocation to a special interest area (SIA). (Alternative A does propose timber harvest of 4% of the area in

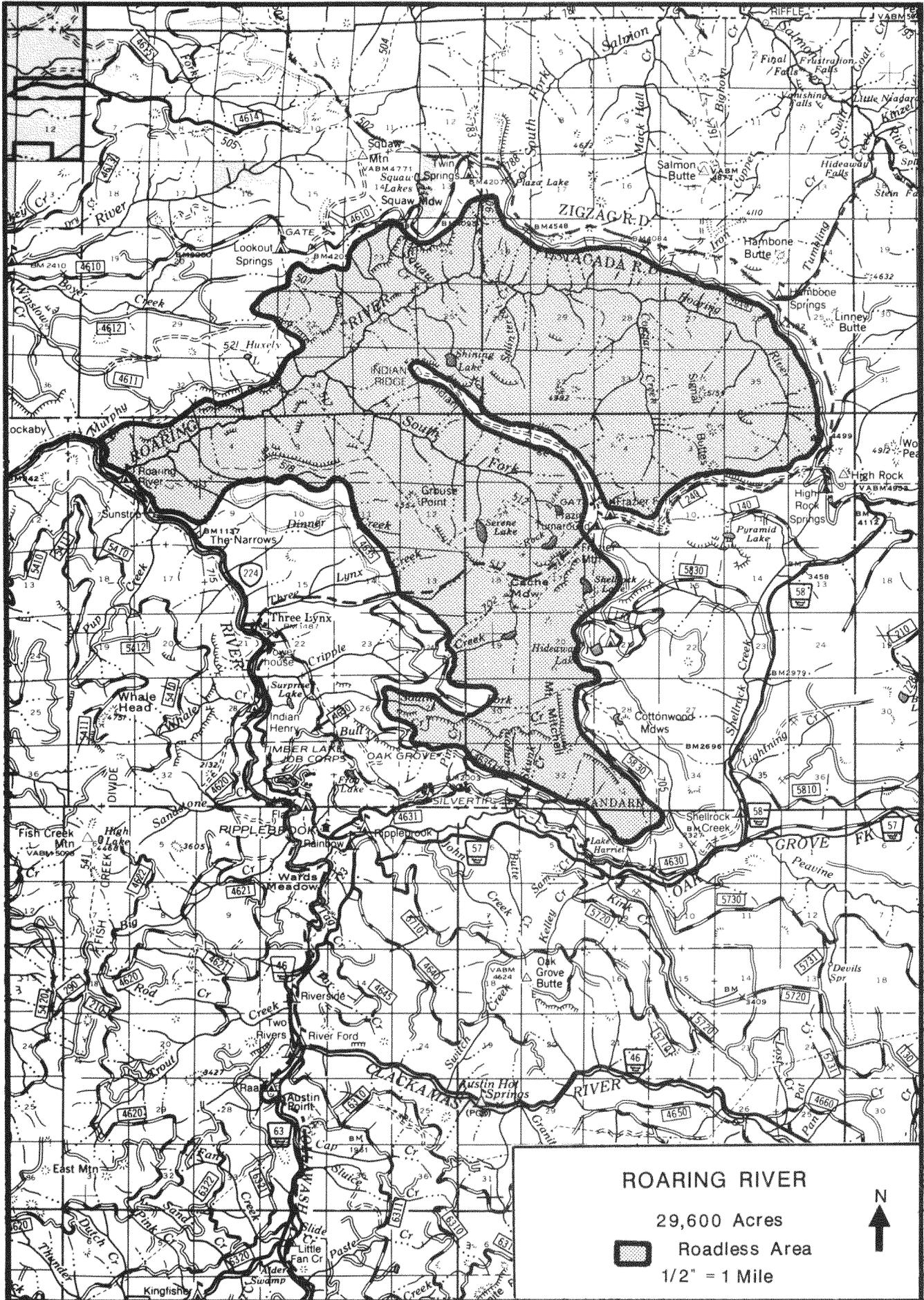
the second decade. This timber emphasis area is located in the Mt. Jefferson addition). The SIA will keep the Skyline Road, on the eastern and western boundary, open though at a low standard of development. Trails and existing short road segments in the unroaded area will be closed to motorized use. The intent of the allocation is to maintain the area in an undeveloped condition. Excepting the timber emphasis portion in Alternative A, the unroaded area could be considered for wilderness in the future.

Alternative F proposes the entire area for management as dispersed roaded recreation. The Skyline Road (4220) would be improved with new roads planned to Potato Butte and around Olallie Lake (with the potential of additional roads necessary for management activities). Motorized use of some trails and roads would be allowed changing the recreational opportunity (ROS) class to roaded natural. The unroaded character of the area would be eliminated and Olallie would not be available for future wilderness designation.

Alternatives B and C allocate the majority of the unroaded area to timber emphasis with the exception of the areas needed to meet minimum management requirements. The suitable timber lands are largely concentrated in the southwestern portion of the area. Harvest is planned for the first decade. Over time, timber harvest and other roaded management activities would eliminate the unroaded character of Olallie. The area would tend to a roaded natural recreation experience. Olallie unroaded area would be eliminated from future consideration as wilderness.

R O A R I N G R I V E R

Map C-7



I. DESCRIPTION

History

The Roaring River unroaded area was inventoried through the RARE I process. The majority of the area was allocated to a special interest scenic zone with a small amount proposed for landscape management in the Roaring River Unit and Salmon River Unit Land Use Plan (FEIS, 10/74).

Location and Access

The Roaring River area is located on the Estacada and Clackamas Ranger Districts in Clackamas County. It is 30 miles southeast of Portland and 15 miles southeast of Estacada.

The area is accessible on the north by the Abbott Road (4610) and a small portion on the south by State Highway 224. The western boundary is roughly Lookout Springs, Huxley Lake, and the mouth of the Roaring River. Forest Road 4635, Mt. Mitchell, Road 5830, Road 5830-240, and High Rock make up the southern and eastern boundaries. The primitive Indian Ridge Road penetrates the area approximately in the center, in an east-west orientation. The road is not included in the inventoried unroaded area; however, it is permanently closed.

Fifty-two miles of trails access the area, including the popular Rock Lakes Basin Trail system.

Physiography and Soils

The Roaring River area is dominated by a steep river drainage flowing in a southwestern direction to the Clackamas River. Smaller side drainages dissect the area and include Cougar Creek, Splintercat Creek, Squaw Creek, and the South Fork of the Roaring River. The lower section of the Roaring River is a spectacular narrow gorge, lined with basalt cliffs and talus slopes. Further upstream the canyon widens to steep, heavily-timbered slopes. Beyond the river corridor, the area is characterized by several dominant ridges as well as a series of upper elevation lakes. Elevation ranges from 990 feet near the confluence of the Roaring and Clackamas Rivers to 5195 feet at Signal Buttes.

Shallow, stony soils with a high erosion potential occur on the steepest sections of the Roaring River drainage. Stony loams are prominent in the southeastern arm of the area and along the upper reaches of the Roaring River. Gravelly silt loams and sandy silt loams are found on moderate to steep sideslopes throughout the area. Rock outcroppings and talus slopes are significant features throughout.

Vegetation

The majority of the Roaring River area is forested. Douglas fir, western red cedar, and red alder dominate the river and tributary bottoms. The lower elevation slopes are largely Douglas fir and western hemlock, intergrading to mountain hemlock, Pacific silver fir and noble fir at upper elevations. There are small amounts of Engelmann spruce and western white pine. The understory is typical of Western Oregon, comprised of rhododendron, huckleberry, beargrass and other shrubs and forbs. The ridges are relatively open with some coniferous trees and hardwood shrub species as well as rock fields. The large area between the Serene Lakes Basin and Mt. Mitchell contains wet meadows.

Current Use

General management policy (Roaring River/Salmon River FEIS, 10/74) established a Special Interest Zone - Scenic for the majority of the Roaring River unroaded area. This zone is managed to preserve and protect special scenic values and unique natural features.

Primitive and semi-primitive recreation opportunities exist in the central portion of the area. Access into this area is limited so most recreation use occurs on the roaded periphery and in the Rock Lakes Basin. Major uses include hiking, camping, fishing, huckleberry picking and cross-country skiing. Total recreation use is estimated at 13,900 RVDs.

A small portion of the western edge of the unroaded area is in a grazing allotment. There is very little use associated with this portion of the permit area.

Surroundings and Attractions

The Roaring River unroaded area includes the entire Roaring River drainage, and the Cache Meadow/Cripple Creek areas to the south. The area is bounded on the north by the Salmon-Huckleberry Wilderness. The western, eastern, and southern boundaries are forest roads and lands managed for timber emphasis.

Primary attractions of the area are water related: the Rock Lakes Basin, Cache Meadows, Shining Lake, and Roaring River. The dominant ridges afford excellent views of the entire area and other Cascade mountain peaks. Another attraction of the area is its rugged and inaccessible character.

II. CAPABILITY

Manageability and Boundaries

The present boundaries are adequate to manage the unroaded area in an undeveloped condition. While roads define the perimeter of the area, terrain limits both access and the sights and sounds associated with a greater level of development. Gating the road access to the southwestern boundary (Road 4636)

would reduce potential conflict with other development oriented uses. The present road system provides a variety of access points and adequate parking for day and overnight use.

Natural Integrity and Appearance

The overall development of Roaring River unroaded area is low. Development includes trails, minor recreation facilities at Serene Lake, a shelter at Cache Meadow, and past timber harvesting. There is evidence of recreation use. These features affect less than 10% of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

The opportunity for solitude is excellent all year. The area, exclusive of Serene Lake, Rock Lakes Basin, and Cache Meadows, is rugged and has limited access. Travel into the upper reaches of the Roaring River drainage would be physically demanding and provide opportunities for recreation in a primitive setting.

Special Features

There are several cultural resource sites within the area. The Cache Meadow Trail Shelter, built around 1910, is located within the unroaded area. It remains in excellent condition due to voluntary maintenance done by Ranger District personnel. Also, lookouts were once located at Grouse Point, Mt. Mitchell, and Indian Ridge.

One site with Indian religious significance used for spirit questing has been located. Other prehistoric occupation sites may exist. A traditional huckleberry gathering area is located near the northwestern boundary of the unroaded area.

There are no known sensitive plant or animal species identified in the area.

III. AVAILABILITY

Recreation

In the current undeveloped condition, Roaring River has the potential to provide a variety of unroaded types of recreation activities. It is one of the only areas outside of wilderness that has been inventoried as providing a primitive recreational experience. Estimated carrying capacity by ROS class:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	11440
RM	17196
SPNM	27500
P	8191

Wildlife and Fish

The area has the capability of providing habitat for the following management indicator species: spotted owl, pine marten, ruffed grouse, pileated woodpecker and deer/elk. High quality wildlife habitat is limited by high elevations, steep slopes, and poor soil conditions.

Of all the unroaded areas, Roaring River provides some of the highest quality fisheries habitat. The lower three miles of Roaring River is a major production and holding area for spring chinook, steelhead, and possibly coho salmon. Management of the area for primitive recreation would be compatible with fisheries objectives concerning fishing pressure, harassment, water quality, tributary shading and overall habitat quality.

Water

The study area lies in the Clackamas basin, primarily encompassing the Roaring River drainage. Two small hydroelectric projects have been proposed on Roaring River. Two others are proposed on an unnamed tributary of the river near its confluence with the Clackamas. There are also proposed hydroelectric projects on several creeks just outside the unroaded area boundary. They include: Dinner Creek, Three Lynx Creek, Cripple Creek, and Canyon Creek. The potential for further exploration and development in the area is moderate. Powerlines, a key consideration in small hydro developments, follow Highway 224 along the area's southwest boundary.

Livestock

The western portion of the area falls within the Roaring River Cattle Allotment. Current domestic use in this small portion is minimal. The potential of the area for forage production is estimated at 10 AUM's.

Timber

The area contains approximately 15,079 acres of land suitable for timber production. Species are Douglas-fir, western red cedar, hemlock, Pacific silver fir, and noble fir. There is a current standing volume of 153.3 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 1.9 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	5640	L	M	-	L	L

The potential for geothermal exploration and development is low. There are lease applications available for oil and gas exploration and development. The area has moderate potential for oil and gas recovery but present economic conditions make exploration and development unlikely.

The area does have evidence of locatable mining activity. There are no active claims.

A mercury claim is located on the Oak Grove Fork of the Clackamas River close to the unroaded area's southern boundary. It is the only patented claim on the Forest. The mine has been closed for a number of years, but there is some renewed interest in working and developing the mine. The potential for exploration and development within the unroaded area is, however, low.

Two active quarries currently exist adjacent to the eastern and southwestern boundaries. The potential for development of saleable rock material is low.

Fire

Past fire history indicates stand rotation fire frequency of 250-350 years with low intensity fire frequency of 75 to 125 years. Fuel loadings in the area are predominantly sparse undergrowth with a thin layer of ground fuels. Scattered areas of heavy concentrations of large and small downed materials also occur. Fires burning in these fuels would burn with low intensity and low rates of spread except where down woody material is concentrated.

Insects and Disease

There is evidence of spruce budworm scattered throughout the area. The potential is low for extensive damage or significant outbreaks of insects or disease.

IV. NEED FOR UNROADED AREAS

Directly north of the Roaring River unroaded area is the Salmon Huckleberry Wilderness. The ecosystems within Roaring River are represented in the adjacent wilderness. The unroaded area does however, provide for a primitive recreational experience outside of designated wilderness.

The area was not included in the RARE II inventory as a unit plan had been completed. Public response in the unit plan and during the formulation of alternatives for this plan supported special interest classification for the area to maintain scenic and recreation values.

IV. ENVIRONMENTAL CONSEQUENCES

Table C-15 indicates the different management allocations, by alternative, for the Roaring River unroaded area. Table C-16 presents the first decade timber harvest and roading schedule by alternative.

Table C-15 Management Acres for Roaring River by Alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A4 Special Interest Area	21,800	0	22,400	25,500	0	0	22,400
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	29,600	29,600	7200
B1 Wild/Scenic/Rec. River	0	0	400	400	0	0	0
B2 Scenic Viewshed	3500	0	500	100	0	0	0
C1 Timber Emphasis (see note)	4300	29,600	6300	3600	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-16 First Decade Harvest and Rooding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Rooded/Harvested	0	445	0	62	0	62	0
MMBF Harvested	0	17	0	2	0	2	0
Rooding Cost (\$MM)	0	0.7	0	0.1	0	0.1	0

Alternatives F, H, and I maintain the current unroaded character of the entire area through allocation to a special interest area (SIA) or dispersed unroaded recreation. These three alternatives, therefore, will maintain unroaded qualities and allow future consideration for wilderness designation.

Four alternatives, A, D, E, and G, maintain the majority of the roadless area by allocation to a special interest area. Alternative A allocates approximately 26% of the unroaded area to timber or scenic emphasis. The portion to be managed for timber emphasis is along the western boundary: from Road 4635 to the ridge (the Grouse Point Trail) with an additional smaller area from the southwestern boundary along the South Fork of Cripple Creek to near Mt. Mitchell. The area on an extended rotation as a scenic viewshed is located from the northwestern boundary near Lookout Springs to the ridge above Roaring River. Entry for timber harvest will not begin until the second decade of this plan. Timber harvest in these three areas would require development in the form of road building. Particularly, harvesting to the Grouse Point Trail will reduce the unroaded qualities of and improve access to the interior and the Rock Lakes Basin, Cache Meadows areas. Similarly, the trail to Huxely Lake and Roaring River would be affected by harvest in the scenic viewshed. The recreation opportunity (ROS) class would change to rooded modified,/rooded natural in these three areas and the primitive/semi-primitive ROS classes would

be reduced overall. The entire area would be available for consideration for wilderness designation at the end of the first decade. Thereafter, only the portion allocated as an SIA could be proposed for wilderness.

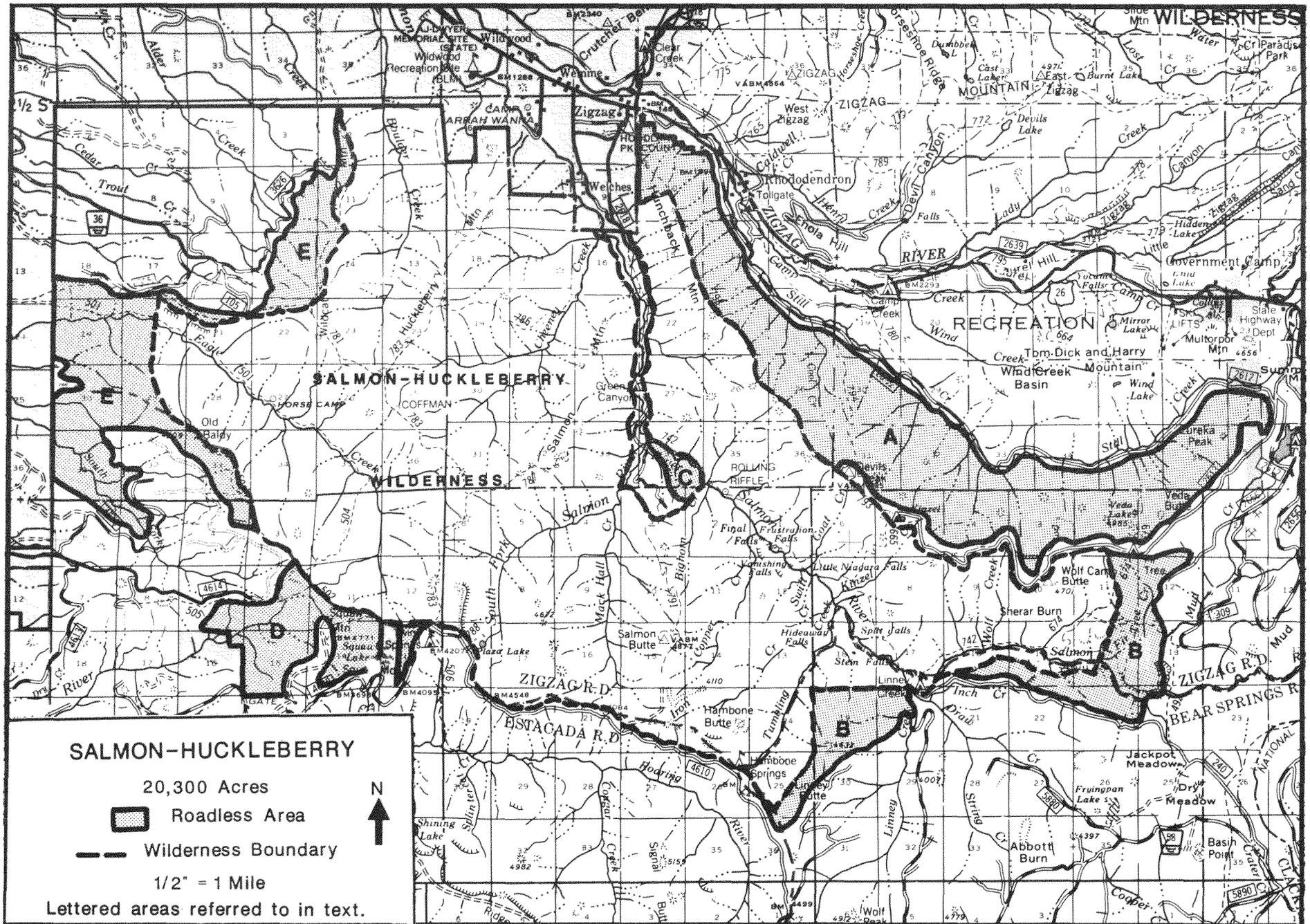
Alternative D is similar to Alternative A in treatment of the Roaring River unroaded area with some exceptions. The area on the South Fork of Cripple Creek will not be managed for timber emphasis. The portion near Lookout Springs is allocated to timber emphasis, as is the area south of Mitchell Rim, and a small area along the eastern boundary south of Shellrock Lake. The amount of area allocated to timber emphasis is 21%; the amount of area on an extended rotation for scenic emphasis is less than 2%. As in Alternative A, Alternative D maintains the availability of the entire area for wilderness designation at the end of the first decade. Thereafter, only the portion allocated as an SIA could be proposed for wilderness.

Alternatives E and G allocate approximately 12% of the area to timber emphasis. There are three areas for potential harvest: an area to the south of Lookout Springs, an area from Road 4635 to the Ridge (Grouse Point Trail), and a small portion of timberland on the eastern border south of Shellrock Lake. Alternative E and G maintain only the SIA for potential wilderness designation at the end of the first decade.

Alternatives B and C allocate the majority of the unroaded area to timber emphasis with the exception of the areas needed to meet minimum management requirements. The suitable timber lands are located throughout, though somewhat concentrated in the northern and western portions of the area. Harvest is planned for the first decade. This intensity of timber harvest would, over time, require development of the road system eliminating the unroaded character of Roaring River. The area would no longer have primitive or semi-primitive recreational opportunities but, rather, would tend toward a roaded modified experience. Roaring River unroaded area would be eliminated from future consideration as a wilderness.

SALMON - HUCKLEBERRY

C-63



I. DESCRIPTION

History

The Salmon-Huckleberry area was inventoried as part of the RARE I process but was not included in the final list of candidate Wilderness Study Areas. It was studied under three separate Forest Service Unit plans: Roaring River/Salmon River, Huckleberry, and Mt. Hood Interagency. Final environmental statements were issued in 1974, 1975 and 1977, respectively. These documents proposed unroaded and roaded recreation, landscape, and multiple use management for the area.

Public interest in the Salmon-Huckleberry area prompted consideration in the RARE II process even though completed unit plans prescribed management for the area. Through the RARE II process, 8300 acres were allocated for wilderness and 60,500 acres allocated to nonwilderness.

Over eight thousand acres of the Salmon-Huckleberry area were included in the Oregon Wilderness Bill of 1979 (S-2031) and 53,000 acres in the Oregon Wilderness Bill of 1983 (HR-1149). The majority of the area (44,800 acres) became wilderness under the Oregon Wilderness Act of 1984.

Location and Access

The Salmon-Huckleberry area is located on the Estacada and Zigzag Ranger Districts in Clackamas County. There are five separate pieces that remain after the passage of the Oregon Wilderness Act. Piece A lies east of Hunchbuck Mountain (Trail 793) and north of Road 2613 bounded by the Still Creek Road (2612) to the north. A second piece, (B), is comprised of the area south of Fir Tree Campground bounded by the road to Linney Creek (5800240) on the south, and an area south and west of Linney Creek campground to Linney Butte. The third piece, (C), is a small area at the end of the Salmon River Road (2618). The fourth piece, (D), is the headwaters of the North Fork of the Clackamas River southwest of the Old Baldy Trail (502). This piece includes the Squaw Lakes area. The final piece, (E), is west of the Wildcat Mountain (782), and Old Baldy (502) Trails bounded by roads or the Forest boundary.

Primary access to the five areas includes: Highway 26 and Still Creek Road; Road 5800240 and 4610; Road 2618; Road 4610; and Roads 3626 and 4614, respectively. Generally, the unroaded areas are 30 miles from Portland and accessed by trail systems.

Physiography and Soils

The portion east of the Hunchback Ridge, (piece A), is a steep, northeast facing slope. The area is very dissected by drainages including Cool Creek. Elevation

ranges from 2000 feet to 4700 feet near Devil's Peak. Piece B is more moderate terrain comprised of a south facing slope to the Salmon River and a broad bench above the Salmon to the south. The Linney Butte portion is a southwest-northeast ridge. Elevation ranges from 2800 feet to approximately 4800 feet. The piece at the end of the Salmon River Road, Piece C, is varied topography, approximately 1800 feet in elevation. Piece D forms the headwaters of the North Fork of the Clackamas River and also includes Squaw Lakes. Elevation ranges from 3600 feet to 4771 feet at Squaw Mountain. The final piece, (E), is west to northwest facing slopes including portions of the Eagle Creek drainage. Elevation ranges from 2400 feet to 4209 feet at Old Baldy.

Generally, soils are classified as cobbly to gravelly loams. On the steeper, dissected slopes, landslide hazards exist.

Vegetation

Vegetation is varied for the five areas. At the lower elevations, tree species are predominantly Douglas-fir, western hemlock, with some western red cedar. Red alder is common at lower elevations such as the end of the Salmon River road. Noble fir and Pacific silver fir are found at higher elevations. The area south of Fir Tree Campground has a lodgepole pine, western white pine component. Shrub species include huckleberry, rhododendron, salal, salmonberry, chinkapin and oceanspray. Beargrass is common, particularly along drier ridgetops and benches. The Squaw Lakes area is a wet meadow ecosystem. There are thin soiled rocky outcrops throughout all areas that support high elevation grass/forb communities.

Current Use

Management direction for the area is included in the following unit plans:

Mt. Hood Planning Unit: 8,100 acres of the area between Still Creek and Hunchback - Kinzel Lake were designated roaded recreation in the final environmental statement issued November 1977. This is a portion of piece A.

Roaring River/Salmon River Unit Plan: Portions of the remaining unroaded areas are covered by this final environmental statement (10/74). Piece B was allocated to landscape management and general forest. Piece C was allocated to landscape management and the Squaw Lake area, of piece D, was allocated to a special interest area - geologic.

Recreation opportunities include semi-primitive experiences in a near natural unroaded condition. Dispersed recreation opportunities are also available that have reasonable access to road systems. The primary use of the area includes hiking, fishing, hunting, berry picking and cross country skiing. Each of the remaining unroaded pieces have trail and nearby road access.

Surrounding and Attractions

Each of the remaining unroaded pieces is bounded on one or more sides by the Salmon-Huckleberry Wilderness. The other boundaries are forest roads and lands managed for timber emphasis.

Primary attractions are the dominant ridges that afford excellent views of the entire area and other Cascade Mountain peaks. The Squaw Lakes and Veda Lake areas are local attractions, along with the Salmon River.

II. CAPABILITY

Manageability and Boundaries

Each of the five areas could be managed in an undeveloped condition in compliment with the Salmon-Huckleberry Wilderness. These areas are largely the unroaded slopes remaining outside of the ridgeline wilderness boundary and would not, therefore, provide a more manageable wilderness boundary. The Hunchback Mountain area is the only sizeable unroaded piece that would be logical to manage independently of the wilderness.

Natural Integrity and Appearance

The overall development of the Salmon-Huckleberry unroaded area is low confined to the trail system. There is evidence of recreation use. These features affect less than 10% of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

The opportunity for solitude is moderate. The dense shrub layer has a tendency to concentrate use. Off-site intrusions include roads, timber harvesting and community development. Travel off the trail system would be physically demanding but not within a primitive setting.

Special Features

The area contains old fire system trails dating to the 1920's. The Salmon River Trail (not the present recreation trail) was built of puncheon in 1925 and is still in good condition. The Squaw Lakes area was popular for huckleberry picking. Two prehistoric sites have been found nearby and others may exist.

Sensitive plants in the area include Corydalis aquae-gelidae, Draba aureola, and Lycopodium selago.

III. AVAILABILITY

Recreation

These remaining unroaded pieces have the potential to provide a variety of recreation activities. Estimated carrying capacity by ROS class is as follows:

ROS Class

Capacity in RVDs/year

RN	32250
RM	20540
SPNM	9280
SPM	637

Wildlife and Fish

The area has the capability to provide wildlife habitat for the following management indicator species: spotted owl, pine marten, ruffed grouse, pileated woodpecker, and deer/elk. The lower elevations, below 2400 feet, have the potential of providing critical winter range for deer/elk.

The Salmon-Huckleberry unroaded area provides high quality fisheries habitat. The lower 11 miles of the Salmon River and Still Creek supports major runs of anadromous fish. Fisheries objectives include maintenance of self-sustaining fish populations and high water quality (temperature, sediment) for downstream hatchery production.

Water

Tributaries and streams on the east side of Hunchback Mountain, Piece A, flow east to Still Creek and the Zigzag River drainage. The tributaries in Piece B drain into the upper reaches of the Salmon River as does Piece C located at the end of the Salmon River Road (2618). Piece D forms the headwaters of the North Fork of the Clackamas River. The area to the west of wildcat Mountain (Piece E) drains into the Sandy river while the area west of Old Baldy drains into Eagle Creek and the Clackamas River. Two small hydroelectric proposals exist in Eagle Creek and South Fork Eagle Creek. The potential for further hydroelectric exploration is moderate though the probability of development is low.

Timber

The area contains approximately 7,595 acres of land suitable for timber production. Species are Douglas-fir, western hemlock, western red cedar, noble fir, and Pacific silver fir. There is a current standing volume of 83.3 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 1.1 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	L	L	0	L	L

While there have been some lease application areas for geothermal adjacent to the remaining unroaded areas, the potential for exploration and development of both geothermal and oil and gas resources is low. There is also low potential for metallic mineral deposits in the area.

Fire

Fuels in the area are predominately thin ground fuels. There are intrusions of concentrated large fuels and concentrated fuels less than 3 inches in diameter. Fires burning in the area would generally be of low intensity and spread except in the areas of heavy fuel concentration.

Insects and Disease

A few isolated areas of balsam woolly aphid have been mapped in the unroaded area. There is some evidence of spruce budworm activity. The potential is low for further damage or significant outbreaks of insects and disease.

Land Use

There is a 160 acre inholding of private land near Squaw Lakes (T.4S, R.6E, Sec. 13). This area has been used for limited timber harvesting and rangeland lease. The property is a high priority for exchange or purchase. However, the funds to implement are not currently available.

IV. NEED FOR UNROADED AREAS

All of the remaining unroaded pieces have one or more boundaries along the Salmon-Huckleberry Wilderness. There are several other wilderness areas nearby: to the north is Mt. Hood and Columbia; to the east is Badger Creek. On the north side of the Still Creek Road (2612) is the Wind Creek unroaded area. Other nearby areas that have historically been managed in an unroaded condition are Twin Lakes and Roaring River to the east and south, respectively. The ecosystems present in the Salmon-Huckleberry unroaded area are similar to those in the wilderness.

The public involvement process during RARE II and development of the Roaring River-Salmon River Unit Plan indicated interest in ensuring primitive recreation opportunities. This interest was for the large unroaded area that existed before the passage of the Oregon Wilderness Act. The remaining unroaded pieces have had continued public support for management in an undeveloped condition.

V. ENVIRONMENTAL CONSEQUENCES

Table C-17 indicates the different management allocations, by alternative, for the Salmon-Huckleberry unroaded area. Table C-18 presents the first decade timber harvest and roading schedule by alternative.

Table C-17 Management Acres for Salmon-Huckleberry by Alternative

Management Areas:	A	B & C	D	E & G	F	H	I
A4 Special Interest Area	500	0	0	500	0	0	500
A5 Unroaded Recreation, No Timber Harvest	0	0	0	2600	13,300	20,300	19,800
B1 Wild/Scenic/Rec. River	1000	0	1000	1000	0	0	0
B2 Scenic Viewsheds	10,900	0	4000	1200	5300	0	0
B3 Roaded Rec., Reduced Timber Harvest	0	0	0	700	0	0	0
B6 Special Emphasis Watersheds	0	0	0	5100	1700	0	0
C1 Timber Emphasis (see note)	7900	20,300	15,300	9200	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-18 First Decade Harvest and Rooding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Rooded/Harvested	201	206	195	162	19	162	0
MMBF Harvested	5.9	6.1	5.8	4.9	0.5	4.9	0
Rooding Cost (\$MM)	0.32	0.33	0.31	0.26	0.03	0.26	0

Alternative H proposes the entire area as dispersed unroaded recreation. Alternative I proposes 97% of the area as dispersed unroaded recreation and the remainder as a special interest area (SIA) at Squaw Lakes. The SIA will limit development of Squaw Lakes to protect the unique high elevation meadows. Therefore, both Alternatives H and I maintain unroaded qualities and allow for future addition to the Salmon-Huckleberry Wilderness.

Alternative F allocates approximately 65% of the area to dispersed unroaded recreation (and as a proposed wild segment of a Wild and Scenic River). This allocation applies to: all of pieces B, and C, the eastern portions of pieces D and E, and the area east of Hunchback Mountain (piece A) from the Forest boundary to just south of Devil's Peak (with the exception of a small area allocated to scenic emphasis in the northernmost portion of this piece). These areas will retain unroaded qualities and would be available for future addition to the wilderness. The area to the southwest of Devil's Peak (piece A), the western portion piece D and E are allocated to scenic or riparian emphasis and

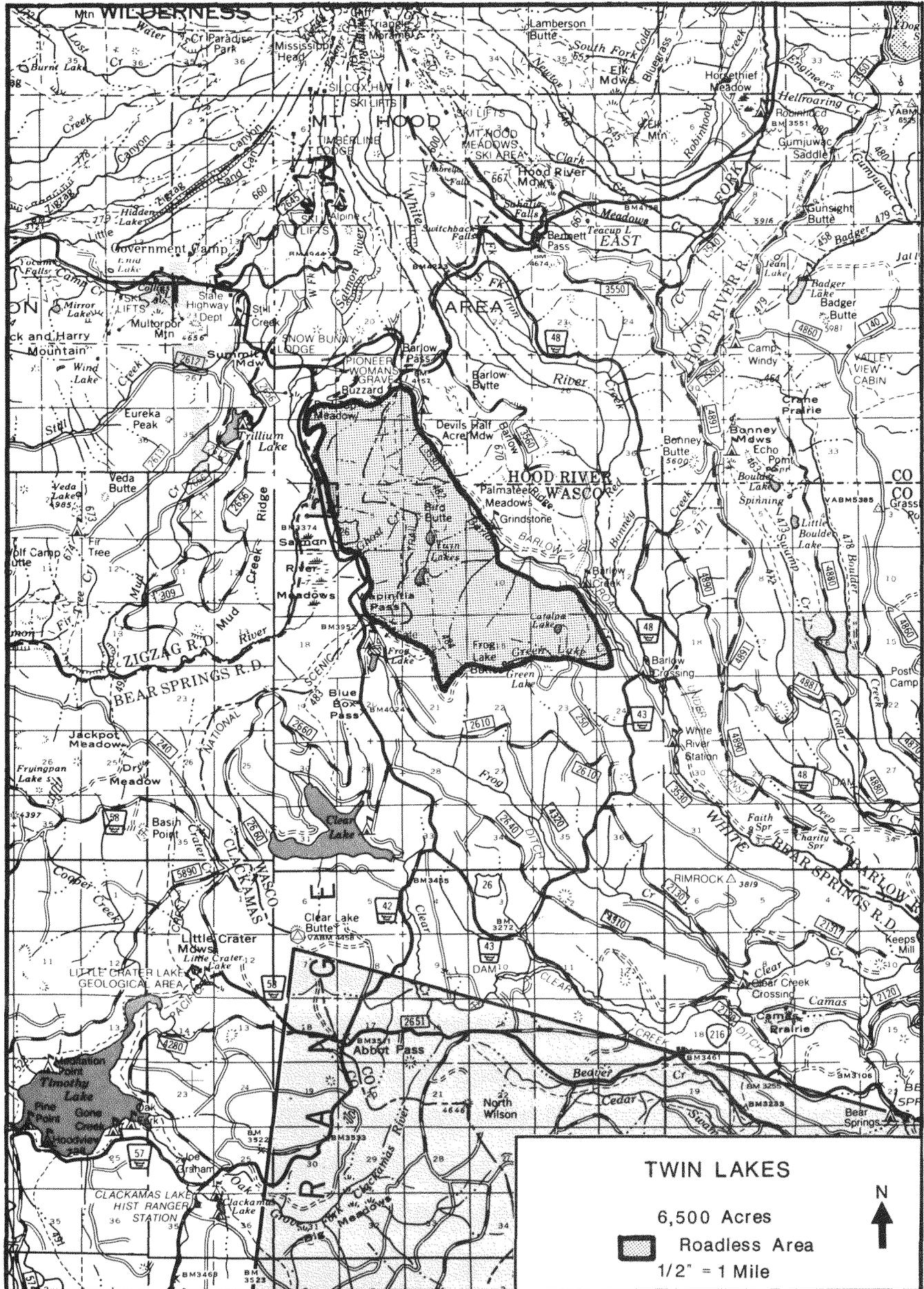
would be available for timber harvest at a reduced rate. Harvest is scheduled for the first decade. These allocations would not maintain the unroaded character, would reduce the semi-primitive nonmotorized recreational opportunity (ROS) class, and would not allow future addition to the wilderness.

In Alternative E and G, timber emphasis is the proposed allocation for the suitable acres beyond the minimum management requirements in pieces B, C, D, and E (with the exception of the wild segment of the Salmon River in pieces B and C and the Squaw Meadows SIA in piece D). Timber harvest would occur in the first decade and eliminate the unroaded character and semi-primitive nonmotorized ROS class of each of these areas. The opportunity for the future addition of these areas to the wilderness, would also be eliminated. A portion of the Hunchback area, from the Forest boundary to near Devil's Peak would be managed as dispersed unroaded recreation (as in Alternative F, there is a small area allocated to scenic emphasis north of this area). The remainder of the area is allocated to management prescriptions that allow timber harvesting at a reduced rate. Harvest will occur in the first decade. Thus, only the portion north of Devil's Peak would retain unroaded characteristics and be available as a future addition to the wilderness.

Alternatives A and D propose timber emphasis of suitable acres beyond the minimum management requirements for pieces B, C, D, and E (with the exception of the SIA at Squaw Lakes for Alternative A, and the proposed wild segment of the Salmon River for Alternative D). Piece A is allocated entirely to scenic emphasis in Alternative A and to scenic or timber emphasis in Alternative D. Harvest will occur in the first decade and eliminate the unroaded qualities and semi-primitive nonmotorized ROS class of all pieces. There would be no opportunity to designate any of the areas as additions to the wilderness.

Alternatives B and C propose allocation of the entire area to timber emphasis with the exception of the areas needed to meet minimum management requirements. Harvest will occur in the first decade and eliminate the unroaded character of the area. The ROS class would tend to roaded modified. There would be no potential for future addition to the wilderness.

T W I N L A K E S



I. DESCRIPTION

History

The Twin Lakes area was initially inventoried through the RARE I process and was not recommended as a Wilderness Study Area. In the final environmental statement of the RARE II process, the unit was allocated to non-wilderness. As part of RARE II, it was included in the release language of the RARE II Review Act of 1981, S-842.

Location and Access

The area is located on the Bear Springs Ranger District within Clackamas, Hood River and Wasco Counties. It is 60 miles southeast of Portland and 35 miles south of Hood River. It is roughly bounded by U.S. Highway 26 to the west, Buzzard Point to the north, Barlow Road (3530) to the east, and Frog Lake Buttes to the south.

Trailhead access includes Barlow Pass and Wapinita Pass/Frog Lake. Five miles of the Pacific Crest National Scenic Trail and the Twin Lakes trail system are available for horse and hiker use.

Physiography and Soils

The area encompasses both steep mountain slopes and a plateau atop gentler sloping ridges. Dominant ridges surround two high elevation lakes, the Twin Lakes, formed in glaciated cirques. Other smaller lakes in the area include Green and Catalpa Lakes. Elevations range from 3200 feet near Barlow Creek to the Cascade Crest at 4,925 feet.

Almost the entire Twin Lakes area is composed of sandy and silt loams. The steep glaciated sideslopes exhibit potentials for surface soil damage and erosion.

Vegetation

The majority of the area is densely forested. Major species include Douglas-fir, noble fir, Pacific silver fir, mountain hemlock, Englemann spruce, western white pine and lodgepole pine. The understory is diverse, comprised of huckleberry, rhododendron, beargrass and a variety of other shrubs and forbs. There are also a number of wet meadows. Scattered throughout, and particularly associated with major peaks, are barren or sparsely vegetated talus openings.

Current Use

Management direction for the area is general forest. Areas along Highway 26 and Barlow Road are managed to emphasize the visual resource. Recreation opportunities occur in a natural environment but within easy access of road and trail systems.

Major activities include hiking, cross country skiing, camping, and fishing. Total recreation use within the area is 8,000 RVDs, the majority occurring at Twin Lakes. Heavy year-round use directly outside the perimeter (26,500 RVDs) occurs at Frog Lake and along the Barlow Road corridor.

The area is within the White River Cattle Allotment, though use is minimal.

Surroundings and Attractions

The Twin Lakes area is bounded on the west by Highway 26. Frog Lake, a popular year-round recreation site is near the southwest corner. The historic Barlow Road is adjacent to the eastern boundary and forest land managed for multiple use surrounds the eastern and southern sides.

The Pacific Crest Trail and Twin Lakes Trail systems provide easy access to the lakes and scenic vistas. The entire unroaded area is accessed via Highway 26 and is less than two hours from Portland.

II. CAPABILITY

Manageability and Boundaries

This unroaded area is large enough to be managed in an undeveloped condition and provide a semi-primitive/roaded natural recreation experience. The western and northern boundaries are defined by major roads (Highway 26 and 35). The eastern and southern boundaries are defined by lower standard roads. Consequently, these roads provide access for day and overnight use.

Natural Integrity and Appearance

The overall development of the Twin Lakes unroaded area is low. Development includes trails, timber harvesting, a firebreak on Bird Butte, roads, and some recreation facilities. There is evidence of recreation use and grazing. These features affect less than 10% of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

Opportunities for solitude and primitive recreation in the area is low because of the proximity to roads, trails (Pacific Crest National Scenic Trail), and timber harvest activities.

Special Features

The northern and eastern edges of this area contain segments of the 1846 Barlow Road, a part of the Oregon National Historic Trail, designated by Congress in 1978. The Barlow Road and the associated historical sites in the area (Pioneer Woman's Grave, Devil's Half Acre, Barlow Pass, and Grindstone) are in the process of being nominated to the National Register. The area is especially significant to the Warm Springs Indians as traditionally they held their first Huckleberry Ceremony in the area. Forest growth has subsequently decreased huckleberry production and curtailed use of the area for the ceremony.

There are no known sensitive plant or animal species identified in the area.

III. AVAILABILITY

Recreation

The primary form of recreation use in the area is hiking and cross country skiing. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/year</u>
RN	4453
RM	4185
SPNM	8400

Wildlife and Fish

The area has the capability of providing wildlife habitat for the following management indicator species: spotted owl, pine marten, pileated woodpecker, ruffed grouse and deer/elk. A great blue heron rookery is present in the northeastern portion of the area. High quality wildlife habitat is limited by high elevations, steep slopes and poor soil conditions.

Eight miles of fish bearing streams and natural lakes support resident and stocked trout populations. A planned Bonneville Power Administration fisheries project would introduce steelhead, chinook, and coho salmon to the entire length of Barlow Creek. Maintenance and enhancement of resident and potential anadromous fisheries is a major fisheries objective in the area.

Water

The Twin Lakes, Green Lake, and other ephemeral tributaries flow easterly into Barlow Creek. Barlow Creek, subsequently, flows into the White River. To the west of the dominant ridge the ephemeral creeks flow to the Salmon River Meadows and Salmon River.

Livestock

The unroaded area falls within the White River Cattle Allotment. Current use is minimal and the area can potentially provide 20 AUM's.

Timber

The area contains approximately 4,778 acres of lands suitable for timber production. Species are Douglas-fir, noble fir, Pacific silver fir, mountain hemlock, Engelmann spruce, western white pine, and lodgepole pine. There is a current standing volume of 53.9 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 0.7 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	M	L	-	L	L

Geothermal and oil and gas lease applications exist directly north of the unroaded area. The proximity to the Mt. Hood Known Geothermal Resource Area suggest a moderate resource potential for geothermal. Exploration and development for oil and gas is rated low.

Fire

Past fire history indicates stand rotation fire frequency of 250-350 years with low intensity fire frequency of 75-125 years. Fuels in the area are predominately thin ground fuels. Fires burning in these fuels would be of low intensity with low spread rates.

Insects and Disease

The area was included in a forest level Western Spruce Budworm Study in 1983-84. There is evidence of spruce budworm activity in the area. Small and isolated outbreaks of the mountain pine beetle have occurred in the past.

IV. NEED FOR UNROADED AREAS

To the northwest is the Mt. Hood Wilderness. At a greater distance, to the west and east, respectively, are the Salmon-Huckleberry Wilderness and Badger Wilderness. There is also an area that has, historically, been managed as unroaded: the Wind Creek area to the northwest. There are no unique ecosystems within this unroaded area.

Public input reflected through the RARE II public involvement process showed little interest in the Twin Area in comparison to the other unroaded areas.

V. ENVIRONMENTAL CONSEQUENCES

Table C-19 indicates the different management allocations, by alternative, for the Twin Lakes unroaded area. Table C-20 presents the first decade timber harvest and roading schedule by alternative. Alternatives H and I allocate the entire unroaded area to unroaded dispersed recreation. This would perpetuate the roadless character of the area and allow future classification as a wilderness.

Table C-19 Management Acres for Twin Lakes by Alternatives

Management Areas:	A	B & C	D	E & G	F	H	I
A5 Unroaded Recreation, No Timber Harvest	0	0	0	0	0	6500	6500
B2 Scenic Viewshed	2600	0	200	2500	6500	0	0
C1 Timber Emphasis (see note)	3900	6500	6300	4000	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

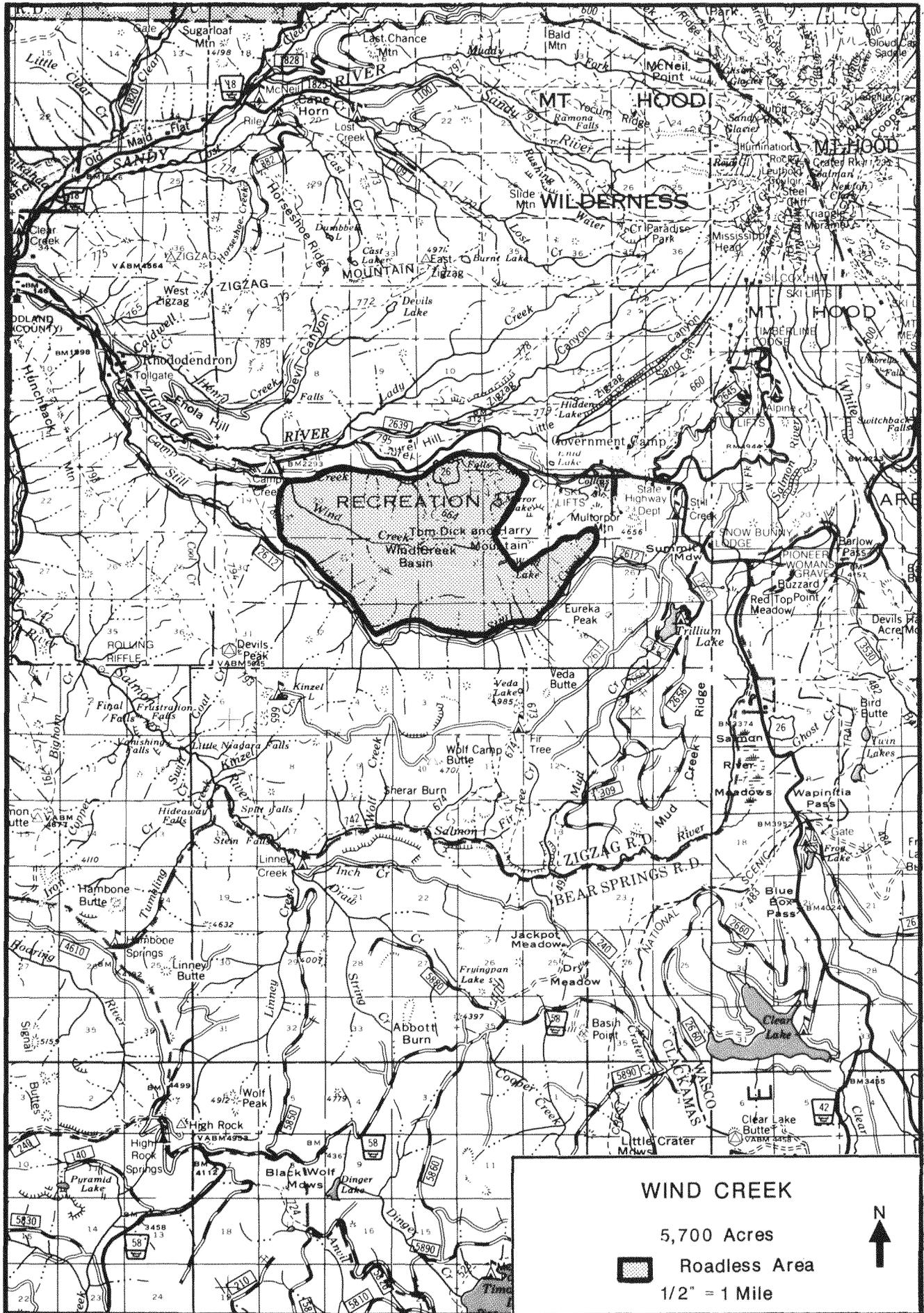
Table C-29 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E						
	A	B & C	D	E	F	G	H & I
Suitable Acres Roded/Harvested	0	153	148	111	32	0	0
MMBF Harvested	0	8.9	8.6	6.4	1.9	0	0
Roding Cost (\$MM)	0	0.26	0.25	0.18	0.05	0	0

In Alternative F, the entire area is allocated as a scenic viewshed. Alternatives A, E, and G allocate approximately 40% of the area as a scenic viewshed with the remainder to be managed as timber emphasis. Timber harvest associated with the scenic viewshed, and timber emphasis allocation would eliminate the unroaded character of the area and the semi-primitive nonmotorized ROS class. Harvest would occur in the first decade in Alternative E and F, but not until the second decade in A and G. The area would not be available for future wilderness designation.

Three alternatives, B, C and D allocate the majority of the area to timber emphasis (less than 5% of the area in alternative D is to be managed, as scenic emphasis) with the exception of the areas needed to meet minimum management requirements. Timber harvest would, over time, eliminate the unroaded character of the area. Harvest would occur in the first decade in all three alternatives. The three-quarters of the area that is in semi-primitive and roaded natural ROS classes would be changed to a roaded modified experience. Twin Lake area would be eliminated from future consideration as wilderness.

W I N D C R E E K



I. DESCRIPTION

History

The Mt. Hood National Forest identified and inventoried the unroaded area at Wind Creek Basin through the Mt. Hood Interagency Unit Plan. The final environmental statement was completed in November 1977 and management for the area was unroaded recreation.

Wind Creek was included in the RARE II inventory and was allocated for non-wilderness uses. As part of RARE II, it was included in the release language of the RARE II Review Act of 1981, S-842.

Location and Access

Wind Creek is located on the Zigzag Ranger District in Clackamas County. It is 50 miles southeast of Portland and less than one mile west of the community of Government Camp.

The area is bounded on the north by Highway 26 (Laurel Hill) and on the south by Still Creek and Still Creek Road (2612). The eastern and western boundaries, respectively, are the Multotorpor/Ski Bowl Ski Area and the Still Creek Trail #780. Roads of the Zigzag summer home area also access the western boundary. The Mirror Lake Trail, #664, provides nonmotorized access three miles into the interior from the northeast corner.

Physiography and Soils

The area is a high elevation basin and sloping plateau. Steep, slightly dissected side slopes drop from the plateau into the Still Creek and Zigzag River drainage. Talus slopes and rock outcrops are prominent in the eastern portion of the area. Elevations range from 2400 feet near Camp Creek to 5066 feet at Tom, Dick and Harry Mountain.

Soils include harsh site sandy loams on the high plateau and gravelly silt loams on the steep side slopes.

Vegetation

The majority of the area is forested. Major tree species include Douglas-fir, western hemlock, red alder, noble fir, Pacific silver fir, and lodgepole pine. The understory is typical of Western Oregon with a variety of shrubs and forbs such as huckleberry, rhododendron, salal, and beargrass. Wet meadows occur in the basin with shrub and forb fields common on the steep drainage faces.

Current Use

Management direction for the area is unroaded recreation (Mt. Hood Planning Unit FEIS, 10/77). The management goals provide for semi-primitive recreation opportunities in a near natural unroaded setting. The outskirts of the area still provide a natural environment but within proximity of roads and trails.

Hiking, berry picking, camping, and hunting are the major uses. Total recreation use is estimated at 14,500 RVDs, with approximately 93% occurring in the Mirror Lake Basin.

Surroundings and Attractions

The Wind Creek Area is bordered by relatively well traveled roads to the north and south and by housing and ski area development to the west and east.

Mirror Lake, Wind Creek, and Tom, Dick and Harry Mountain are the major geographic features and attractions.

II. CAPABILITY

Manageability and Boundaries

The unroaded area is large enough to be managed in an undeveloped condition and provide a semi-primitive/roaded natural recreation experience. The boundaries are defined by major roads and developments. Roads to the north and south provide access to the area for day and overnight use.

Natural Integrity and Appearance

The overall development of the Wind Creek unroaded area is low, consisting of recreation trails and facilities. There is evidence of heavy recreation use at Mirror Lake, and ski trails and adjacent ski facilities can be observed. These features affect less than 25 % of the area. Natural ecological processes have not been greatly altered.

Opportunities for Solitude, Primitive Recreation and Challenge

The opportunity for solitude and primitive recreation in the Wind Creek area is low. Its small size coupled with terrain offers limited screening potential. Off-site intrusions include highways and a developed ski area. There are low standard recreation facilities present.

Special Features

A lookout was once present on Tom, Dick, and Harry Mountain. The area was a favored Indian huckleberry picking area and may contain prehistoric sites. There are no known sensitive plant or animal species identified in the area.

III. AVAILABILITY

Recreation

The primary form of recreation use in the area is hiking. Estimated carrying capacity by ROS class is as follows:

<u>ROS Class</u>	<u>Capacity in RVDs/Year</u>
RN	8830
SPNM	7086

Wildlife and Fish

The area has the capability of providing wildlife habitat for the following management indicator species: pine marten, ruffed grouse, pileated woodpecker, deer/elk and spotted owl. The quality of wildlife habitat is limited due to high elevations, steep slopes and poor soil conditions.

Still and Camp Creeks support populations of anadromous fish. Wind Creek and the natural lakes in the area support wild and introduced trout species. Fisheries objectives focus on maintaining self-sustaining fish populations and high water quality.

Water

Streams in the area flow into the Zigzag River drainage of the Sandy River basin. An unused powerline crossing through the northern portion of this area has been examined by a small hydroelectric proponent for reactivation. The opportunity for potential development still exists.

Timber

The area contains approximately 2538 acres of land suitable for timber production. Species are Douglas-fir, western hemlock, noble fir, Pacific silver fir, and lodgepole pine. There is a current standing volume of 18.0 million cubic feet. The potential long run sustained yield from this area under intensive timber management would be 0.1 million cubic feet per year.

Minerals and Energy (H=high, M=Medium, L=Low)

LEASABLE				LOCATABLE		SALEABLE
Lease Application Area (Acres)		Resource Potential		Number of Claims	Mineral Potential	Rock Materials Resource Potential
Geothermal	Oil & Gas	Geothermal	Oil & Gas			
-	-	M	L	-	L	L

The Mt. Hood area was included in a study prepared by the U.S. Geological Survey (Professional Paper 1300). Their study identified probable geothermal resource potential areas. The areas, including the Mt. Hood known Geothermal Resource area, are located directly north of the Wind Creek unroaded area. The potential for exploration and development is moderate. The potential for oil and gas exploration and development is low.

The U.S. Geological Survey study, recognized an area of substantiated mineral resource potential. The Lady Creek-Laurel Hill Area is adjacent to the northwestern boundary of the Wind Creek area. Claims for low grade metallic ores were staked in the Laurel Hill area in the 60's. No mining is known to have occurred and the potential for prospecting and development is low.

Fire

Fuels in the area are generally thin ground fuels with occasional areas of large concentrated woody materials. Fires burning in these fuels are generally of low intensity and low spread rates except where material is concentrated.

Insects and Disease

No significant insect or disease outbreaks have occurred in the unroaded area. The potential is low for significant outbreaks of insect or disease.

IV. NEED FOR UNROADED AREAS

In close proximity are the Mt. Hood Wilderness (north) and Salmon-Huckleberry Wilderness (southwest). The Badger Wilderness is located to the east. There is also an area that has been managed as unroaded to the southeast: The Twin Lakes area. There are no unique ecosystems within this unroaded area.

Public input gathered through the RARE II public involvement process and during development of the Mt. Hood Interagency Unit Plan indicated a desire to maintain undeveloped recreation areas.

V. ENVIRONMENTAL CONSEQUENCES

Table C-21 indicates the different management allocations, by alternative, for the Wind Creek Unroaded area. Table C-22 presents the first decade timber harvest and roading schedule by alternative. (Within the existing unroaded area boundary, there is a small portion of the permit area for the adjacent developed ski area. This is common to all alternatives.)

Table C-21 Management Acres for Wind Creek by Alternatives

Management Areas:	A	B & C	D	E & G	F	H	I
A5 Unroaded Recreation, No Timber Harvest	0	0	0	3400	0	5500	5500
A10 Developed Rec. Ski Areas	200	200	200	200	200	200	200
B2 Scenic Viewshed	1200	0	1700	1200	5500	0	0
B6 Special Emphasis Watershed	0	0	0	900	0	0	0
C1 Timber Emphasis (see note)	4300	5500	3800	0	0	0	0

NOTE: Acres shown do not include allocations for Minimum Management Requirements

Table C-22 First Decade Harvest and Roding Schedule (Average Annual)

	A L T E R N A T I V E							
	A	B & C	D	E	F	G	H & I	
Suitable Acres Roded/Harvested	0	75	57	32	0	0	0	
MMBF Harvested	0	0.4	0.3	0.2	0	0	0	
Roding Cost (\$MM)	0	0.13	0.10	0.06	0	0	0	

Alternatives H and I allocate the entire unroaded area to unroaded dispersed recreation. This would perpetuate the unroaded character of the area and allow future classification as a wilderness.

Alternatives E and G allocate approximately 21% of the area as a scenic viewshed. An additional 16% is allocated to special emphasis riparian management with the remainder of the area to be managed for dispersed unroaded recreation. Timber harvest, on an extended rotation, will occur in the scenic emphasis and riparian emphasis allocations with the core of the area remaining unroaded. Harvest will occur in the first decade for Alternative E and in the second decade for Alternative G. Though the remaining unroaded area is decreased in these alternatives, there is potential to continue to manage as an unroaded area and, perhaps, classify as wilderness in the future.

Alternative F, allocates the majority of the area as a scenic viewshed. Timber harvest, on an extended rotation, will occur on all suitable acres and eliminate the unroaded character of the area and the semi-primitive nonmotorized recreational opportunity (ROS) class. Harvest will not take place until the second decade. Thereafter, the area would not have the potential for future wilderness designation.

Alternatives A and D allocate 21 and 30% of the area as a scenic viewshed with the remainder managed as timber emphasis. Timber harvest associated with the scenic viewshed and timber emphasis allocations will eliminate the unroaded character of the area. The ROS class would tend to be roaded modified in the central portion of the unroaded area and roaded natural in the scenic corridors associated with the northern and southern boundaries in Alternative A, and the northern boundary in Alternative D. Harvest will occur in the second decade for Alternative A, and in the first decade for Alternative D.

The last two alternatives, B and C, allocate the majority of the unroaded area to timber emphasis with the exception of the areas needed to meet minimum management requirements. Timber harvest would, over time, eliminate the unroaded character of the area. Harvest would occur in the first decade in both alternatives. The ROS class would tend to be roaded modified throughout. Wind Creek area would be eliminated from future consideration as a wilderness.

APPENDIX D

APPENDIX D

MANAGEMENT DIRECTION NOT IN PERFERRED ALTERNATIVE

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DEIS-APPENDIX D

I. INTRODUCTION

This appendix presents the Prescriptions, including the Management Standards, for the management areas to which land was not allocated to in the preferred Alternative for the Proposed Forest and Land Management Plan, i.e. Forest Plan; but were listed for some of the other Alternatives discussed in the Draft Environmental Impact Statement for The Proposed Forest and Land Management Plan (DEIS).

As noted in the management area table in Chapter II of the DEIS, the alternatives vary as to the number of management areas they prescribe. There are standards which pertain to each of the management areas discussed in Chapter II of the DEIS. In addition, there are standards which pertain to every acre of the Forest, regardless of the Management Area or alternative chosen. These are called "Forest-Wide Standards".

The Forest Plan contains the Forest-Wide Standards. It also contains the standards which pertain to the management areas included in the Preferred Alternative. If another alternative also proposes some of these same Management Areas; then these same standards will apply.

This leaves a third set of standards; those which are specific to management areas NOT included in the preferred alternative and incorporated in this Appendix. These standards, and the alternative(s) to which they pertain, are as follows:

MANAGEMENT AREA		ALTERNATIVE
Name	Designation	
Old Growth	A7	H
Developed Recreation Sites:	A10	
-Proposed Sites	"	None
Scenic Viewsheds	B2	
-Foreground Modification	"	F,H,I
-Middleground Modification	"	F,H,I
Minimum Management	NA	NONE
Pine/Oak Habitat		
-High Intensity	B4	F,I

A. Purpose of Standards

Some management activities purposed under the nine alternatives described in this document have the potential to cause significant effects on the various resources and programs on the Forest. The Prescriptions and Management Standards that will be presented in this Appendix, and in The forest Plan, were designed to protect resources, prescribe parameters in which activities could occur and to aid in meeting objectives of resource programs.

Standards are goal statements used in the context of forest planning to describe the environmental condition of a part of the Forest, or a specific resource, that is desired after, or during, the implementation of a given Management activity.

Management Areas are the contiguous areas of land assigned to a specific Management Prescription.

B. Source of Standards

The standards were developed by an Interdisciplinary Team of Specialists (I.D. Team) working together to develop integrated standards. The I.D. Team used the Standards and Guidelines from the Regional Guide^{1/} to form the core for the Forest Wide Standards. While the standards from the regional Guide were not always quoted verbatim in the Forest Wide Standards, the basic idea from these standards was incorporated. The standards which were derived from the Regional Guide are identified, by an asterick.

Forest Service established policy and manual direction was incorporated into the standards where important and applicable. Applicable Law from the National Forest Management Act (NFMA) and Forest Service Regulations was used as the basis for some of the standards. Other standards were formulated from the research papers and professional knowledge of the I.D. Team in response to needs recognized by the Team collectively.

C. Reference to Standards

To avoid duplication and to reduce the size of the Draft Environmental Impact Statement; the Standards that apply to the Forest's Preferred Alternative will be found in the Proposed Forest Plan that outlines the Proposed Management areas and proposed management Actions that would be implemented under the Preferred Alternative.

^{1/} Regional Guide for the Pacific Northwest Region. May 1984. (The Regulations implementing the forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as ammended by the National Forest Management Act of 1976 (NFMA), required the preparation of a Regional Guide that set the framework of standards for the Draft Environmental Impact Statement.

D. Forest Wide Standards

Forest Wide Standards apply to all management activities on the Forest, irregardless of Management Area. Refer to Chapter 4 of the Forest Plan for all of the Forest Wide Standards.

II. MANAGEMENT DIRECTION NOT IN PERFERRED ALTERNATIVE

A. Prescriptions and Standards

Following are the Management Area Prescriptions and accompanying standards for Alternatives discussed in in the Draft Environmental Impact Statement; but were not applied to any land allocations in the Perferred Alternative discussed in the Forest Plan. (refer to Chapter 4 of the Forest Plan for Prescriptions that apply to land as allocated in the Perferred Alternative).

The Standards presented in this Appendix provide the conditions under which management practices shall be implemented in achieving the objectives of the Alternatives listed in the chart on page D-1 and presented in the Draft Environmental Impact Statement (DEIS).

Note to readers: In reading the Standards it will be helpful to remember the following use of specific verbs that appear in the standards. These verbs are used to convey the intent of the management direction expressed by the standard.

<u>VERB</u>	<u>INTENT OF STANDARD</u>
MUST, SHALL	Action is <u>Mandatory</u>
SHOULD, OUGHT	Action is <u>Required</u> , <u>Unless</u> reason exists for not taking action, as identified in environmental assessments.
MAY, CAN	Action is <u>Optional</u>
WILL *	Is not restrictive; applies only to a statement or future condition or an expression of time. <u>*Is not used in place of shall.</u>

PRESCRIPTION for MANAGEMENT AREA: A7-("OLD GROWTH")

NOTE: This prescription describes how "Old Growth" timber shall be managed in Alternative "H" described in the Draft Environmental Impact Statement (DEIS).

Description: "Old Growth" is defined to be: Any stand of trees 10 acres or greater generally containing the following characteristics:

- Mature and overmature trees in the overstory and the stand is well into the mature growth stage.
- Multilayered canopy with trees of two or more age classes.
- Standing dead trees and down materials.
- Evidence of man's activities may be present, but do not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

Goal: To provide dedicated Old Growth Forested areas in terms of quality, size and distribution to insure perpetuation of Old Growth stands and trees through preservation of natural genetic gene pools and to provide for aesthetic, scenic, recreational and ecological aspects of "Old Growth", and to provide for future populations of "Old Growth" dependent species of plants and animals associated with overmature tree stands.

Management Activities:

These areas shall be managed to preserve mature, or overmature, tree stands having large trees, snags, dead dowed material and, in many situations, two or more canopy levels. Snags in these stands shall be managed to vary in size and be located so that a wide variety of conditions are present in the stands. Management insures that evidence of human activity, while it may be present, shall be subordinate to the Old Growth characteristics of the management areas.

Other Management activities are permitted provided they do not alter overall Old Growth stand conditions. These activities could include road access to the edge of the old growth stands, trails within the stands for walk-in dispersed recreation Activities, habitat improvement projects for fish & wildlife, and educational or interpretative activities. Scheduling timber operations or cultural treatments shall not be permitted within Old Growth Management Areas.

Standards by Functional Activity: (see following Pages)

FUNCTIONAL ACTIVITY	STANDARDS
1) DISPERSED RECREATION	
- PLANNING AND INVENTORY	1A. CONCENTRATED RECREATION USE MAY OCCUR IN "Old Growth" AREAS, BUT SHALL NOT BE ALLOWED TO BE A DETRIMENT TO THE OLD GROWTH STAND OR CONFLICT WITH THE PURPOSE OF ESTABLISHING THE "Old Growth".
- FACILITY AND SITE CONSTRUCTION	1B. NEW DISPERSED RECREATION SITES MAY OCCUR IN "Old Growth" AREAS; BUT SHALL BE OBLITERATED AND RESTORED IF THEY BECOME A DETERIMENT TO THE "Old Growth".
- USE ADMINISTRATION	1C. OFF-ROAD-VEHICLES SHALL BE PROHIBITED WITHIN "OLD GROWTH" ECOSYSTEM AREAS. AREAS CLOSED TO OFF-ROAD VEHICLE USE SHALL BE POSTED.
- TRAILS	1D. NEW TRAILS OR ASSOCIATED TRAIL FACILITIES MAY BE DEVELOPED IN "Old "GROWTH" AREAS; BUT MUST BE DESIGNED AND LOCATED TO PROTECT THE "Old Growth" VALUES.
	1E. EXISTING TRAILS OR FACILITIES IN "Old Growth" AREAS SHALL BE MAINTAINED AT THE LOWEST STANDARD, CONSISTENT WITH DISTRICT TRAIL DEVELOPEMENT PLANS.
2) DEVELOPED RECREATION	2A. NEW DEVELOPED RECREATION FACILITIES FACILITIES MAY BE CONSTRUCTED; BUT MUST BE DESIGNED AND LOCATED LOCATED TO MINIMIZE DETERMENTAL EFFECTS ON "old Growth" AREAS.
3) WILDERNESS	(N/A)
4) VISUAL MANAGEMENT	4A. THE VISUAL QUALITY OBJECTIVE FOR "Old Growth" MANAGEMENT AREAS SHALL BE RETENTION.

FUNCTIONAL ACTIVITY	STANDARDS
5) CULTURAL RESOURCES	5A. (Refer to Forest Wide Standards for Cultural Resource Management)
6) WILDLIFE MANAGEMENT	6A. DIRECT HABITAT IMPROVEMENTS FOR "Old Growth" DEPENDENT SPECIES SHALL BE ENCOURAGED. 6B. SUITABLE "Old Growth" MANAGEMENT AREAS, OR PARTS OF AREAS, REMOVED FOR ANY REASON SHALL BE OFFSET BY ADDITION OF EQUAL OR BETTER HABITAT.
7) FISHERIES	7A. FISH HABITAT IMPROVEMENT PROJECTS SHALL BE ALLOWED IF THEY DO NOT SUBSTANTIALLY IMPACT "Old Growth" ECOSYSTEMS.
8) RANGE MANAGEMENT	8A. LIVESTOCK GRAZING SHALL NOT BE ALLOWED TO SUBSTANTIALLY IMPACT "Old Growth" HABITAT/ECOSYSTEMS.
9) TIMBER MANAGEMENT	9A. THERE SHALL BE NO CHARGEABLE TIMBER HARVEST WITHIN "Old Growth" AREAS. 9B. TIMBER SALVAGE OPERATIONS SHALL NOT BE ALLOWED WITHIN "Old Growth" MANAGEMENT AREAS. REMOVAL AND/OR SALE OF DOWN TREES THAT ARE A HAZARD TO ROAD PRISMS OR ROAD ACCESS SHALL BE PERMITTED <u>ONLY</u> WITHIN CLEARED ROAD RIGHTS-OF-WAYS. 9C. FIREWOOD CUTTING SHALL NOT BE ALLOWED WITHIN "Old Growth" MGMT. AREAS; EXCEPT BY SPECIAL PERMIT.
- GENETIC IMPROVEMENT	9D. WITHIN "Old Growth" AREAS GENETIC IMPROVEMENT ACTIVITIES SHALL BE LIMITED TO SELECT TREES.
10) SOIL, WATER AND AIR	10A. (Refer to Forest Wide Standards for Soil, Water, Air and Riparian Areas)

FUNCTIONAL ACTIVITY	STANDARDS
11) MINERALS MANAGEMENT	11A. COMMON VARIETY MINERALS SHALL NOT BE DEVELOPED WITHIN "Old Growth" AREAS.
12) GEOLOGY	12A. (Refer to Forest Wide Geology Standards)
13) LANDS-SPECIAL USES	13A. "Old Growth" MANAGEMENT AREAS SHALL BE RECOMMENDED FOR WITHDRAWAL FROM ALL FORMS OF APPROPRIATION, INCLUDING ROADS AND TIMBER HARVEST. IF THE AREA IS DROPPED FROM CONSIDERATION AS "Old Growth", THE WITHDRAWAL SHALL BE RECOMMENDED TO BE DROPPED.
- OWNERSHIP PLANNING	13B. NEW RIGHTS-OF-WAY SHALL NOT BE LOCATED WITHIN "Old Growth" AREAS.
	13C. "Old Growth" MANAGEMENT AREAS MUST BE PLACED IN LANDS CATEGORY II, FOR ACQUISITION OR RETENTION.
14) TRANSPORTATION SYSTEMS/FACILITIES	14A. NEW ROADS AND OTHER FACILITIES SHALL NOT BE CONSTRUCTED WITHIN "Old Growth" MANAGEMENT AREAS, BUT NEW ACCESS SHOULD BE PROVIDED TO THE BOUNDARY OF THE AREA.
	14B. EFFECTIVE ROAD DENSITY SHALL NOT EXCEED 2 MILES PER SQUARE MILE. EXISTING ROADS WITHIN "Old Growth" MANAGEMENT AREAS SHALL BE CLOSED AS PRESCRIBED IN THE ROAD MANAGEMENT OBJECTIVES; ESPECIALLY DURING THE BREEDING AND NESTING SEASON, MARCH 1-AUGUST 31.

FUNCTIONAL ACTIVITY	STANDARDS
15) PROTECTION FUNCTIONS	
- FIRE PREVENTION	15A. (Refer to Prevention Standards in Forest Wide Standards for Protection Functions)
- INITIAL ATTACK FIRE SUPPRESSION - ESCAPED FIRE SUPPRESSION	15B. GIVE PREFERENCE TO THOSE SUPPRESSION METHODS RESULTING IN THE SMALLEST PRACTICABLE AREA BURNED, (commensurate with cost effectiveness) AND HAVING THE LEAST EFFECT ON THE "Old Growth" HABITAT CHARACTERISTICS OF THE AREA.
- PEST MANAGEMENT	15C. HERBICIDES SHALL NOT BE USED WITHIN "Old Growth" AREAS.

PRESCRIPTION FOR MANAGEMENT AREA A10- PROPOSED DEVELOPED RECREATION SITES)

This prescription is for management levels **prescribed in various Alternatives in the Draft Environmental Impact Statement (but not in the Preferred Alternative in the Forest Plan)**:

Description: These prescriptions provide for management of forest areas for their value as potential developed recreation sites. At these sites, physical improvements are needed to offer a wide variety of developed recreation experiences. Included in this category are sites with potential for campgrounds, picnic grounds, boating sites, swimming areas, ski areas, resorts, observation sites, marinas, organization sites, and recreation residences.

Goal: To provide an increased range of quality outdoor recreational opportunities for concentrated recreation use at readily accessible sites.

Management Activities:

Under this intensity selected areas shall be reserved for future study and development. The type of facilities to be developed shall be dependent on user demand patterns and specific site suitability. Sites to be developed shall complement the existing areas as developed facilities and expand the forests capacity to accommodate additional use.

Standards by Functional Activity: (see following pages)

FUNCTIONAL ACTIVITY	STANDARDS
1) DISPERSED RECREATION	<p>1A. FOREST WIDE STANDARDS FOR DISPERSED RECREATION SHALL APPLY; HOWEVER PERMANENT FACILITIES SHALL NOT BE DEVELOPED UNTIL SITE PLANS ARE COMPLETE FOR THE AREA, AND THE DISPERED RECREATION FACILITIES CONFORM WITH THE DEVELOPMENT PLANS.</p> <p>2A. PROPOSED RECREATION SITES SHALL BE MAINTAINED IN A CONDITION THAT PROTECTS THE SITES VALUE FOR DEVELOPMENT AS A RECREATION SITE.</p> <p>1C. PROPOSED RECREATION SITES SHALL BE CLOSED TO OFF ROAD VEHICLE USE AND VEHICLE USE MANAGED TO PREVENT DAMAGE TO RESOURCE VALUES AND VEGETATION.</p>
2) PROPOSED SITE DEVELOPMENT AND ADMINISTRATION	<p>2A. AREAS, AND SITES, DESIGNATED AS SUITABLE FOR FUTURE DEVELOPED RECREATION SITES SHALL BE RESERVED FOR FUTURE STUDY AND DEVELOPMENT.</p> <p>2B. THE TYPE OF FACILITIES TO BE DEVELOPED SHALL BE DEPENDENT ON USER PATTERNS AND SPECIFIC SITE SUITABILITY. SITES TO BE DEVELOPED SHALL COMPLEMENT THE EXISTING AREAS AND EXPAND THE FORESTS CAPACITY TO ACCOMODATE ADDITIONAL USE OR MEET A NEED FOR A CERTAIN TYPE OF DEVELOPED RECREATION.</p> <p>2C. NEW CONSTRUCTION SHALL CONFORM TO APPROVED DEVELOPMENT (SITE) PLANS.</p> <p>2D. CONSTRUCTION OF PROPOSED RECREATION SITES SHOULD NOT BE CONSIDERED AT "MINIMUM" LEVEL FUNDING; BUT MAY BE CONSIDERED AT "LOW STANDARD LEVEL" OR "STANDARD SERVICE LEVEL".</p>
3) WILDERNESS	3A. N/A

FUNCTIONAL ACTIVITY	STANDARDS
4) VISUAL RESOURCE MANAGEMENT	4A. PROPOSED RECREATION SITES SHALL BE MANAGED TO MEET A VISUAL QUALITY OBJECTIVE OF PARTIAL RETENTION.
5) CULTURAL RESOURCES	5A. (Refer to Forest Wide Standards for Cultural Resources Management)
6) WILDLIFE MANAGEMENT &	6A. WILDLIFE AND FISH HABITAT IMPROVEMENT & PROJECTS AND/OR STRUCTURES SHALL BE
7) FISHERIES	7A. ALLOWED; BUT SHALL NOT IMPAIR THE VALUE OF THE SITE FOR A DEVELOPED RECREATION SITE.
8) RANGE MANAGEMENT	8A. USE OF PROPOSED RECREATION SITES FOR COMMERCIAL LIVESTOCK GRAZING SHALL NOT BE PERMITTED.
9) TIMBER MANAGEMENT	9A. CHARGEABLE TIMBER HARVEST SHALL NOT BE PERMITTED WITHIN SITES PROPOSED FOR DEVELOPMENT AS A RECREATION SITE; UNLESS HARVEST IS PLANNED AS PART OF THE SITE DEVELOPMENT (as per Approved Site Plan).
10) SOIL, WATER AND AIR	(Refer to Forest Wide Standards for Soil, Water, Air and Riparian Areas).
11) MINERALS MANAGEMENT	11A. (Refer to Forest Wide Standards for Minerals Management)
	11B. REMOVAL OF COMMON VARIETY MINERALS WITHIN PROPOSED RECREATION SITES SHALL NOT BE PERMITTED; UNLESS PLANNED AS PART OF THE SITE DEVELOPMENT (as per Approved Site Plan).
	11C. PROPOSED RECREATION SITES SHALL BE RECOMMENDED FOR WITHDRAWAL FROM MINERAL ENTRY AND THE MINING LAWS, TO PROTECT THE RECREATIONAL VALUES OF THE SITE.
12) GEOLOGY	12A. (Refer to Forest Wide Geology Standards)

FUNCTIONAL ACTIVITY	STANDARDS
13) LANDS-SPECIAL USES	13A. (Refer to Forest Wide Standards for Lands and Special Uses)
14) TRANSPORTATION SYSTEM/	14A. ROADS AND/OR ASSOCIATED FACILITIES SHALL NOT BE CONSTRUCTED WITHIN PROPOSED RECREATION SITES; UNLESS PLANNED AS PART OF CONSTRUCTION OF THE DEVELOPED RECREATION FACILITIES (as per Approved Site Plan).
15) PROTECTION FUNCTIONS	
-PREVENTION	15A. (Refer to Prevention Standards in forest Wide Protection functions Standards)
-WOOD RESIDUE TREATMENT	15B. FIREWOOD CUTTING MAY BE ALLOWED UNDER PERMIT; WITH SPECIAL PROVISIONS TO PROTECT RECREATION AND AESTHETIC VALUES OF THE SITE.
-PEST CONTROL	15C. PEST CONTROL STANDARDS IN FOREST WIDE PROTECTION STANDARDS SHALL APPLY; HOWEVER BIOLOGICAL CONTROL SHALL BE FAVORED AND MEASURES TAKEN TO PROTECT RESOURCE VALUES WITHIN THE SITES PROPOSED FOR DEVELOPMENT.
-LAW ENFORCEMENT	15D. LAW ENFORCEMENT ACTIONS APPROPRIATE TO PRESERVING THE RESOURCE VALUES WITHIN THE SITES PROPOSED FOR DEVELOPMENT SHALL BE TAKEN.

PRESCRIPTION for MANAGEMENT AREA B2-(SCENIC VIEWSHEDS)-MODIFICATION

This prescription applies only to land allocated to viewsheds in alternatives other than the "Perferred Alternative" described in the Forest Plan.

Description: This Prescription provides for management of the portions of the forest landscape that include "Modification" Intensities; for the value of these areas as a scenic resource, as well as for other multiple uses and resources. There are two "Modification" Intensities which may be implemented under this Prescription that represent combinations of two distance zones and two visual management quality objectives. Each "Modification" intensity represents a different level of scenic quality. The level of scenic quality to be provided is based upon relative degrees of acceptable alteration of the natural landscape. The degree of landscape alteration associated with each intensity is determined by the Standards.

Goal: Provide moderately high visual quality levels within viewsheds.

Management Activities:

1) Foreground Modification

This management intensity provides that the alterations of the natural landscape shall not be visually dominate. Activities associated with this intensity must borrow from naturally established form, color, or texture elements in a manner that their visual characteristics appear as natural occurrences within the surrounding area or character type. Visual contrast of management with these elements shall be reduced through manipulation of the shape, edge effect, scale, and distribution of resource treatments. There shall be timber harvest at a reduced rate in Modification Intensities.

2) Middleground Modification

This management intensity provides that alterations of the natural landscape may be visually dominate. Activities in the Middleground Intensity Zone should appear as natural occurances. Visual contrast of management with these elements shall be reduced through manipulation of the shape, edge effect, and scale of resource treatments. There shall be timber harvest at a reduced rate in Modification Intensities.

Standards by Functional Activity: (see following pages)

FUNCTIONAL ACTIVITY	STANDARDS
1) DISPERSED RECREATION -USE ADMINISTRATION	1A. MODIFICATION VISUAL INTENSITY AREAS SHALL BE OPEN FOR OFF-ROAD VEHICLE USE, EXCEPT WHERE SPECIFICALLY CLOSED OR RESTRICTED TO ALLOW FOR MEETING THE VISUAL QUALITY OBJECTIVES FOR EACH INTENSITY. ALL AREAS AREAS AND TRAILS CLOSED OR RESTRICTED FROM OFF-ROAD VEHICLE USE SHALL BE POSTED.
-TRAILS	1B. TRAIL USE AND MAINTENANCE LEVEL FOR TRAILS MUST BE CONSISTENT WITH A RECREATION OPPORTUNITY CLASS OF "ROADED NATURAL"
2) DEVELOPED RECREATION	2A. (Refer to Developed Recreation Site Management Area Standards)
3) WILDERNESS	(N/A)
4) VISUAL RESOURCE MANAGEMENT -VISUAL QUALITY OBJECTIVE	<p>4A. THE VISUAL QUALITY OBJECTIVE SHALL BE MODIFICATION.</p> <p>4B. IN FOREGROUND MODIFICATION INTENSITY AREAS: -ALTERATIONS OF THE VISUAL LANDSCAPE SHALL NOT BE VISUALLY DOMINATE. -ACTIVITIES ASSOCIATED WITH THIS INTENSITY MUST BORROW FROM NATURALLY ESTABLISHED FORM, COLOR OR TEXTURE ELEMENTS IN A MANNER THAT THEIR VISUAL CHARACTERISTICS APPEAR AS NATURAL OCCURANCES IN THE AREA. -VISUAL CONTRAST OF MANAGEMENT SHALL BE REDUCED THROUGH MANIPULATION OF THE SHAPE, EDGE EFFECT, SCALE, AND DISTRIBUTION OF RESOURCE TREATMENTS.</p> <p>4C. IN MIDDLEGROUND MODIFICATION INTENSITY AREAS: -ALTERATIONS OF THE VISUAL LANDSCAPE MAY BE VISUALLY DOMINATE. -ACTIVITIES WITHIN THE MIDDLEGROUND ZONE SHOULD APPEAR AS NATURAL OCCURANCES. -VISUAL CONTRAST OF MANAGEMENT SHALL BE REDUCED THROUGH MANIPULATION OF THE SHAPE, EDGE EFFECT AND SCALE OF RESOURCE TREATMENTS.</p>

FUNCTIONAL ACTIVITY	STANDARDS
VISUAL RESOURCES (con't) -ENHANCEMENT	4D. OPPORTUNITIES FOR ENHANCING PROMINATE LANDSCAPE FEATURES, AND FOR INCREASING VEGETATIVE VARIETY MUST BE UTILIZED.
-REHABILITATION	4E. UNACCEPTABLE CHANGES, IN FORM, LINE, COLOR OR TEXTURE, AS A RESULT OF MANAGEMENT ACTIVITIES SHALL BE SCHEDULED FOR REHABILITATION ACTIONS; TO BE ACCOMPLISHED WITHIN 5 YEARS AFTER OCCURRANCE.
5) CULTURAL RESOURCES MANAGEMENT	5A. (Refer to Forest Wide Standards for Cultural Resources Management)
6) WILDLIFE	6A. STRUCTURAL WILDLIFE HABITAT IMPROVEMENTS SHALL BE LOCATED AND DESIGNED TO MEET THE VISUAL QUALITY OBJECTIVES FOR MODIFICATION.
7) FISHERIES	7A. STRUCTURAL AND NON-STRUCTURAL FISHERIES HABITAT IMPROVEMENTS MUST BE LOCATED AND DESIGNED TO MEET THE VISUAL QUALITY OBJECTIVE OF MODIFICATION.
8) RANGE MANAGEMENT	8A. LIVESTOCK GRAZING SHOULD BE PERMITTED WITHIN "MODIFICATION" INTENSITY AREAS; IF OCCURRING WITHIN AN APPROVED ALLOTMENT.
	8B. STRUCTURES, SUCH AS WATER TANKS HOLDING PENS, AND FENCES MUST BE LOCATED AND DESIGNED TO MEET VISUAL QUALITY OBJECTIVE OF MODIFICATION.
9) TIMBER MANAGEMENT -SILVICULTURAL SYSTEMS	9A. ROTATION AGE ON THE AVERAGE GROWING SITE SHALL BE: - <u>125 YEARS</u> IN FOREGROUND MODIFICATION - <u>Normal Rotation for the Timber Species</u> IN MIDDLEGROUND MODIFICATION
	(Refer to Timber Emphasis Management Area Standards).

FUNCTIONAL ACTIVITY	STANDARDS
TIMBER MANAGEMENT (con't) -LOGGING SYSTEMS/SALE PLANNING	9B. SPUR ROADS, LANDINGS OR HARVEST UNITS MUST NOT DOMINATE OVER LINE, FORM, COLOR OR TEXTURE; BUT MUST BLEND WITH THE NATURAL LANDSCAPE CHARACTER.
10) SOIL, WATER , AIR AND RIPARIAN	10A. (Refer to Forest Wide Standards for Soil, Water, Air And Riparian Areas)
11)MINERALS MANAGEMENT	11A. (Refer to Forest Wide Standards for Minerals management)
-SITE SPECIFIC DEVELOPMENT	11B. SURFACE MINES, GEOTHERMAL ACTIVITIES, ROCK QUARRIES AND STOCKPILES etc. SHALL BE DESIGNED AND LOCATED TO MEET THE VISUAL QUALITY OBJECTIVE OF MODIFICATION.
-SITE SPECIFIC DEVELOPMENT	11C. ALL MINERAL DEVELOPMENTS SHALL REQUIRE A COMPLETE DEVELOPMENT PLAN, INCLUDING RESTORATION AND LANDSCAPING PRIOR TO DEVELOPMENT. EXISTING DEVELOPMENTS THAT DO NOT MET THE VISUAL QUALITY OBJECTIVE OF MODIFICATION SHALL BE IDENTIFIED AND PROGRAMMED FOR REHABILITATION.
12)GEOLOGY	(Refer to Forest wide Geology standards)
13)LANDS -BOUNDARIES, OWNERSHIP PLANNING	13A. (Refer to Forest Wide Standards for Lands)
-RIGHTS-OF-WAY	13B. UTILITY CORRIDORS, TOWERS AND/OR RIGHTS-OF- WAYS MUST BE LOCATED OUTSIDE OF SCENIC VIEWSHEDS WHEREVER POSSIBLE. CLEARINGS AND STRUCTURES REQUIRED BY RIGHTS-OF WAY, MUST BE DESIGNED, AND/OR MODIFIED, TO BLEND WITH THE NATURAL LANDSCAPE CHARACTER IN MODIFICATION INTENSITY AREAS.

FUNCTIONAL ACTIVITY	STANDARDS
14) TRANSPORTATION SYSTEMS/FACILITIES	
-PLANNING & CONSTRUCTION	14A. ROAD LOCATION AND DESIGN MUST BE ADJUSTED TO MEET THE VISUAL QUALITY OBJECTIVE OF MODIFICATION; TO THE EXTENT PRACTICABLE.
-ROAD OPERATION	14B. VEGETATION ADJACENT TO MAJOR TRAVEL ROUTES OR RECREATION SITES MUST BE CONTROLLED PRIMARILY BY MACHINE OR MANUAL METHODS. ANY USE OF CHEMICALS MUST BE TIMED TO AVOID BROWNOUT DURING THE HEAVY USE SEASON.
-FA & O CONSTRUCTION	14C. BUILDINGS AND OTHER ROAD ASSOCIATED STRUCTURES MUST BE LOCATED AND DESIGNED TO BLEND WITH THE NATURAL LANDSCAPE CHARACTER.
15 PROTECTION FUNCTIONS	
	15A. (Refer to Forest Wide Prevention Standards in Timber Standards)
-INITIAL ATTACK SUPPRESSION -ESCAPED FIRE SUPPRESSION	15B. GIVE PREFERENCE TO THE SUPPRESSION STRATEGY AND METHODS RESULTING IN THE SMALLEST PRACTICABLE AREA BURNED (Commensurate with cost effectiveness) AND HAVING THE LEAST EFFECT ON THE VISUAL RESOURCE
-WOOD RESIDUE TREATMENT	15C. (Refer to Standards for Timber Emphasis Mangement Areas)

PRESCRIPTION FOR MIMIMUM MANAGEMENT LEVEL (BASIC STEWARDSHIP)

Description: This Prescription does not apply to a specific Management Area; but reflects how the Forest Service would manage the Mt. Hood National Forest under conditions where funding was below any of the management situations described for the various alternatives in the Draft Environmental Impact Statement (DEIS).

Goal: The purpose of a MIMIMUM LEVEL Prescription is to meet basic stewardship Responsibilities for life and health and safety of incidental users and stewards of the Mt. Hood National Forest; and to prevent damage to resources while conserving soil and water resource and not allowing significant or permanent impairment of the productivity of the forest lands.

Management Activities:

The emphasis would be on basic administration functions necessary to meet the standards outlined for Basic Stewardship.

Standards by Functional Activity: (see following pages)

FUNCTIONAL ACTIVITY	STANDARDS
1) DISPERSED RECREATION	
- PLANNING AND INVENTORY	1A. NOT APPLICABLE AT MINIMUM LEVEL
- FACILITY AND SITE CONSTRUCTION	1B. NOT APPLICABLE AT MINIMUM LEVEL
- USE ADMINISTRATION	1C. ONLY THAT LEVEL OF MANAGEMENT NEEDED TO PROTECT THE LIFE, HEALTH AND SAFETY OF FOREST VISITORS SHALL BE PROVIDED.
- TRAILS	1D. ONLY TRAIL MAINTENANCE TO LEVEL I, OR THAT MAINTENANCE, NECESSARY TO PROTECT THE LIFE HEALTH AND SAFETY OF TRAIL USERS AND FOR ADMINISTRATIVE USES SHALL BE PROVIDED. SIGNING TO PROVIDE SAFETY FOR TRAIL USERS SHALL BE MAINTAINED.
2) DEVELOPED RECREATION	* 2A. ALL DEVELOPED RECREATION SITES SHALL BE CLOSED. ONLY THE NECESSARY MANAGEMENT TO PROTECT LONG TERM DAMAGE TO CAPITAL INVESTMENTS AND TO PROTECT THE LIFE, HEALTH AND SAFETY OF USERS IN THE SITES REMAINING OPEN SHALL BE PROVIDED. SOME ROADS LEADING TO DEVELOPED SITES SHALL BE CLOSED.
3) WILDERNESS	* 3A. PROVIDE THE MINIMUM LEVEL OF MANAGEMENT THAT IS NECESSARY TO PREVENT THE THE DEGRADATION OF WILDERNESS RESOURCES AND IS CONSISTENT WITH WILDERNESS LEGISLATION, AND IS WITHIN FUNDING AND MANPOWER CONSTRAINTS.
4) VISUAL RESOURCE MANAGEMENT	4A. VISUAL MANAGEMENT IS NOT APPLICABLE AT MINIMUM LEVEL MANAGEMENT.
5) CULTURAL RESOURCE	5A. FOREST-WIDE STANDARDS FOR CULTURAL RESOURCE MANAGEMENT REQUIRED BY LAW SHALL BE PROVIDED FOR AT MINIMUM LEVEL MANAGEMENT.

FUNCTIONAL ACTIVITY	STANDARDS
6) WILDLIFE MANAGEMENT & 7) FISHERIES MANAGEMENT	<ul style="list-style-type: none"> * 6A. ONLY THE MINIMUM LEVEL OF COOPERATION WITH STATE, COUNTY AND FEDERAL AGENCIES, AND OTHER GROUPS, NECESSARY TO INSURE REGULATIONS AND MAINTENANCE OF INCIDENTAL HUNTING AND FISHING AND WILDLIFE VIEWING SHALL BE CONDUCTED. 6B. PROVIDE ONLY THE MINIMUM LEVEL OF MANAGEMENT NECESSARY TO MAINTAIN WILDLIFE AND FISH HABITAT FOR INCIDENTAL HUNTING AND FISHING USE THAT OCCURS. 6C. PROVIDE ALL ACTIVITIES AND MANAGEMENT NECESSARY TO PROTECT THREATENED AND ENDANGERED AND SENSITIVE SPECIES 6D. LIMIT INVESTMENTS IN FISH AND WILDLIFE HABITAT TO THOSE NECESSARY TO PREVENT ADVERSE HABITAT IMPACTS AND/OR CONDITIONS FROM DEVELOPING WHICH WOULD CREATE A NON-VIABLE SITUATION FOR EXISTING-NATIVE VERTEBRATE SPECIES.
8) RANGE MANAGEMENT	<ul style="list-style-type: none"> 8A. PROVIDE ONLY THAT LEVEL OF ADMINISTRATION TO PROCESS RENEWALS OF PREVIOUSLY HELD PERMITS ON CURRENTLY DELINIATED RANGE ALLOTMENTS WITH CURRENT APPROVED ALLOTMENT PLANS.
9) TIMBER MANAGEMENT	<ul style="list-style-type: none"> * 9A. THERE SHALL BE NO CHARGEABLE TIMBER HARVEST. 9B. THERE SHALL BE NO SALVAGE PROGRAM; EXCEPT THAT NECESSARY FOR PROTECTION OF THE FOREST IF THERE IS A MAJOR BLOWDOWN OR DISEASE OUTBREAK.
10) SOIL, WATER AND AIR	<ul style="list-style-type: none"> 10A. PROVIDE A LEVEL OF MONITORING AND ADMINISTRATION COMMENSURATE WITH THE NEED TO PREVENT DAMAGE AND/OR PROTECT AND MAINTAIN THE PRODUCTIVITY OF NATIONAL FOREST LANDS AND WATER.

FUNCTIONAL ACTIVITY	STANDARDS
SOIL, WATER, AIR (con't)	10B. AIR QUALITY MONITORING NEEDED TO DETERMINE THE APPROPRIATE LEVEL OF OTHER ACTIVITIES AFFECTING AIR QUALITY MAY CONTINUE. STATE STANDARDS SHALL BE MET.
11) MINERALS MANAGEMENT	11A. APPROPRIATE STIPULATIONS SHALL BE RECOMMENDED TO THE AUTHORIZING OFFICIAL FOR MINERAL, OIL AND GAS, GEOTHERMAL LEASING AND DEVELOPMENT, AND FOR MINING CLAIM OPERATING PLANS. THESE STIPULATIONS SHALL BE CONSISTENT WITH THE MANAGEMENT OBJECTIVES FOR A CUSTODIAL LEVEL OF STEWARDSHIP.
	11B. COMMON VARIETY MINERAL MATERIAL SHALL NOT BE DEVELOPED.
	11C. EXPLORATION MUST BE PERFORMED WITHIN A REASONABLE PERIOD OF TIME AND IN A MANNER THAT DOES NOT ALTER THE LONG-TERM PRODUCTIVITY OF THE LAND.
	11D. PROVIDE THE LEVEL OF MINERALS ADMINISTRATION NECESSARY TO PROTECT SURFACE RIGHTS AND RESOURCES AND ADMINISTER ALL OIL AND GAS AND GEOTHERMAL PERMITS AND FERC APPLICATIONS AND PERMITS.
12) GEOLOGY	12A. MANAGEMENT PRACTICES SHALL BE DESIGNED TO PREVENT MOVEMENT OF LAND MASSES.
13) LANDS	13A. ALL ACTIVITIES NORMALLY OCCURRING TO PREVENT ENCHROACHMENT OR DAMAGE TO FOREST LANDS AND THOSE ACTIVITIES OCCURRING TO ADMINISTER LAND CLAIMS, SALES, GRANTS AND/OR LAND SELECTIONS SHALL CONTINUE.
	13B. ADMINISTER ONLY UNAVOIDABLE NON-FOREST SERVICE SPECIAL USES AT A BASE LEVEL.

FUNCTIONAL ACTIVITY	STANDARDS
14) TRANSPORTATION/ FACILITIES	*14A. PROVIDE ONLY THE MANAGEMENT AND ROAD SYSTEM MAINTENANCE NEEDED TO PROTECT THE FOREST AND LIFE AND PROVIDE FOR THE HEALTH AND SAFETY OF INCIDENTAL FOREST USERS: SUCH AS NECESSARY SIGNING, GATING OR OTHERWISE CLOSING ROADS.
	14B. ALL ACTIVITIES NORMALLY NEEDED TO MAINTAIN FACILITIES NECESSARY TO CARRY OUT NATIONAL FOREST FUNCTIONS SHALL BE CONTINUED.
15) PROTECTION FUNCTIONS	15A. PROVIDE THE LEVEL OF FIRE DETECTION AND INITIAL ATTACK FORCES NEEDED TO PROTECT NATIONAL FOREST RESOURCES, ADJACENT LANDS AND FOR THE PROTECTION OF FOREST VISITORS, USERS AND NEARBY RESIDENTS.
- PEST MANAGEMENT	15B. THE SUPPRESSION AND PREVENTION OF PESTS SHOULD BE LIMITED TO OUTBREAKS WHICH THREATENED THE VALUES OF THE AREA OR ADJACENT RESOURCES. BIOLOGICAL METHODS SHOULD BE PREFERRED.
- LAW ENFORCEMENT	15C. PROVIDE THOSE LAW ENFORCEMENT EFFORTS NECESSARY TO ENFORCE EXISTING REGULATIONS RELATING TO PROTECTING THE LIFE, HEALTH AND PROVIDING FOR THE SAFETY OF INCIDENTAL FOREST VISITORS AND USERS. PROVIDE ALSO FOR PROTECTION OF GOVERNMENT EMPLOYEES AND PROPERTY.
	15D. PROVIDE THE LEVEL OF COOPERATIVE LAW ENFORCEMENT WITH LOCAL AUTHORITIES TO ENFORCE STATE AND LOCAL LAWS APPLICABLE TO FOREST USERS AND TO SUPPLEMENT FOREST LAW ENFORCEMENT EFFORTS.
	* MAJOR ASSUMPTIONS UNDERLYING THE STANDARDS (see following page)

***BASIC ASSUMPTIONS UNDERLYING THE STANDARDS for
MINIMUM LEVEL MANAGEMENT**

pg. 5

- * 2A.1 THERE IS A COST ASSOCIATED WITH CLOSING RECREATION SITES; AND A MINIMUM MAINTENANCE COST THEREAFTER THAT SHALL BE PROVIDED FOR.
- * 2A.2 THE RECREATION USE ASSOCIATED WITH DEVELOPED RECREATION SHALL BE SHIFTED TO DISPERSED RECREATION THROUGH THE CLOSURE OF DEVELOPED RECREATION SITES.
- * 3A.1 SOME DISPERSED RECREATION USE SHOULD SHIFT TO WILDERNESS AS USERS ARE DISPLACED.
- * 6A.1 THERE SHALL BE LITTLE OR NO WILDLIFE AND/OR & FISHERIES HABITAT WORK; OTHER THAN THAT
7A.1 FUNDED BY THE "PACIFIC NORTHWEST POWER BILL
- *9A.1 TIMBER VOLUME UNDER CONTRACT SHALL BE ALLOWED TO COMPLETE CUTTING. OTHER USES ALLOWED BY REGULATIONS MUST CONTINUE. DEMAND FOR NON-COMMERCIAL WOOD PRODUCTS PROBABLY WILL CONTINUE BUT PERMITS SHALL NOT BE ISSUED.
- *14A.1 ONLY THOSE ROADS NECESSARY TO PROTECT THE FOREST SHALL BE KEPT OPEN; THE REST SHALL BE CLOSED AND/OR GATED.
- *14A.2 THERE IS A MAINTENANCE COST ASSOCIATED WITH CLOSED ROADS TO PREVENT ENVIRONMENTAL DAMAGE THAT SHALL BE PROVIDED FOR.
- *14A.3 DESIGNATED ROADS LEADING TO RECREATION SITES SHALL BE CLOSED TO PREVENT USE OF DEVELOPED RECREATION SITES.

PRESCRIPTION for MANAGEMENT AREA: B4-(PINE/OAK HABITAT) (Special Wildlife)
-High Intensity-

NOTE: This prescription describes how the "Pine Oak" area on the east side of the Forest wiluld be managed under "High Intensity" standards in Alternatives F and I.

Description: The Pine/Oak habitat on the forest's eastside provides critical habitat for four management indicator/hunted species (deer, elk, silvergray squirrel and turkey). The Pine/Oak habitat provide the largest almost contiguous transition winter ranger for deer/elk on the forest. This same habitat, almost exclusively, provides nesting/feeding/breeding habitat for turkey and squirrel. The major characteristic of this habitat is an average of five or more old growth/mature (200-250 years) Ponderosa Pine/acre along with the existing Oak component.

Goal: To maintain or enhance the pine/oak portion of the east side of the Forest, a major special wildlife habitat, for dependent wildlife species. To Provide sufficient quantity and quality of Pine/Oak habitat to meet the need of resident populations of silver gray squirrel and wild turkey, and also provide sufficient transitory range to maintain the number of deer and elk recommended by the Oregon department of Fish and Wildlife. To concurrently provide for wood products and other resource use.

Management Activities:

Vegetation shall be managed to provide over time a minumum of 50 percent of the existing stands in well-distributed mature, or Old Growth ponderosa pine throughout the Pine/Oak habitat. The natural oak component of the pine/oak timber stands are to be maintained through timber management. Timber harvest thinnings are scheduled **only** to acheive wildlife objectives. Salvage operations are permitted and designed **only** to compliment wildlife objectives.

Facilities such as roads and trails are designed, or closed, to minimize wildlife harassment and loss of effective habitat. Other resource activities may be allowed provided they are consistent with wildlife objectives. Chargeable timber harvest is allowed at a reduced rate on **only 50%** of the area.

Standards by Functional Activity: (see following pages)

FUNCTIONAL ACTIVITY	STANDARDS
1) DISPERSED RECREATION - USE ADMINISTRATION	1A. NON-CONSUMPTIVE USE OF WILDLIFE SHALL BE ENCOURAGED. 1B. ENHANCEMENT OF NON-MOTORIZED RECREATION OPPORTUNITIES WHICH DO NOT CONFLICT WITH MANAGEMENT INDICATOR SPECIES MAINTENANCE/ ENHANCEMENT SHALL BE ENCOURAGED. 1C. PINE OAK HABITAT AREAS SHALL BE CLOSED TO OFF-ROAD VEHICLE USE. ALL AREAS AND TRAILS CLOSED TO OFF-ROAD VEHICLE USE SHALL BE POSTED.
- TRAILS	1D. EXISTING TRAILS SHOULD BE USED AND MAINTAINED AT THE MAINTENANCE CLASS CONSISTENT WITH DISTRICT TRAIL DEVELOPEMENT PLANS.
2) DEVELOPED RECREATION	2A. DEVELOPED RECREATION SITES SHALL NOT BE BE CONSTRUCTED WITHIN SPECIAL WILDLIFE HABITAT AREAS, UNLESS COMPATABLE WITH MANAGING FOR SPECIAL WILDLIFE NEEDS.
3) WILDERNESS	3A. (N/A)
4) VISUAL MANAGEMENT	4A. WHERE PINE/OAK IS LOCATED WITHIN A DESIGNATED LEVEL I SCENIC VIEWSHED; THE VISUAL QUALITY OBJECTIVE (VQO) FOR THE VIEWSHED SHALL BE THE MINIMUM ACCEPTABLE STANDARD. 4B. WHERE PINE/OAK IS LOCATED WITHIN A INVENTORIED LEVEL I VIEWSHED; THE MINIMUM VQO's SHALL BE PARTIAL RETENTION IN THE FOREGROUND AND MODIFICATION IN THE MIDDLE-GROUND. 4C. WHERE PINE/OAK IS LOCATED WITHIN A INVENTORIED LEVEL 2 SCENIC VIEWSHED; THE MINIMUM VQO SHALL BE MODIFICATION.
5) CULTURAL RESOURCES MANAGEMENT	5A. (Refer to Forest Wide Standards for Cultural Resources Management)

FUNCTIONAL ACTIVITY	STANDARDS
6) WILDLIFE MANAGEMENT	6A. DIRECT HABITAT IMPROVEMENTS SHALL BE EMPHASIZED.
	6B. HABITAT QUALITY/QUANTITY AND DISTRIBUTION SHALL BE IMPROVED CONTINUALLY TO MEET (to the extent economically feasible) PUBLIC DEMAND.
7) FISHERIES MANAGEMENT	7A (Refer to Forest Wide Fisheries Standards)
8) RANGE	8A. GRAZING SHOULD BE PERMITTED, WITHIN APPROVED ALLOTMENTS, WHERE GRAZING CAN MAINTAIN OR ENHANCE THE QUALITY OF THE HABITAT FOR "MANAGEMENT INDICATOR SPECIES".
9) TIMBER MANAGEMENT	9A. AVERAGE TIMBER HARVEST UNIT SIZE IN PINE/OAK HABITAT SHALL BE LIMITED TO TWENTY (20) ACRES OR LESS.
	9B. TIMBER HARVEST UNIT SIZE, DISPERSION AND SHALL REFLECT HABITAT NEEDS OF SILVER GRAY SQUIRREL, TURKEY AND DEER/ELK.
	9C. PRECOMMERCIAL THINNING SHALL OCCUR <u>ONLY</u> WHEN BENEFICIAL TO FEATURED "MANAGEMENT INDICATOR SPECIES".
	9D. MANAGE TO MAINTAIN A MINIMUM OF 50 % OF THE OLD GROWTH MATURE PONDEROSA PINE; ALONG WITH MAINTAINING THE EXISTING OAK COMPONENT. PINE AND OAK LEFT IN UNITS MUST BE EVENLY DISPERSED. NO FORESTED AREA OVER 15 ACRES SHALL BE DEVOID OF THIS HABITAT.
	9E. COMMERCIAL THINNING SHALL OCCUR <u>ONLY</u> WHEN BENEFICIAL TO FEATURED "MANAGEMENT INDICATOR SPECIES" AND TO ENHANCE THE QUANTITY, QUALITY AND DISPERSION OF PREFERRED NESTING HABITAT FOR TURKEY, AND/OR TO BENEFIT OTHER WILDLIFE.
	9F. FIREWOOD CUTTING SHALL BE PERMITTED IN SPECIFIED MARKED/DESIGNATED AREAS; PROVIDED ALL STANDING SNAGS ARE PROTECTED.

FUNCTIONAL ACTIVITY	STANDARDS
10) SOIL, WATER, AND AIR	10A. (Refer to Forest Wide Standards for Soil Water, air and Riparian Areas)
11) MINERALS MANAGEMENT	11A. (Refer to Forest Wide Standards for Minerals Management) 11B. COMMON VARIETY MINERAL RESOURCES CAN BE DEVELOPED IF PRESENT "MANAGEMENT INDICATOR SPECIES" ARE NOT IMPACTED, NUMBER OF ANIMALS REDUCED, IF 100% OF ANY ADVERSE IMPACTS ARE MITIGATED, AND NO NEW ROADS ARE REQUIRED.
12) GEOLOGY	12A. (Refer to Forest Wide Geology Standards)
13) LANDS-SPECIAL USES	13A. NEW RIGHTS-OF-WAY PERMITS SHALL NOT BE ALLOWED. 13B. STUDY AND PROJECT PERMITS MUST RECOMMEND MEASURES TO INSURE MINIMAL DISTURBANCE TO WILDLIFE AND WILDLIFE HABITAT. 13C. LANDS CRITICAL TO THE INTEGRITY OF PINE/OAK MANAGEMENT AREAS SHALL BE PLACED IN OWNERSHIP CATAGORY II (Retain or Acquire).

FUNCTIONAL ACTIVITY	STANDARDS
14) TRANSPORTATION/ FACILITIES	14A. EFFECTIVE ROAD DENSITY SHALL NOT EXCEED TWO (2) MILES PER SQUARE MILE. 14B. NEW ROADS AND ASSOCIATED FACILITIES SHALL NOT BE PERMITTED; IN ORDER TO REDUCE WILDLIFE HARASSMENT.
15) PROTECTION FUNCTIONS - FIRE PREVENTTION	15A. (Refer to Prevention Standards in the Forest Wide Standards for Protection Functions)
- INITIAL ATTACK FIRE SUPPRESSION	15B. GIVE PREFERANCE TO THOSE SUPPRESSION METHODS RESULTING IN THE SMALLEST PRACTICABLE AREA BURNED (COMMENSURATE WITH COST EFFECTIVENESS) AND HAVING THE LEAST EFFECT ON THE SPECIAL WILDLIFE HABITAT CHARACTERISTICS OF THE PINE/OAK AREA.
- ESCAPED FIRE SUPPRESSION	
- WOOD RESIDUE TREATMENT	15C. (Refer to Wood Residue Standards in. Forest Wide Timber Management Standards)

APPENDIX E

APPENDIX E

Wild and Scenic Rivers
Eligibility, Classification, Suitability

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DEIS-APPENDIX E

WILD and SCENIC RIVER SUITABILITY ANALYSIS

I. Introduction

A. Background

The Wild and Scenic Rivers Act of 1968, designated the initial rivers for the National system, suggested additional river systems for further study, and defined a process for future inclusion of river systems. Federal protection, as per this act, preserves certain of the countries' outstandingly remarkable, free flowing rivers for present and future generations.

The process for adding rivers to the National system is comprised of **three steps**. **Initially, the river area must be determined eligible**. This step, as done on the Mt. Hood National Forest is explained in B. below.

Eligibility is based on two conditions: free-flow and possession of one or more outstandingly remarkable features. The context for this judgement is regional, a best representative within the physiographic provinces and sections determined in the 1980 "Nationwide Rivers Inventory" conducted by the Heritage Conservation and Recreation Service (HCRS).

The **second step** of the process is **classification of an eligible river into appropriate segments** representing one of three existing conditions: **Wild, Scenic, or Recreational**. This classification into segments is based on the level of development of the water resource and shoreline, accessibility, and water quality. Table 1, on page E-4 defines the classification criteria for the river areas. ^{1/}

The **final step** in the process is the **determination of suitability**. This provides the basis for the decision to recommend designation or nondesignation of a river segment. The suitability analysis is an evaluation of the effects of reasonable alternatives for management on a particular river segment.

^{1/} This table was presented in the Federal Register: "National Wild and Scenic River System, Final Revised Guidelines for Eligibility Classification and Management of River Areas"

B. Mt. Hood National Forest Process for determining Suitability

On the Forest, the 1982 "Interim Management Direction for Rivers with Potential for Inclusion in the National Wild and Scenic River System", included in Section II of this appendix, documents the assessment of eligibility and classification for four river systems. The sources for identifying a river system as a candidate for Wild and Scenic River status were: the HCRS inventory for portions of the Clackamas and Salmon Rivers located within the Forest, public input for portions of the White River within the Forest, and direction in the Salmon River/Roaring River Unit Plan Final Environmental Statement for the Roaring River.

Once the rivers were classified, the Forest developed Interim Management Direction for each classification: **Wild, Scenic, and Recreational**. This Management direction prescribes the activities that can occur within each river corridor until the Forest Plan is approved.

The suitability analysis that follows in Part III, of this appendix examines each of the 15 river segments within the context of 5 alternatives. The effect of each alternative is evaluated by estimating changes to significant factors of physical and managerial environment.

C. GLOSSARY of TERMS USED IN SUITABILITY PROCESS

CLASSIFICATION: The process of determining which of the classes outlined in Section 2(b) of the Wild and Scenic Rivers Act, wild, scenic, or recreation, best fit the river and its various segments.

OUTSTANDINGLY REMARKABLE VALUE: The value of the river area which is unique or unusual when compared with similar rivers in the same physiographic region. The Wild and Scenic Rivers Act cites "Scenic, recreational, geologic, fish and wildlife, historical, cultural, and other similar values..." as those which, if "outstandingly remarkable", can qualify free-flowing rivers for inclusion in the National Wild and Scenic Rivers System.

RIVER CORRIDOR: The river and it's immediate environment as shown on the maps located in land Management Planning in the Supervisor's Office of the Mt. Hood National Forest. It is within the river corridor that the interim management direction applies.

II. Eligibility and Classification Assessment

PART A CLASSIFICATION

Table 1 CLASSIFICATION CRITERIA FOR WILD, SCENIC AND RECREATIONAL RIVER AREAS

ATTRIBUTE	WILD	SCENIC	RECREATIONAL
Water Resource Development	Free of Impoundment.	Free of impoundment.	Some existing Impoundment or diversion. The existence of low dams, diversions or other modifications of the waterway is acceptable, provided the waterway remains generally natural and riverine in appearance.
Shoreline Development	Essentially primitive. Little or no evidence of human activity. The presence of a few inconspicuous structure, particularly those of historic or cultural value, is acceptable A limited amount of domestic livestock grazing or hay production is acceptable. Little or no evidence of past timber harvest. No ongoing timber harvest.	Largely primitive and undeveloped. No substantial evidence of human activity. The presence of small communities or dispersed dwellings or farm structures is acceptable. The presence of grazing, hay production or row crops is acceptable. Evidence of past or ongoing timber harvest is acceptable, provided the forest appears natural from the riverbank.	Some development. Substantial evidence of human activity. The presence of extensive residential development and a few commercial structure is acceptable. Lands may have been developed for for the full range of agricultural and forestry uses. May show evidence of past and ongoing timber harvest.
Accessibility	Generally inaccessible except by trail. No roads, railroads or other provision for vehicular travel within the river area. A few existing roads leading to the boundary of the river area is acceptable.	Accessible in places by road. Roads may occasionally reach or bridge the river. The existence of short stretches of conspicuous or longer stretches of conspicuous roads or railroads is acceptable.	Readily accessible by road or railroad. The existence of parallel roads or railroads on one or both banks as well as bridge crossings and other river access points is acceptable.
Water Quality	Meets or exceeds Federal criteria or federally approved State standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the river, and for primary contact recreation (swimming) except where exceeded by natural conditions.	No criteria prescribed by the Wild and Scenic Rivers Act. The Federal Water Pollution Control Act Amendments of 1972 have made it a national goal that all waters of the United States be made fishable and swimmable. Therefore, rivers will not be precluded from scenic or recreational classification because of poor water quality at the time of their study, provided a water quality improvement plan exists or is being developed in compliance with applicable Federal and State laws.	

* Table to be used only in conjunction with text.

Part B INTERIM MANAGEMENT DIRECTION FOR RIVERS WITH POTENTIAL
FOR INCLUSION IN THE NATIONAL WILD AND SCENIC
RIVERS SYSTEM

Four rivers on the Mt. Hood National Forest have been identified as having the potential for inclusion in the National Wild and Scenic Rivers System. Corridors for these four rivers have been delineated and segments have been assessed for their suitability for potential classification as wild, scenic or recreational. The following Interim Management Direction, both general and specific to each classification, has been developed to guide management activities within the delineated river corridors until the Proposed Land and Resource Management Plan (Forest Plan) for the Forest is finalized.

As the Forest Plan was developed; the Forest developed standards for each Wild and Scenic River classification: **Wild, Scenic, or Recreational**. These standards prescribe the conditions desired within each river classification, and will replace the Interim Management Direction that follows.

Refer to Chapter IV of the Accompanying document, the Forest Plan for the new standards and prescriptions for activities that can occur within each river segment.

The primary management objective of this direction is to ensure nondegradation of the existing condition and the outstandingly remarkable values of each of the four river corridors until the Forest Plan is final.

Under this direction, each river corridor shall be managed so that the existing potential classifications of its segments are not lowered; e.g., management activities must not cause a wild river segment to change to a point where it only meets the scenic classification criteria.

Management options accorded by law, regulation, policy, etc., for National Forest System lands can be employed in the river corridors if they comply with the nondegradation principle and if they are not limited elsewhere in this Interim Management Direction. The activity and development limitations discussed must be planned. For example, although campground construction is permitted in recreational river areas, it is not a required activity.

The following interim standards apply to **all four potential River Corridors** regardless of their potential classification as wild, scenic, or recreational:

Recreation

Developed and Dispersed
Recreation

- Regulate or limit recreation use if necessary to prevent physical resource damage.

Information Services

- Locate new major public use centers such as visitor centers and administrative sites outside the river corridor.

Range

Range Resource Management

- Permit domestic livestock grazing except where significant adverse impacts on river banks or vegetation is a factor or may be predicted.

Timber

Firewood Management

- Use the appropriate District's policies for administration of the firewood management program.

Water

Water Resource

- Allow resource management activities Administration provided they do not significantly modify the river bank, channel alignment, or character (volume, direction, or velocity) of the flow of the main stem. relatively small scale projects designed to cause local (less than 300 sq. yards/structure) variations in pool or riffle location are considered consistent with this direction.
- Limit bank stabilization to protection of improvements where the probability of large scale damage is 70% or greater.

Water Resource
Improvement

- Recommend that Federal Energy Regulatory Commission study permits be granted if no degradation of the river corridor will occur. Notify permit applicants of the recommendation that will be made if they apply for a development license.

Minerals and Geology

Minerals Administration

- Subject to valid existing rights, minimize surface disturbance, sedimentation, and water pollution.

Lands

Land Ownership Adjustment

- Do not dispose of any National Forest System lands within the river corridor.

Special Uses

- Allow existing special land uses, including recreation uses.
- Discourage the construction of new utility transmission lines, gas lines, water pipelines, and similar facilities.

The following interim standards apply to potential Wild River corridors:

The Wild and Scenic Rivers Act describes Wild River Areas as: "Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and water unpolluted. These represent vestiges of primitive America." Management of potential wild river corridors should ensure nondegradation of these attributes.

Recreation

- | | |
|-------------------------|--|
| Dispersed Recreation | - Allow primitive facilities when needed to protect a site from physical degradation, but locate them so that they are screened from view from the river and river bank. |
| Developed Recreation | - Allow no new campgrounds, picnic grounds or other developed recreation facilities. |
| Off-Road Vehicle Travel | - Limit motorized vehicles to Forest highways and Forest System roads. Through a Forest Supervisor's Order, close the remainder of the river corridor to off-road motorized use. |
| Special Uses | - Issue no new developmental recreation special use permits. |

Visual Resources

- | | |
|----------------------------|--|
| Visual Resource Management | - For all management activities within the river corridor, meet the Retention Visual Quality Objective (VQO) for the foreground and middle ground as seen from the river, river banks, U.S. and State Highways, Forest Highways, and Forest System roads, trails, and developed recreation facilities. |
|----------------------------|--|

Wildlife and Fish

Habitat Improvement

- Permit structural and non-structural habitat improvements provided they do not introduce non-native species that could significantly change the natural ecosystem.

Facilities

Maintenance

- Permit the maintenance of existing facilities for all resources, e.g.; campgrounds, range improvements, buildings at administrative sites, utility transmission lines, etc.

Protection

Fire Suppression

- Provide swift initial action on all wildfires (FSM 5130.3), but prohibit off-road vehicle travel plus fireline construction with tractors except through the Escaped Fire Situation Analysis (EFSA) process.
- Direct fire retardant drops to minimize entry of chemicals into water courses.
- Direct and utilize the EA process to assess the installation, maintenance, or enhancement of pre-planned, preattack facilities.
- Utilize the EFSA process to determine what facilities are needed for escaped wildfires.

Prescribed Fires

- Utilize the EA process to assess whether prescribed fire will help meet other land management objectives.

Range

Structural Improvements

- Limit range improvements to those needed for proper distribution for river corridor protection or for the control of trespass.

Timber

Timber Resource Management

- Prohibit all future chargeable timber harvest operations.
- Non-chargeable harvest may occur in response to blowdown, insect attack, or similar natural mortality. Permit salvage operations in the middle ground as seen from the river, but prohibit logging activity in the foreground. Ensure protection for the river bank.

Water

Water Resource Improvement

- Recommend denial of all Federal Energy Regulatory Commission licenses to construct any impoundment, water conduit, reservoir, powerhouse, transmission line or other works within the river corridor.
- Safeguard the river against water pollution from other management activities.

Lands

Special Uses

- Issue no new special use permits unless no alternative exists.

Facilities

Transportation

- Prohibit construction of new roads.

The following interim standards apply to potential Scenic River corridors:

The Wild and Scenic Rivers Act describes Scenic River Areas as: "Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads." Management of potential scenic river corridors should ensure nondegradation of these attributes.

Recreation

Dispersed Recreation

- Allow facilities when needed to protect a site from physical degradation or provide a minimum of comfort and convenience to recreationists, e.g.; access parking, sanitation facilities, put-in sites.

Developed Recreation

- Locate new campgrounds, picnic grounds or other developed recreation facilities so that they are screened from view from the river and river bank.
- Discourage facilities with more than 20 units.

Off-Road Vehicle Travel

- Limit motorized vehicle travel to Forest highways and Forest System roads and designated dispersed recreation sites. Through a Forest Supervisor's Order, closed the remainder of the river corridor to off-road motorized use.

Special Uses

- Issue no new developmental recreation special use permits.

Visual Resources

Visual Resources

- For all management activities within the river corridor, meet the Retention VQO for the foreground and Partial Retention VQO for the middle ground as seen from the river, river banks, U.S. and State highways, Forest highways, and Forest System roads, trails, and developed recreation facilities.

Timber

Timber Resource Management

- Allow chargeable timber harvest and salvage operations.

Water

Water Resource Improvement

- Recommend denial of all Federal Energy Regulatory Commission licenses to construct any impoundment, water conduit, reservoir, powerhouse, transmission line, or other works within the river corridor.
- Minimize water pollution from other management activities.

Lands

Special Uses

- Permit new uses or the renewal of permits for existing uses if they do not degrade the character of the river corridor.

Facilities

Transportation

- Allow the construction of new roads.

The following interim standards apply to the **potential Recreational River corridors**:

The Wild and Scenic Rivers Act describes Recreational River Areas as: "Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past." Management of potential recreational river corridors should ensure nondegradation of these attributes.

Recreation

- | | |
|-------------------------|--|
| Dispersed Recreation | - Allow facilities when needed to protect a site from physical degradation or to provide comfort and convenience for recreationists. |
| Developed Recreation | - Allow new campgrounds, picnic grounds or other developed recreation facilities. |
| Off-Road Vehicle Travel | - Continue the current off-road vehicle policy. |

Visual Resources

- | | |
|----------------------------|--|
| Visual Resource Management | For all management activities within the river corridor, meet the Retention VQO for the foreground and Partial Retention VQO for the middle ground as seen from the river, river banks, trails and developed recreation facilities plus from U.S. Route 26, State Highway 35, State Highway 224, and Forest System Road 2618000 (Salmon River Road). |
|----------------------------|--|

Timber

- | | |
|----------------------------|---|
| Timber Resource Management | - Allow chargeable timber harvest and salvage operations. |
|----------------------------|---|

Water

Water Resource Improvement

- Recommend denial of Federal Energy Regulatory Commission licenses for construction of improvements on the main stem.
- Recommend approval of Federal Energy Regulatory Commission licenses for construction of improvements on other water bodies within the river corridor if the flow of the main stem is not affected, and it meets other management objectives.
- Minimize water pollution from other management activities.

Lands

Special uses

- Permit new uses or the renewal of permits for existing uses if they do not degrade the character of the river corridor.

Facilities

Transportation

- Allow the construction of new roads.

Part C CORRIDOR DESCRIPTIONS FOR RIVERS
WITH POTENTIAL INCLUSION IN
THE NATIONAL WILD AND SCENIC RIVERS SYSTEM

River Name: Clackamas

Eligibility

Termini of Free-Flowing River: From its headwaters to the slack water at Big Cliff, Clackamas and Estacada Ranger Districts.

Outstandingly Remarkable Values: The outstandingly remarkable values of the Clackamas River are its cold-water sport fishery, and its recreation opportunities, including rafting. The Clackamas River is located near Portland and is used for a variety of recreation activities such as fishing, rafting, and boating by metropolitan residents.

Boundaries

Length (Termini): From Big Springs to Big Cliff.

Length (Justification): This length of the Clackamas River is free-flowing. Big Springs was chosen as one terminus rather than the headwaters because the flow is extremely intermittent before Big Springs. Big Cliff was selected as the other terminus because the Clackamas River is not free-flowing beyond that point.

Width: The width of the corridor is variable (see map).

Other Landowners: Several parcels along the river are in other ownership such as Austin Hot Springs. Bureau of Land Management and private parties have property in T.4S, R.5E, Sections 20, 29, 30, and 32.

Classification

River Segment: Segment 1 - From Big Springs to the point where Forest Development Road 4690 crosses the Clackamas River.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Several roads exist within the river corridor and some of them cross the river, but none of them parallel the river for any length. In addition, except for Forest Development Road 4690, these roads are not well traveled. Numerous timber harvest activities have occurred along portions of this segment.

Accessibility: Public vehicular access to the river exists at a few points as Forest Development Roads 4690120, 4690130, and 4220 and are within the river corridor.

Water Quality: Water quality is very good.

Recommended Overall Classification: Scenic.

Non-Conforming Features: Evidence of timber harvest activities.

Classification

River Segment: Segment 2 - From the point where Forest Development Road 4690 crosses the Clackamas River to the point where 4690 meets State Highway 224.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Forest Development Road 4690, the main access route to the Olallie Lakes Scenic Area, closely parallels the river along this segment. In addition, several timber harvest activities have occurred along portions of this segment.

Accessibility: The Clackamas River is very accessible to the motoring public along this segment because Forest Development Road 4690 runs close to the river. In addition, several local roads are present within the river corridor.

Water Quality: Water Quality is very good.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

Classification

River Segment: Segment 3 - From the point where Forest Development Road 4690 meets State Highway 224 to the June Creek Bridge.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Although State Highway 224 runs the entire length of this segment, in most places it is not readily apparent from the river. In some places though, the Highway meets and/or crosses the river. Numerous timber harvest activities have occurred along portions of this segment and some of them are visible from the river.

Accessibility: State Highway 224 and some local roads are located within the river corridor.

Water Quality: Water quality is very good.

Recommended Overall Classification: Scenic.

Non-Conforming Features: Evidence of timber harvest Activities and a gravel pit.

Classification

River Segment: Segment 4- From the June Creek Bridge to Tar Creek.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Several developed recreation sites exist in this segment of the corridor, including Riverside, River Ford and Two Rivers Campgrounds. Also Austin Hot Springs site is fully developed for recreation use. A transmission line crosses the river in this segment. State Highway 224 closely parallels the river and is visible from the river. Several areas of timber harvest activity are located in this segment.

Accessibility: The Clackamas River is very accessible to the motoring public along this segment because State Highway 224 parallels the river.

Water Quality: Water quality is very good.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

Classification

River Segment: Segment 5 - From Tar Creek to just south of Indian Henry Campground.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Rainbow and Alder Flats Campgrounds are located within the corridor of this segment, but Rainbow Campgrounds is situated over a 1/4 mile from the river itself. Some timber harvest activities have occurred along portions of this segment.

Accessibility: State Highway 224 lies in the eastern portion of this segments of the river corridor. In some instances, other local roads provide closer access to the river. The Riverside National Recreational Trail is located in this segment.

Water Quality: Water quality is very good.

Recommended Overall Classification: Scenic.

Non-Conforming Features: Evidence of timber harvest activities.

Classification

River Segment: Segment 6 - From just south of Indian Henry Campground to Big Cliff.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Eleven campgrounds and/or picnic grounds are located along the river in this segment. Three large parking areas for recreationists are located near bridges that cross the river. A transmission line and a telephone line follow this segment and cross the Lynx Power Plant and housing area are in the river corridor as are the buildings of the Oregon City Watershed Facility and a Forest Service shop. The river bank is rip-rapped in some places. Some timber harvest activities have occurred along this segment. Also, the Clackamas River Trail provides pedestrian access.

Water Quality: Water quality is very good.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

River Name: Roaring

Eligibility

Termini of Free-Flowing River: From its headwaters to its confluence with the Clackamas River, Estacada Ranger District.

Outstandingly Remarkable Values: The Roaring River's primitive character and remoteness are its outstandingly remarkable values. The Roaring River drainage is mostly undeveloped and there is no vehicular access. Scenery and fisheries are two significant resources along the river.

Boundaries

Length (Termini): From its headwaters to its confluence with the Clackamas River.

Length (Justification): The full length of the Roaring River is free-flowing and the outstandingly remarkable values of the river are present along its entire length.

Width: The width of the corridor is variable (see map).

Other Landowners: None.

Classification

River Segment: Segment 1 - From the headwaters to a point about 1/4 mile from the confluence with the Clackamas River.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Little shoreline development exists in this segment of the Roaring River. A few areas of concentrated primitive camping are evident. Also, three established trails and a rough fisherman's trail are located in the river corridor.

Accessibility: A rough fisherman's trail, that was not constructed and is not maintained, follows the river for three miles from its junction with the Clackamas River. Three established trails provide access to the Roaring River corridor. No vehicular access exists.

Water Quality: Water quality is very good.

Recommended Overall Classification: Wild.

Non-Conforming Features: None.

Classification

River Segment: Segment 2 - From the confluence of the Roaring River with the Clackamas River to a point 1/4 mile upstream. This segment overlaps the proposed corridor for the Clackamas River.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: The Following developments are located in this segment:

1. State Highway 224 crosses the river at its mouth;
2. Roaring River Campground is situated on the south side of the river near its mouth;
3. A PGE powerline crosses the river; and
4. A cable car crosses the river and is used for a water flow gauging system.

Accessibility: State Highway 224 provides vehicular access at the mouth of the river. A rough fisherman's trail, that was not constructed and is not maintained, follows the river.

Water Quality: Water quality is very good.

Recommended Overall Classification: Recreational

Non-Conforming Features: None.

River Name: Salmon

Eligibility

Termini of Free-Flowing River: From its headwaters on Mount Hood to its confluence with the Sandy River, Bear Springs and Zigzag Ranger Districts.

Outstandingly remarkable Values: The Salmon River's outstandingly remarkable values are its cold-water sport fishery and its varied vegetation and topography. The Salmon River's cold-water sport fishery is regarded as the best tributary fishery in the Sandy River drainage. Anadromous species include winter and summer steelhead, and spring chinook and coho salmon. Anadromous species are confined to the lower third of the river. Resident, wild cutthroat trout occur in good numbers above the falls.

From its headwaters through the upper third, the Salmon River is characterized by exposed rock and sparse coniferous vegetation. Steep canyon walls and dense coniferous forest, creating a sense of seclusion and isolation, are typical of the river's midsection. The lower reaches exhibit more uniformly steep slopes and younger vegetation. A 2.5 mile stretch of the river has successive, spectacular waterfalls ranging in height from approximately 15 to 75 feet.

Boundaries

Length (Termini): From its headwaters to the boundary of the Forest, which is approximately one mile south of Welches, Oregon.

Length (Justification): This length of the Salmon River is free-flowing. Stretches of the river have substantial private development. The outstandingly remarkable values of the river have been altered such that recommendation for inclusion within the National Wild and Scenic Rivers System may not be appropriate.

Width: The width of the corridor is variable (see map).

Other Landowners: Two parcels along the river are owned privately. One is located in T.4S, R.9E, Section 6, NE 1/4 and has been subdivided and private homes have been constructed. The second area is located in T.3S, R.7E, Section 16 and it also has been subdivided and a number of homes have been built.

Classification

River Segment: Segment 1 - From the headwaters to approximately 1/2 mile downstream.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Timberline Lodge, chairlifts at Timberline Ski Area, and the road leading to these facilities are located within or are evident from this river segment.

Accessibility: The road to Timberline Lodge is located along the western edge of this river segment. The Pacific Crest Trail crosses the headwaters.

Water Quality: Water quality is very good.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

Classification

River Segment: Segment 2 - From approximately 1/2 mile from the headwaters to the northern edge of Salmon River Meadows.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: A number of homes are located near the river along portions of this segment, but they are not readily apparent to the casual observer. US Highway 26 crosses the river and continues adjacent to it for about 2.5 miles.

Accessibility: Public vehicular access exists in the middle of this river segment as US Highway 26 crosses the river and runs along the eastern edge of the corridor for 2.5 miles. In addition Forest Development Road 2656254 ends near the river corridor near Salmon River Meadows.

Water Quality: Water quality is very good.

Recommended Overall Classification: Scenic.

Non-Conforming Features: None.

Classification

River Segment: Segment 3 - From the northern edge of Salmon River Meadows to the point where the Salmon River and the South Fork of the Salmon River intersect.

Water Resource Development: Currently, this segment of the river is free-flowing, but Federal Energy Regulatory Commission withdrawals exist in T.4S, R.8E, T.4S, R.8 1/2E; and T.3S, R.9E.

Shoreline Development: Little shoreline development exists in this segment of the Salmon River. A few areas of concentrated dispersed primitive camping are evident. The Salmon River National Recreation Trail parallels the river, but is located above the shoreline level of the river. The Salmon River is visible from only certain portions of the trail.

Timber harvest activities have occurred quite close to the river in the Mud Creek area, but they are not visible from the river or the trail.

Water Quality: Water quality is very good.

Recommended Overall Classification: Wild.

Non-Conforming Features: Evidence of timber harvest activities.

Classification

River Segment: Segment 4 - From the point where the Salmon River and the South Fork of the Salmon River intersect to the Forest boundary.

Water Resource Development: Currently, this segment of the river is free-flowing, but Federal Energy Regulatory Commission withdrawals exist in T.3S, R.7E.

Shoreline Development: A number of homes are located near the river just south of the Forest boundary. The Green Canyon Campground is situated on the east bank of the river. Forest Development Road 2618 parallels the river along the entire segment. Also, the Salmon River National Recreation Trail, which receives heavy use along its first few miles, runs parallel to the river in this segment.

Accessibility: Forest Development Road 2618 runs along the edge of the river and crosses it in this segment. Also, the Salmon River National Recreation Trail parallels the river along a portion of this segment.

Water Quality: Water quality is very good.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

River Name: White

Eligibility

Termini of Free-Flowing River: From its headwaters on Mount Hood to its confluence with the Deschutes River; Barlow, Bear Springs and Zigzag Ranger Districts.

Outstandingly Remarkable Values: The outstandingly remarkable values of the White River are its variation in vegetative zones and the evidence of glacial influence. In a relatively short distance, the river passes through vegetative zones from alpine to shrub steppe. Also, the dynamic forces of glaciation and erosion are readily evident. Concern has been expressed that the values of the White River may not be outstandingly remarkable in a regional* context and thus, that the river is only minimally eligible for inclusion in the National Wild and Scenic Rivers System. Within the White River's regional context, the Middle Cascades, there may be many other rivers with attributes similar to those of the White.

Boundaries

Length (Termini): From its headwaters to the boundary of the Forest.

Length (Justification): This length of the White River is free-flowing. Although additional portions of the White River off National Forest System land may be eligible for inclusion in the National Wild and Scenic Rivers System, boundaries and classification are not being proposed.

Width: The width of the corridor is variable (see map).

Other Landowners: None.

*Regional refers to the physiographic provinces used by the National Park Service.

Classification

River Segment: Segment 1 - From the headwaters to the section line between Sections 9 and 16 in T.3S, R.9E.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Little shoreline development exists in this segment of the White River. A segment of a high voltage, 4-wire power transmission line crosses the southeastern tip of the corridor and then runs across the southern segment boundary.

Accessibility: Public access is limited to pedestrian use, primarily the Timberline Trail. No vehicular access exists.

Water Quality: The water often contains a high level of glacial flour and sand sediment, especially during the warmer months of the year. The water quality can change quickly. It should be noted though, that the river is not polluted in the sense that the water quality is impacted only by natural phenomenon.

Recommended Overall Classification: Scenic.

Non-Conforming Features: Timberline Lodge and chairlifts at Timberline Ski Area may possibly be seen from some points within the river corridor. A transmission line crosses a corner of this segment.

Classification

River Segment: Segment 2 - From the section line between Sections 9 and 16 in T.3S, R.9E to Klip Creek.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: A segment of a high-voltage, 4-wire power transmission line runs across the northern segment boundary. A sand excavation pit, about 2000' x 4000' with a cut slope 250' high, is located along the river. A Boy Scout lodge is situated within the river corridor, although it is not visible from the river's shoreline. The White River Campground is located within the river corridor. Timber harvest activities have occurred along portions of this segment, but they are not readily apparent to the casual observer. Several roads parallel and/or cross the river.

Accessibility: An unmaintained four-wheel drive road and a road to the sand pit are located north of State Highway 35. State Highway 35 crosses the river corridor. One paved road and several other roads exist south of State Highway 35.

Water Quality: The water often contains a high level of glacial flour and sand sediment, especially during the warmer months of the year. The water quality can change quickly. It should be noted though, that the river is not polluted in the sense that the water quality is impacted only by natural phenomenon. Some tributaries have high iron content.

Recommended Overall Classification: Recreational.

Non-Conforming Features: None.

Classification

River Segment: Segment 3 - From Klip Creek to the Forest boundary.

Water Resource Development: This segment of the river is free-flowing.

Shoreline Development: Little shoreline development exists in this segment of the White River, except for the Keeps Mill Campground and the road that leads to the campground and across the river. Vehicles must ford the White River since no bridge connects the road.

Accessibility: The only vehicular access within this segment of the river is the road through Keeps Mill.

Water Quality: Water quality is good.

Recommended Overall Classification: Wild.

Non-Conforming Features: Keeps Mill Campground and the road through Keeps Mill.

III. Suitability Analysis

The suitability analysis section is comprised of five parts: definition of alternatives, definition of factors, description of evaluation matrix, general considerations that apply to all river classifications, and completed evaluation matrices/narrative summaries for each segment.

A. Definition of Alternatives

The following five alternatives represent a range of alternative management scenarios for the river corridors.

(A) National Designation, Classification as Inventoried - The river segment will be nominated for Congressional designation into the Wild and Scenic River System as classified in the Interim Management Direction.

(B) National Designation, with an Alternate Classification - The river segment will be nominated for Congressional designation into the Wild and Scenic River system with a classification less restrictive than proposed in the Interim Management Direction. For example, a wild segment could be considered for scenic and recreational classification.

(C) Not Nationally Designated, Other Protective Land Allocations - The river segment would be managed by a land allocation which would closely approximate the intent of National Designation, Classification as Inventoried (Alternative A).

(D) Not Nationally Designated, Nondesignation - The river segment would be managed by appropriate existing legislative classifications (wilderness and research natural areas) and minimum legal requirements (MMRs). These MMRs are designed to maintain viable populations of indicator species: spotted owl, pileated woodpecker, pine marten, big game, and salmonids (salmon, steelhead, and resident trout) through special habitat management.

(E) Not Nationally Designated, Current Management - Continues management of the river segments under the 1982 "Interim Management Direction for rivers with Potential for Inclusion in the National Wild and Scenic Rivers System." This alternative duplicates Alternative A with the exception of the withdrawal of locatable and leasable minerals in a wild river segment.

B. Definition of Factors

Through an interdisciplinary approach, the following eleven factors were determined to be significant indicators of potential change to the river environment or of changes to management flexibility.

- (1) Timber - Chargeable harvest.

Fish and Wildlife:

- (2) Maintaining Habitat - Protecting the natural aging and development of forest lands.
- (3) Flexibility to Manipulate Habitat - Ability to modify the existing habitat characteristics for the benefit of target species.
- (4) Visual Character - Retain or restore natural appearing landscapes.

Recreation:

- (5) Developed - Site managed to enhance opportunities for intensive recreation use.
- (6) Dispersed, Primitive and Semi-primitive nonmotorized - Area managed in essentially unmodified natural environment or with subtle alterations of natural setting. (See glossary for further definition of terms.)
- (7) Dispersed, Semi-primitive motorized and Roaded Natural - Area managed so that moderate to dominant alterations of natural setting remain visually subordinate from travel routes. (See glossary for further definition of terms.)
- (8) Special Use - Recreation activities managed through a special land use permit.

Minerals:

- (9) Locatable - Hard rock minerals which are mined and processed to recover valuable metals, such as gold and copper.
- (10) Leasable - Congress has specified the following as leasable minerals: coal, oil, gas, potassium, sodium, phosphate, oil shale, native asphalt, solid and semi-solid bitumen and bituminous rock, geothermal resources.
- (11) Small Hydroelectric Development - Any power project in which capacity will be installed or increased to not more than a total of 5 megawatts.

C. Description of Evaluation Matrix

The evaluation matrix displays the effect of the alternatives on the factors. The rating system is qualitative: 1. no effect, 2. effect, or 3. opportunity foregone. A narrative explains the rating of each cell of the matrix when there is an effect or further explanation is necessary.

D. General Considerations that Apply to all River Classifications

The following discussion details considerations that apply to all alternatives.

1. For the Clackamas, Roaring, and Salmon Rivers the portions on National Forest land, comprise, with limited exception, the potential length available for designation as a Wild and Scenic River. The White River, however, may be eligible for Wild and Scenic designation beyond the Forest boundary. This would require coordination with Federal, State and local agencies, and private landowners. The Interim Management Direction provides detail as to boundary determination.
2. The Clackamas and Salmon Rivers have other ownership classes (private and BLM) within proposed segments (see Interim Management Direction). Nomination for Wild and Scenic River status may affect the potential development of these parcels. Particularly, Austin Hot Springs, located in Segment 4 of the Clackamas River, will require coordination with the landowner.
3. Cultural (historic) resources and water quality will be maintained as per appropriate law and regulation in all classifications.
4. The potential land allocation(s) for Alternative C was determined through existing Forest resource inventories. Those other potential land allocations were considered if significant portions of the river segment were inventoried in an appropriate protective land allocation (eg. key site riparian, visual emphasis, etc.). This analysis assumes that the areas not available for a reduced or unregulated timber harvest will be managed as general forest.
6. As explained in Part A, the land allocations for Alternative D were based on classified and inventoried minimum management requirements (MMRs). The General Riparian land allocation which applies to all Class I, II, and III streams is an MMR, but not easily mapped. It is, however, associated with each river segment though not specifically discussed in the analysis.

7. Standards developed for management of Wild and Scenic Rivers apply unless a more restrictive land allocation occurs.
8. The possible land allocations for alternatives B and C are noted parenthetically on matrix form and defined, as necessary, in Factor 1, Timber.

E. Evaluation Matrices and Narrative Summaries

Matrix and narrative summaries follow for each of the 15 river segments. These evaluations do not make conclusions regarding the suitability of a particular segment but rather present consequences resulting from differing management scenarios. In the forest planning process, this suitability analysis will be used to determine which river segments to include in a Forest Plan alternative. For example, an alternative with an objective of maximizing timber volume would probably not recommend any river segments for nomination as a Wild and Scenic River. Similarly, an amenity alternative might propose nomination of some or all of the river segments in response to particular objectives. Thus, the suitability analysis is the basis for future evaluation of Wild and Scenic Rivers in the forest planning process.

Roaring River, Segment 1 - Wild

Current Situation - The river area is presently unroaded with very limited access. The entire river system is on National Forest land.

Factor (1) Timber:

1B - Chargeable timber harvest is allowed in scenic River classification. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1C - The area could be managed in a dispersed unroaded land allocation. Harvest is unregulated in this land allocation.

1D - Approximately 40 percent of the river area is unsuitable for timber harvest, 10 percent would be on an extended rotation (MMRs), and 50 percent would be available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2B - See 1B. There would be a slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):
3A,C - Restricts development and implementation of structural/nonstructural habitat improvement projects. Requires increased coordination of project with other resource specialists.
3B - Restricts projects as in 3A, & C but to a lesser degree.

Factor (4) Visual Character:
4B - Timber harvest will modify environment though intent of classification is to maintain natural appearing landscapes.
4D - Entire area modified through intensive timber harvest.

Factor (5) Recreation (Developed):
5B - Potential for adding developed sites with appropriate considerations.

Factor (6) Recreation (Dispersed - Primitive/Semi-Primitive Nonmotorized (P/SPNM)):
6B - Roading would decrease the P/SPNM recreational experience.
6D - The amount of timber harvest and associated road building would eliminate the P/SPNM recreational experience.

Factor (7) Recreation (Dispersed - Semi-Primitive Motorized/Roaded Natural (SPM/RN)):
7B - See 6B.
7D - See 6D. Resulting recreational experience would tend toward RN/roaded modified (RM).

Factor (8) Recreation (Special Uses):
8A,C - Excludes developmental special uses.
8B - Some restriction to developmental recreational special uses to maintain character of river segment.

Factor (9) Minerals (Locatable):
9A - Can be recommended for withdrawal if no valid rights exist.
9B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leaseable):
10A - Can be recommended for withdrawal if no valid rights exist.
10B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:
11A,B - Recommend denial of projects in river corridor to Federal Energy Regulatory Commission (FERC).
11C - Discourage and minimize development of FERC projects.

Matrix 1 - ROARING, SEGMENT: 1-Wild

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER Roaring

SEGMENT 1 - Wild

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A	B	C	D	E
	CLASSIFICATION AS INVENTORIED	(SCENIC) With An ALTERNATE CLASSIFICATION	(DISPERSED USES/OTHERS) OTHER PROTECTIVE LAND ALLOCATIONS	NONDESIGNATION	CURRENT MANAGEMENT
FACTORS:					
Timber -Chargeable harvest (1)	●	◐	●	○	●
Fish and Wildlife:					
1. Maintaining habitat (2)	○	◐	○	◐	○
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	○	◐	○	◐	○
Recreations:					
1. Developed (5)	●	◐	●	○	●
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○	◐	○	●	○
b. Semi-primitive motorized/Roaded Natural (7)	●	◐	●	◐	●
3. Special Use (8)	●	◐	●	○	●
Minerals:					
1. Locatable (9)	●	◐	◐	○	◐
2. Leasable (10)	●	◐	◐	○	◐
Small Hydroelectric Development (11)	●	●	◐	○	●

Roaring River, Segment: 2-Recreational

Current situation - This one-quarter mile segment, of approximately 40 acres, overlaps the proposed corridor for the Clackamas River. The shoreline is well developed: State Highway, campground, powerline.

Factor (1) Timber:

- 1A - Chargeable harvest is allowed in recreational river classification. Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.
- 1C - Upper portion (about 50 percent of the area) could be managed as dispersed unroaded land allocation with no chargeable harvest.
- 1D - Approximately 50 percent of the river area is unsuitable for timber harvest with the remaining 50 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

- 2A - See 1A. There would be a slight alteration of natural conditions.
- 2C - See 1C.
- 2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

- 3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.
- 3C - Projects would be restricted in upper portion in accord with dispersed unroaded land allocations.

Factor (4) Visual Character:

- 4A - Timber harvest will modify environment though intent of classification is to maintain natural appearing landscapes.
- 4C - Maintains natural landscapes on dispersed unroaded land allocation.
- 4D - Area modified through intensive timber harvest. (To access Segment 1, roads might be necessary near, or within, Segment 2.)

Factor (5) Recreation (Developed):

- 5A - Potential for adding or expanding developed sites with appropriate considerations.
- 5C - Developed sites would not be planned within dispersed unroaded land allocation.

Factor (8) Recreation (Special Use):

8A,C - Some restriction of developmental special uses to maintain character of river segment.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A,C - Recommend denial of projects on main stem; recommend approval for projects on tributaries, if main stem not degraded.

Matrix 2 - ROARING, SEGMENT: 2-Recreational

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER ROARING

SEGMENT 2 - RECREATIONAL

ALTERNATIVES:	FACTORS:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
		A CLASSIFICATION AS INVENTORIED	B With An ALTERNATE CLASSIFICATION	C (DISPERSED UNROADED - PART) OTHER PROTECT'VE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
	Timber - Chargeable harvest (1)	◐	○ NOT APPLICABLE	◐	○	◐
	Fish and Wildlife:					
	1. Maintaining habitat (2)	◐	◐	◐	◐	◐
	2. Flexibility to manipulate habitat (3)	◐	○	◐	○	◐
	Visual Character (4)	◐	○	○	◐	◐
	Recreations:					
	1. Developed (5)	◐	○	◐	○	◐
	2. Dispersed					
	a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
	b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	○	○
	3. Special Use (8)	◐	○	◐	○	◐
	Minerals:					
	1. Locatable (9)	◐	○	◐	○	◐
	2. Leasable (10)	◐	○	◐	○	◐
	Small Hydroelectric Development (11)	◐	◐ ↓	◐	○	◐

White River, Segment: 1-Scenic

Current situation - Approximately 90 percent of the area is unsuitable for timber harvest (suitable area aggregated in southeast portion of segment). There is no vehicular access in this segment.

Factor (1) Timber:

1A,B,C - Suitable land available for chargeable harvest on extended rotation.

1D - Approximately 90 percent of the river area is unsuitable for timber harvest with remaining 10 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,B,C,D - Chargeable harvest will affect only small portion of river segment.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A,B,C - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

Factor (4) Visual Character:

4A,B,C,D - See 2A,B,C,D.

Factor (5) Recreation (Developed):

5A,B,C - There is potential of adding developed sites with appropriate considerations.

Factor (8) Recreation (Special Use):

8A,B,C - Some restriction to developmental recreation special uses to maintain character of river segment.

Factor (9) Minerals (Locatable):

9A,B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydro Electrical Development:

11A - Recommend denial of projects in river corridor to FERC.

11B - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydro electrical projects.

Matrix 3 - WHITE, SEGMENT: 1-Scenic

RIVER White SEGMENT 1- SCENIC

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B (RECREATIONAL) With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber - Chargeable harvest (1)	◐	◐	◐	○	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	○	○	○	○	○
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	○	○	○	○	○
Recreation:					
1. Developed (5)	◐	◐	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	○	○
3. Special Use (8)	◐	◐	◐	○	◐
Minerals:					
1. Locatable (9)	◐	◐	◐	○	◐
2. Leasable (10)	◐	◐	◐	○	◐
Small Hydroelectric Development. (11)	●	◐	◐	○	●

White River, Segment: 2-Recreational

Current situation - This segment of the river is well developed: high voltage transmission line, sand excavation pit, a lodge, and campgrounds. The historic Barlow Road is located within portions of the River corridor. There is evidence of past timber harvest activities. Off road vehicle use is occurring in this segment.

Factor (1) Timber:

1A - Chargeable harvest is allowed in recreational river classification. Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.

1C - The segment could be managed as a combination of key site riparian (no chargeable harvest) and scenic emphasis (extended rotation) land allocations.

1D - Approximately 60 percent of the river area is unsuitable for timber harvest with remaining 40 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A, C - See 1A, C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

3C - Projects developed in scenic emphasis key site Riparian land allocations would consider visual qualities and fisheries' objectives, respectively.

Factor (4) Visual Character:

4A, C- Timber harvest will modify environment though intent of classification allocation is to maintain natural appearing landscapes.

4D - Modification of natural landscape through intensive timber harvest particularly in lower portion of segment.

Factor (5) Recreation (Developed):

5A - There is potential of adding or expanding developed sites with appropriate considerations.

5C - See 5A. In key site riparian land allocation, this opportunity is foregone.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Use):

8A,C - Some restriction of developmental special uses to maintain character of river segment or fish habitat, scenic quality.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects on main stem; recommend approval for projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 4 - WHITE, SEGMENT: 2-Recreational

RIVER WHITE SEGMENT 2-RECREATIONAL

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS; BY THE APPLICANT) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber -Chargeable harvest (1)	◐	○ NOT APPLICABLE	◐	○	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	◐	◐	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	◐	○	◐	◐	◐
Recreation:					
1. Developed (5)	◐	○	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	○	◐	○	◐
Minerals:					
1. Locatable (9)	◐	○	◐	○	◐
2. Leasable (10)	◐	○	◐	○	◐
Small Hydroelectric Development. (11)	◐	◐	◐	○	◐

White River, Segment: 3-Wild

Current situation - The river area has primitive road access to a developed campground. The remainder of the segment is undeveloped.

Factor (1) Timber:

1B - Chargeable timber harvest is allowed in scenic river classification. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.
1D - Approximately 60 percent of the river area is unsuitable for timber harvest with remaining 40 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2B - See 1B. There would be a slight alteration of natural conditions.
2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Restricts development and implementation of structural/nonstructural habitat improvement projects. Requires increased coordination of project with other resource specialists.
3B - Restricts projects as in 3A but to a lesser degree.

Factor (4) Visual Character:

4B - Timber harvest will modify environment though intent of classification is to maintain natural appearing landscapes.
4D - Entire area modified through intensive timber harvest.

Factor (5) Recreation (Developed):

5A - Current developed site not, generally, appropriate for wild river classification.
5B - Potential for adding or expanding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7A - SPM/RN is the present recreational opportunity. (If nominated as a wild segment, road would be evaluated for closure.)
7B,D - Roads necessary for timber harvest will increase access and motorized use of roads.

Factor (8) Recreation (Special Uses):

8A - Excludes developmental special uses.

8B - Some restriction to developmental recreational special uses to maintain character of river segment.

Factor (9) Minerals (Locatable):

9A - Can be recommended for withdrawal if no valid rights exist.

9B - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A - Can be recommended for withdrawal if no valid rights exist.

10A - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A,B - Recommend denial of projects in river corridor to FERC.

Matrix 5 - WHITE, SEGMENT: 3-Wild

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER WHITE

SEGMENT 3-Wild

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B (SCENIC) With An ALTERNATE CLASSIFICATION	C (NONE APPROPRIATE) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber - Chargeable harvest (1)	●	◐	○	○	●
Fish and Wildlife:					
1. Maintaining habitat (2)	○	◐	○	◐	○
2. Flexibility to manipulate habitat (3)	◐	◐	○	○	◐
Visual Character (4)	○	◐	○	◐	○
Recreation:					
1. Developed (5)	●	◐	○	○	●
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	◐	○	◐	○
3. Special Use (8)	●	◐	○	○	●
Minerals:					
1. Locatable (9)	●	◐	○	○	◐
2. Leasable (10)	●	◐	○	○	◐
Small Hydroelectric Development (11)	●	●	○ V	○	●

Salmon River, Segment: 1-Recreational

Current situation - This small segment is well developed with Timberline Lodge and associated facilities, and the Pacific Crest Trail near, or within the river corridor.

Factor (3) Fish and Wildlife (Flexibility to Maintain Habitat):

3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

3C - Projects developed in scenic emphasis land allocation would consider visual qualities.

Factor (5) Recreation (Developed):

5A,C - Potential to add developed sites with appropriate considerations.

Factor (8) Recreation (Special Use):

8A - Some restriction of developmental special uses to maintain character of river segment. (Wild and Scenic River designation may conflict with the potential expansion of Timberline Ski Area).

8C - There would be a concern for visual quality in new or expanded recreational special use permits.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects on main stem; recommend approval for projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 6 - SALMON, SEGMENT: 1-Recreational

RIVER SALMON SEGMENT 1 - RECREATIONAL

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A	B	C (SEEING ENHANCEMENT)	D	E
FACTORS:	CLASSIFICATION AS INVENTORIED	With An ALTERNATE CLASSIFICATION	OTHER PROTECTIVE LAND ALLOCATIONS	NONDESIGNATION	CURRENT MANAGEMENT
Timber - Chargeable harvest (1)	◐ <i>UNSUITABLE</i>	○ <i>NOT APPLICABLE</i>	○	○ <i>UNSUITABLE PLACES; NO RANGES</i>	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	○	○	○	◐	○
2. Flexibility to manipulate habitat (3)	◐	○	◐	○	◐
Visual Character (4)	○	○	○	○	○
Recreation:					
1. Developed (5)	○	○	○	○	○
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ <i>OPPORTUNITY NOT AVAILABLE</i>	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	○	○
3. Special Use (8)	◐	○	◐	○	◐
Minerals:					
1. Locatable (9)	◐	○	◐	○	◐
2. Leasable (10)	◐	○	◐	○	◐
Small Hydroelectric Development (11)	◐	◐	◐	◐	◐

Salmon River, Segment: 2-Scenic

Current situation- The river is crossed by Highway 26 and parallels the road for 2.5 miles. Shoreline residences and past timber harvest occur in portions of segment.

Factor (1) Timber:

1A,B,C - Chargeable harvest is allowed in scenic and recreational river classification and scenic land allocation. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1D - Approximately 30 percent of the river area is unsuitable for timber harvest, 10 percent is on an extended rotation or unregulated (MMRs), 60 percent would be available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,B,C - See 1A,B,C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Maintain Habitat):

3A,B,C - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

Factor (4) Visual Character:

4A,B,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Modification of natural landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

5A,B,C - There is potential of adding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Use):

8A,B,C - Some restriction of developmental special uses to maintain character of river.

Factor (9) Minerals (Locatable):

9A,B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects in river corridor to FERC.

11B Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 7 - SALMON, SEGMENT: 2-Scenic

RIVER SALMON SEGMENT 2-SCENIC

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B (RECREATIONAL) With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS; KEY SITE ALTERNATE) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber -Chargeable harvest (1)	◐	◐	◐	○	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	◐	◐	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	◐	◐	◐	◐	◐
Recreation:					
1. Developed (5)	◐	◐	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	◐	◐	○	◐
Minerals:					
1. Locatable (9)	◐	◐	◐	○	◐
2. Leasable (10)	◐	◐	◐	○	◐
Small Hydroelectric Development (11)	●	◐	◐	○	●

Salmon River, Segment: 3-Wild

Current situation - Approximately one-half of the river area is in wilderness. There is access to the remainder of the segment via the Salmon River National Recreation Trail. No vehicular access exists. Timber harvest has occurred in Mud Creek area.

Factor (1) Timber:

1B - Chargeable timber harvest is allowed in scenic river classification (for portion outside of wilderness). Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1C - Portion outside of wilderness could be managed as scenic emphasis land allocation (extended rotation). There is a small area of suitable acres managed as key site riparian (no chargeable harvest).

1D - In the portion of the river area outside of wilderness, 15 percent is unsuitable, 5 percent is unregulated (MMRs), and 30 percent would be available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2B,C - See 1B,C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Restricts development and implementation of structural/nonstructural habitat improvement projects. Requires increased coordination of project with other resource specialists.

3B,C - Restricts projects as in 3A but to a lesser degree.

Factor (4) Visual Character:

4B,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Portion outside of wilderness modified through intensive timber harvest.

Factor (5) Recreation (Developed):

5B,C - Potential for adding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7A - Roaded natural is the inventoried recreational opportunity. However, designation as a wild river will maintain unroaded character of segment.

7B,C,D - Roads necessary for timber harvest will increase access and motorized use of roads.

Factor (8) Recreation (Special Uses):

8A - Excludes developmental special uses.

8B,C - Some restriction to developmental recreational special uses to maintain character of river segment.

Factor (9) Minerals (Locatable):

9A - Can be recommended for withdrawal if no valid rights exist.

9B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A - Can be recommended for withdrawal if no valid rights exist.

10B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A,B - Recommend denial of projects in river corridor to FERC.

11C - Discourage and minimize development of FERC projects.

Matrix 8 - SALMON, SEGMENT: 3-Wild

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER SALMON

SEGMENT 3 - Wild

ALTERNATIVES:	FACTORS:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
		A CLASSIFICATION AS INVENTORIED	B (SCENIC) With An ALTERNATE CLASSIFICATION	C (WILDERNESS & SOME SCENIC SENSITIVE KEY SITE) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
	Timber - Chargeable harvest (1)	●	◐	◐	○	●
	Fish and Wildlife:					
	1. Maintaining habitat (2)	○	◐	◐	◐	○
	2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
	Visual Character (4)	○	◐	◐	◐	○
	Recreation:					
	1. Developed (5)	●	◐	◐	○	●
	2. Dispersed					
	a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE (OUTSIDE OF WILDERNESS)	○	○	○	◐
	b. Semi-primitive motorized/Roaded Natural (7)	○	◐	◐	◐	○
	3. Special Use (8)	●	◐	◐	○	●
	Minerals:					
	1. Locatable (9)	●	◐	◐	○	◐
	2. Leasable (10)	●	◐	◐	○	◐
	Small Hydroelectric Development (11)	●	●	◐	○	●

Salmon River, Segment: 4-Recreational

Current situation - Approximately 70 percent of the river area is in wilderness. The remainder of the segment is well developed: campground, road, and heavily used recreation trail.

Factor (1) Timber:

1A - Chargeable harvest is allowed in recreational river classification (for area outside of wilderness). Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.

1C - The portion outside of wilderness could be managed as a combination of scenic emphasis (extended rotation) and spotted owl (no chargeable harvest) land allocations.

1D - In the portion of the river area outside of wilderness, 10 percent is unregulated (MMRs) and the remaining 20 percent is available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,C - See 1A,C. There would be slight alteration of natural conditions.

2D - Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

3C - Projects developed in scenic emphasis land allocation would consider visual qualities.

Factor (4) Visual Character:

4A,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Portion outside of wilderness modified through intensive timber harvest.

Factor (5) Recreational (Developed):

5A,C - There is potential of adding or expanding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Uses):

8A,C - Some restriction of developmental special uses to maintain character of river segment or fish habitat, scenic quality.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A,C - Recommend denial of projects on main stem; recommend approval for projects on tributaries, if main stem not degraded.

Matrix 9 - SALMON, SEGMENT: 4-Recreational

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER SALMON

SEGMENT 4-RECREATIONAL

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A	B	C	D	E
	CLASSIFICATION AS INVENTORIED	With An ALTERNATE CLASSIFICATION	(WILDERNESS = 70%, SENSITIVE ENVIRONMENTAL RESERVE SITE, OTHER PROTECTIVE LAND ALLOCATIONS)	NONDESIGNATION	CURRENT MANAGEMENT
FACTORS:					
Timber - Chargeable harvest (1)	◐	○	◐	○	◐
Fish and Wildlife:		NOT APPLICABLE			
1. Maintaining habitat (2)	◐	○	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	○	◐	○	◐
Visual Character (4)	◐	○	◐	◐	◐
Recreation:					
1. Developed (5)	◐	○	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	OPPORTUNITY NOT AVAILABLE ◐	○	○	○	→
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	○	◐	○	◐
Minerals:					
1. Locatable (9)	◐	○	◐	○	◐
2. Leasable (10)	◐	○	◐	○	◐
Small Hydroelectric Development (11)	◐	↓	◐	○	◐

Clackamas River, Segment: 1-Scenic

Current situation - Numerous timber harvest activities have occurred in portions of this segment. There is road access.

Factor (1) Timber:

1A,B,C - Chargeable harvest is allowed in scenic and recreational river classification and scenic land allocation. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1D - Approximately 40 percent of the river area is unsuitable for timber harvest, with the remaining 60 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,B,C - See 1A,B,C. There would be a slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Maintain Habitat):

3A,B,C - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

Factor (4) Visual Character:

4A,B,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Continued modification of landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

5A,B,C - There is potential of adding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Intensive timber harvest would perpetuate a roaded modified recreational experience.

Factor (8) Recreation (Special Uses):

8A,B,C - Some restriction of developmental special uses to maintain character of river.

Factor (9) Minerals (Locatable):

9A,B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects in river corridor to FERC.

11B - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 10 - CLACKAMAS, SEGMENT: 1-Scenic

RIVER CLACKAMAS SEGMENT 1-SCENIC

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES: FACTORS:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A	B	C	D	E
	CLASSIFICATION AS INVENTORIED	(RECREATIONAL) With An ALTERNATE CLASSIFICATION	(SCENIC EMPHASIS) OTHER PROTECTIVE LAND ALLOCATIONS	NONDESIGNATION	CURRENT MANAGEMENT
Timber - Chargeable harvest (1)	◐	◐	◐	○	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	◐	◐	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	◐	◐	◐	◐	◐
Recreation:					
1. Developed (5)	◐	◐	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	◐	◐	○	◐
Minerals:					
1. Locatable (9)	◐	◐	◐	○	◐
2. Leasable (10)	◐	◐	◐	○	◐
Small Hydroelectric Development (11)	●	◐	◐	○	●

Clackamas River, Segment: 2-Recreational

Current situation - The river segment is well roaded. Past timber harvest activities have occurred in portions of segment.

Factor (1) Timber:

1A - Chargeable harvest is allowed in recreational river classification. Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.

1C - The segment could be managed as a combination of spotted owl (no chargeable harvest) and scenic emphasis (extended rotation) land allocations.

1D - Approximately 30 percent of the river area is unsuitable for timber harvest, 25 percent is unregulated (MMRs), and the remaining 40 percent is available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,C - See 1A,C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

3C - Projects developed in scenic emphasis/spotted owl land allocations would consider visual qualities and wildlife objectives, respectively.

Factor (4) Visual Character:

4A,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Modification of natural landscape through intensive timber harvest particularly in upper portion of segment.

Factor (5) Recreation (Developed):

5A - There is potential of adding or expanding developed sites with appropriate considerations.

5C - See 5A. In spotted owl land allocation, this opportunity is foregone.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Uses):

8A,C - Some restriction of developmental special uses to maintain character of river segment or spotted owl management area, scenic quality.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects on main stem; recommend approval of projects on tributaries if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 11 - CLACKAMAS, SEGMENT: 2-Recreational

RIVER CLACKAMAS SEGMENT 2-RECREATIONAL

LEGEND
 ○ No effect
 ◐ Effect
 ◑ Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B With An ALTERNATE CLASSIFICATION <i>NOT APPLICABLE</i>	C <i>(SEGMENT EMPHASIS; STATE)</i> OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber -Chargeable harvest (1)	◐	○	◐	○	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	◐	○	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	○	◐	○	◐
Visual Character (4)	◐	○	◐	◐	◐
Recreation:					
1. Developed (5)	◐	○	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○ <i>OPPORTUNITY NOT AVAILABLE</i>	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	○	◐	○	◐
Minerals:					
1. Locatable (9)	◐	○	◐	○	◐
2. Leaseable (10)	◐	○	◐	○	◐
Small Hydroelectric Development. (11)	◐	◑	◐	○	◐

Clackamas River, Segment: 3-Scenic

Current situation - The river area is accessed by road. Past timber harvesting has occurred in portions of this segment.

Factor (1) Timber:

1A,B - Chargeable harvest is allowed in scenic and recreational river classification. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1C - Approximately two thirds of the river area could be allocated to key site riparian, spotted owl (no chargeable harvest) and scenic emphasis (extended rotation) land allocations. The remainder could not be managed by a protective land allocation and suitable acres would be available for harvest.

1D - Approximately 10 percent of the river area is unsuitable for timber harvest, 35 percent is unregulated or managed on an extended rotation (MMRs) with the remaining 50 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,B - See 1A,B. There would be a slight alteration of natural conditions.

2C,D - See 2CD. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Maintain Habitat):

3A,B,C - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

Factor (4) Visual Character:

4A,B - Timber harvest will modify environment though intent of classification is to maintain natural appearing landscapes.

4C,D - Continued modification of landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

5A,B - There is potential of adding developed sites with appropriate considerations.

5C - Developed sites are not compatible with key site riparian and spotted owl land allocations.

Factor (7) Recreation (Dispersed - SPM/RN):

7A,B - Presently, about three quarters of the river area is inventoried as roaded modified. An extended rotation age reduces acres harvested. In this scenario, the area would move toward a roaded natural recreational experience.

Factor (8) Recreation (Special Uses):

8A,B - Some restriction of developmental special uses to maintain character of river.

8C,D - Restriction of developmental special uses to maintain integrity of spotted owl and key site riparian land allocations.

Factor (9) Minerals (Locatable):

9A,B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects in river corridor to FERC.

11B - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 12 - CLACKAMAS, SEGMENT: 3-Scenic

RIVER CLACKAMAS

SEGMENT 3-SCENIC

LEGEND

-  No effect
-  Effect
-  Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	B (RECREATIONAL) With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS; KEY SITE, SPOTTED OWL) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
FACTORS:					
Timber -Chargeable harvest (1)					
Fish and Wildlife:					
1. Maintaining habitat (2)					
2. Flexibility to manipulate habitat (3)					
Visual Character (4)					
Recreation:					
1. Developed (5)					
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	OPPORTUNITY NOT AVAILABLE				
b. Semi-primitive motorized/Roaded Natural (7)					
3. Special Use (8)					
Minerals:					
1. Locatable (9)					
2. Leasable (10)					
Small Hydroelectric Development (11)					

Clackamas River, Segment: 4-Recreational

Current situation - The segment is well developed: State highway, campgrounds, and private inholding of Austin Hot Springs. The development of Austin as a private fee site will affect the character of the river segment. To date logging and redesign of the facility have taken place. Designation of this segment as a Wild and Scenic River would require coordination with the landowner. Past harvest activity has occurred in this segment.

Factor (1) Timber:

- 1A - Chargeable harvest is allowed in recreational river classification. Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.
- 1C - The segment could be managed as a scenic emphasis land allocation (extended rotation).
- 1D - Approximately 30 percent of the river area is unsuitable for timber harvest, 10 percent is unregulated (MMRs), and the remaining 60 percent is available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

- 2A,C - See 1A,C. There would be slight alteration of natural conditions.
- 2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

- 3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.
- 3C - Projects developed in scenic emphasis would consider visual qualities.

Factor (4) Visual Character:

- 4A,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.
- 4D - Modification of natural landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

- 5A,C - There is potential of adding or expanding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN)

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Uses):

8A,C - Some restriction of developmental special uses to maintain character of river segment, scenic quality.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 13 - CLACKAMAS, SEGMENT: 4-Recreational

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

RIVER CLACKAMAS

SEGMENT 4-RECREATIONAL

FACTORS:	ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
		A	B	C	D	E
		CLASSIFICATION AS INVENTORIED	With An ALTERNATE CLASSIFICATION	(SCHEDULE EMPHASIS) OTHER PROTECTIVE LAND ALLOCATIONS	NONDESIGNATION	CURRENT MANAGEMENT
Timber -Chargeable harvest	(1)	◐	○ <i>NOT APPLICABLE</i>	◐	○	◐
Fish and Wildlife:						
1. Maintaining habitat	(2)	◐	○	◐	◐	◐
2. Flexibility to manipulate habitat	(3)	◐	○	◐	○	◐
Visual Character	(4)	◐	○	◐	◐	◐
Recreation:						
1. Developed	(5)	◐	○	◐	○	◐
2. Dispersed						
a. Primitive/Semi-primitive nonmotorized	(6)	○ <i>OPPORTUNITY NOT AVAILABLE</i>	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural	(7)	○	○	○	◐	○
3. Special Use	(8)	◐	○	◐	○	◐
Minerals:						
1. Locatable	(9)	◐	○	◐	○	◐
2. Leasable	(10)	◐	○	◐	○	◐
Small Hydroelectric Development.	(11)	◐	◐	◐	○	◐

Clackamas River, Segment: 5-Scenic

Current situation - There are developed campgrounds in the river corridor. Roads and the Riverside National Recreation Trail provide access. Past timber harvesting is evident.

Factor (1) Timber:

1A,B - Chargeable harvest is allowed in scenic and recreational river classification. Rotation age is extended to maintain, restore, or enhance the natural landscape and perpetuate old growth conditions.

1C - The segment could be managed as a combination of key site riparian (no chargeable harvest) and scenic emphasis (extended rotation) land allocations.

1D - Approximately 40 percent of the river area is unsuitable for timber harvest, 20 percent is unregulated (MMRs), with the remaining 40 percent available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,B,C - See 1A,B,C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Maintain Habitat):

3A,B,C - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

Factor (4) Visual Character:

4A,B,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Continued modification of landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

5A,B - There is potential of adding or expanding developed sites with appropriate considerations.

5C - Developed sites are not compatible with key site riparian land allocation.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Intensive timber harvest would create a roaded modified recreational experience.

Factor (8) Recreation (Special Uses):

8A,B - Some restriction of developmental special uses to maintain character of river.

8C,D - Restriction of developmental special uses to maintain integrity of key site riparian land allocation.

Factor (9) Minerals (Locatable):

9A,B,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,B,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects in river corridor to FERC.

11B - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 14 - CLACKAMAS, SEGMENT: 5-Scenic

RIVER CLACKAMAS SEGMENT 5-SCENIC

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
	A CLASSIFICATION AS INVENTORIED	(RECREATIONAL) B With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS; KEY SITE ALIGNED) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
Timber - Chargeable harvest (1)	◐	◐	◐	◐	◐
Fish and Wildlife:					
1. Maintaining habitat (2)	◐	◐	◐	◐	◐
2. Flexibility to manipulate habitat (3)	◐	◐	◐	○	◐
Visual Character (4)	◐	◐	◐	◐	◐
Recreation:					
1. Developed (5)	◐	◐	◐	○	◐
2. Dispersed					
a. Primitive/Semi-primitive nonmotorized (6)	○	○	○	○	◐
b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
3. Special Use (8)	◐	◐	◐	◐	◐
Minerals:					
1. Locatable (9)	◐	◐	◐	○	◐
2. Leasable (10)	◐	◐	◐	○	◐
Small Hydroelectric Development (11)	◐	◐	◐	○	◐

OPPORTUNITY NOT AVAILABLE

Clackamas River, Segment: 6-Recreational

Current situation - This segment of river is well developed: campgrounds, parking areas, transmission line, Three Lynx Power Plant and housing. The segment is accessible via State Highway 224 and Clackamas River Trail. Some past timber harvesting is evident.

Factor (1) Timber:

1A - Chargeable harvest is allowed in recreational river classification. Rotation age is extended to maintain, restore the natural landscape and perpetuate old growth conditions.

1C - The segment could be managed as a scenic emphasis land allocation (extended rotation).

1D - Approximately 50 percent of the river area is unsuitable for timber harvest, 10 percent is unregulated (MMRs), and the remaining 40 percent is available for intensive timber harvest.

Factor (2) Fish and Wildlife (Maintaining Habitat):

2A,C - See 1A,C. There would be slight alteration of natural conditions.

2D - See 1D. Portion allocated to intensive timber harvest would be altered, tending to younger age classes.

Factor (3) Fish and Wildlife (Flexibility to Manipulate Habitat):

3A - Development and implementation of structural/nonstructural habitat improvement projects would be flexible with some restriction to maintain character of river segment.

3C - Projects developed in scenic emphasis would consider visual qualities.

Factor (4) Visual Character:

4A,C - Timber harvest will modify environment though intent of classification/allocation is to maintain natural appearing landscapes.

4D - Modification of natural landscape through intensive timber harvest.

Factor (5) Recreation (Developed):

5A,C - There is potential of adding or expanding developed sites with appropriate considerations.

Factor (7) Recreation (Dispersed - SPM/RN):

7D - Areas of intensive timber harvest would create a roaded modified experience.

Factor (8) Recreation (Special Uses):

8A,C - Some restriction of developmental special uses to maintain character of river segment, scenic quality.

Factor (9) Minerals (Locatable):

9A,C - Protect character of river corridor through stipulations.

Factor (10) Minerals (Leasable):

10A,C - Protect character of river corridor through stipulations.

Factor (11) Small Hydroelectric Development:

11A - Recommend denial of projects on main stem; recommend approval of projects on tributaries, if main stem not degraded.

11C - Discourage and minimize development of small hydroelectric projects.

Matrix 15 - CLACKAMAS, SEGMENT: 6-Recreational

RIVER CLACKAMAS SEGMENT 6-RECREATIONAL

LEGEND
 ○ No effect
 ◐ Effect
 ● Foregone

ALTERNATIVES:	FACTORS:	NATIONAL DESIGNATION		NOT NATIONALLY DESIGNATED		
		A CLASSIFICATION AS INVENTORIED	B With An ALTERNATE CLASSIFICATION	C (SCENIC EMPHASIS) OTHER PROTECTIVE LAND ALLOCATIONS	D NONDESIGNATION	E CURRENT MANAGEMENT
	Timber -Chargeable harvest (1)	◐	○ NOT APPLICABLE	◐	○	◐
	Fish and Wildlife:					
	1. Maintaining habitat (2)	◐	○	◐	◐	◐
	2. Flexibility to manipulate habitat (3)	◐	○	◐	○	◐
	Visual Character (4)	◐	○	◐	◐	◐
	Recreation:					
	1. Developed (5)	◐	○	◐	○	◐
	2. Dispersed					
	a. Primitive/Semi-primitive nonmotorized (6)	○ OPPORTUNITY NOT AVAILABLE	○	○	○	◐
	b. Semi-primitive motorized/Roaded Natural (7)	○	○	○	◐	○
	3. Special Use (8)	◐	○	◐	○	◐
	Minerals:					
	1. Locatable (9)	◐	○	◐	○	◐
	2. Leasable (10)	◐	○	◐	○	◐
	Small Hydroelectric Development. (11)	◐	◐	◐	○	◐

APPENDIX F

APPENDIX F

EFFECTS OF THE REGIONAL DRAFT SPOTTED OWL
ENVIRONMENTAL IMPACT STATEMENT (SEIS)
ON ALTERNATIVES PRESENTED
IN MT. HOOD'S DEIS

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I. INTRODUCTION

The alternatives and benchmarks displayed in the Draft Environmental Impact Statement for the Proposed Land and Resource Management Plan for the Mt. Hood National Forest were developed using procedures described in Chapter 3 of the Regional Guide for the Pacific Northwest Region (May 1984). Specifically, the Regional Guide required that modeling procedures meet the requirements of the proposed Spotted Owl Management Plan (3/6/81) prepared by the Oregon-Washington Interagency Wildlife Committee and the Region 6 Minimum Management Requirements (MMRs) date 2/9/83. For the Mt. Hood National Forest, the MMRs for northern spotted owls required 51 Spotted Owl Management Areas (SOMAs) distributed across the Forest which would provide 1,000 acres of old-growth forest for a spotted owl nesting pair. This could consist of 300 acres of old-growth as a core area with at least 700 acres of mature or old-growth trees within 1.5 miles of the core area.

At the same time that the Mt. Hood National Forest was preparing the DEIS and proposed Forest Plan, a draft Supplemental Environmental Impact Statement (SEIS) was being developed by the Region for the Regional Guide EIS. That Supplement is a response to an appeal of the Regional Guide which was filed in July, 1984 by the National Wildlife Federation, et al. The appeal concerned direction in the Regional Guide for treating spotted owl habitat in Forest Planning. The Acting Assistant Secretary of Agriculture, Douglas McCleery, directed the Chief of the Forest Service to re-examine the direction in the Regional Guide in light of new scientific information.

The draft Supplement to the Regional Guide EIS (hereafter referred to as "the draft SEIS") was issued in June 1986. It provides a range of options for protecting the spotted owl: from providing no formal protection of the spotted owl to providing for no further reduction in spotted owl habitat in addition to selecting additional areas capable of growing into suitable habitat. In the supplement, the term Spotted Owl Management Areas (SOMAs) changes to Spotted Owl Habitat Areas (SOHAs). The draft SEIS alternatives provide for a range in the size of the Spotted Owl Habitat Areas (SOHAs). In the State of Oregon, SOHAs vary from zero acres to 2,900 acres. Some form of management of 2,200 acre SOHAs is considered in five of the draft SEIS Alternatives.

The Pacific Northwest Forest and Range Experiment Station has published a research paper indicating 2,000 to 2,500 acres of old-growth are needed for each pair of spotted owls. The Oregon Department of Fish and Wildlife has developed a position statement which calls for the protection of 2,200 acres of old-growth to meet the biological requirements of a pair of spotted owls. The Washington Department of Game has not taken a position as to the needed size of a spotted owl habitat area because their research is still being conducted. They have, however, indicated that 1,000 acres of old-growth is not adequate to meet the biological requirements for a pair of owls.

The Preferred Alternative in the draft SEIS recommends that SOHAs be 2,200 acres during the first decade of the Forest Plan and 1,000 acres thereafter. This allows ten years to better evaluate the needs of the owl. Since all of the alternatives, except for Alternative NC (No Change), in the Mt. Hood DEIS assume that SOHAs are 1,000 acres for the entire planning horizon, additional information is needed to inform the reader of the potential impact of the draft SEIS Preferred Alternative on each of the Forest's land management scenarios. Since the No Change Alternative does not incorporate MMRs it is unaffected by the SEIS and is therefore not addressed in this Appendix.

It must be emphasized that the draft SEIS is itself only a draft. A final decision will not be made regarding the draft SEIS Preferred Alternative until the Final Environmental Impact Statement and Record of Decision have been prepared. Since implementation of this final SEIS decision is likely to take a year or more, the Draft Environmental Impact Statement (DEIS) for the Mt. Hood National Forest's Plan is being released at this time to present to the public the many issues and concerns being addressed by the Forest Planning effort. All but the last page of this Appendix will address the impacts which might result from increasing the size of SOHAs from 1,000 to 2,200 acres during the first decade of the Forest Plan and managing the additional 1,200 acres for timber production after the first decade.

The last page of this analysis comprises an estimate of the impact on ASQs of increasing the size of SOHAs from 1,000 to 2,200 acres during the entire planning horizon (150 years). Even though this is not the draft SEIS's preferred alternative, this scenario is addressed in order to indicate the sensitivity of ASQs to such an action.

II. RESOURCE AND ENVIRONMENTAL EFFECTS

If the draft SEIS Preferred Alternative were to be incorporated into the alternatives presented in the Mt. Hood's DEIS then the size of the 51 SOHAs comprising the MMRs would be increased from 1,000 acres to 2,200 acres during the first decade of the Forest Plan. After the first decade, the size would revert back to 1,000 acres.

The effect of this 1,200 acre/SOHA increase has been analyzed two ways: Through the use of FORPLAN and through on-the-ground evaluations. These evaluations were based on (a) examinations of site-specific maps reflecting the boundaries of the alternatives' respective management areas, (b) knowledge of resource values and locations, and (c) awareness of existing plans for timber sales and other management activities. Although these two analytical processes were independent of one another, they resulted in nearly identical findings.

The results of these analyses have been quantified in Table F-1 relative to selected resource outputs and environmental effects pertaining to each of the alternatives presented in the DEIS, except for the No Change Alternative.

Table F-1 FIRST DECADE, AVERAGE ANNUAL, EFFECTS BY ALTERNATIVE
-- 2,200 Acre SOHAS During The First Decade, 1,000 Acres Thereafter --

OUTPUT or EFFECT	UNIT OF MEASURE	A (No Action)	B (RPA)	C	D	E (Preferred)	F	G	H	I
Affected Visual Condition										
Preservation	Acres	187,200	187,200	187,200	187,200	187,200	188,200	187,200	188,200	196,300
Retention	Acres	144,000	33,800	40,000	105,600	168,600	200,000	168,600	365,800	284,000
Partial Retention	Acres	87,200	24,900	18,400	106,600	157,900	290,500	157,900	118,200	265,100
Modification	Acres	206,400	175,900	176,600	180,200	109,900	74,300	109,900	72,800	7,000
Maximum Modification	Acres	128,200	331,200	330,800	173,400	129,400	0	129,400	8,000	0
Unroaded Areas Assigned To Roaded Management Prescriptions, But Which Have No Development Activities Planned for the Next 15 Years.	Number of Areas	3	1	1	0	0	1.5	2	0	0
Unroaded Areas Permanently Assigned To Unroaded Management Prescriptions Eventually Harvested	Number of Areas	4	0	0	3.5	4	3.5	4	10	10
Management Indicator Species										
Spotted Owls	Pairs	80	80	80	85	85	101	85	148	120
Pileated Woodpeckers	Pairs	110	110	110	110	110	145	110	110	180
Pine Martens	Pairs	250	250	250	250	250	330	250	250	405
Anadromous Fish										
Commercial Harvest	M Pounds	526	526	526	526	538	596	538	598	638
Habitat Improvement	Acres	1.0	1.0	1.0	1.0	1.3	3.0	1.3	3.0	4.6
Wildlife Habitat Improvement										
Non-Structural	Acres	1,800	2,400	2,500	2,200	2,200	1,700	2,100	1,600	1,700
Structural	Number of Structures	129	142	15	133	133	107	125	98	107
Range--Permitted Grazing	M AUM's	9.2	11.1	12.6	10.0	9.2	7.4	9.0	4.5	6.6

Table F-1 (Continued) FIRST DECADE, AVERAGE ANNUAL, EFFECTS BY ALTERNATIVE
 -- 2,200 Acre SOHAS During The First Decade, 1,000 Acres Thereafter --

OUTPUT or EFFECT	UNIT OF MEASURE	A (No Action)	B (RPA)	C	D	E (Preferred)	F	G	H	I
Allowable Sale Quantity	(MMBP)	220	288	338	247	219	157	213	60	131
Other Timber Volume	MMBP	83	94	86	84	79	70	82	44	63
Total Timber Sale Program	MMBP	303	382	424	331	298	229	295	104	194
Allowable Sale Quality	(MMCP)	43.4	56.8	66.7	48.7	43.2	31.4	42.0	11.8	25.8
Other Timber Volume	MMCP	16.4	18.5	17.0	16.6	15.6	13.8	16.2	8.7	12.4
Total Timber Sale Program	MMCP	59.8	75.3	83.7	65.3	58.8	45.2	58.2	20.5	38.2
Fuelwood	MMCP	2.8	3.7	4.4	3.2	2.8	2.0	2.7	0.8	1.7
Reforestation	M Acres	4.43	4.79	6.54	3.78	3.77	3.38	3.63	2.78	2.65
Timber Stand Improvement	M Acres	4.63	4.81	5.07	4.67	4.64	4.92	5.13	4.10	4.61
Long-Run Sustained Yield	Million CF	46.4	50.9	56.0	45.1	43.4	39.5	43.4	20.7	33.7
Timber Growth in 2030	Million CF	37.8	47.5	53.6	41.1	37.8	34.7	37.0	23.3	31.4
Improved Watershed Condition	Index	-196	-325	-390	-155	-140	+90	-140	+40	+150
Fire Management Effectiveness Index	\$/M Protected Acres	3433	4316	4903	4085	3823	3081	3906	2173	2826
Arterial and Collector Road Construction/Reconstruction	Miles	7.5	13	14.5	11	9.5	5	8.5	2	4
Timber Purchaser Road Construction/Reconstruction	Miles	22.5	32	37	31	27.5	17	24	7	14
Fuel Treatment	1000 Acres	8.46	10.71	11.83	10.43	9.69	7.23	7.97	5.14	6.85
Job Change In Influence Area	Jobs Index	-500	+900	+2,600	+20	-500	-1,800	-700	-3,900	-2,400
Payments to Counties	Million \$	7.8	9.8	10.9	8.5	7.7	5.9	7.6	2.7	5.0

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III. ANALYSIS OF THE EFFECTS ON THE TIMBER PROGRAM

A. Changes In Allowable Sale Quantities (ASQs)

By comparing Table F-1 of this Appendix to similar tables in Chapter II of the DEIS it is noted that the draft SEIS Preferred Alternative has the effect of changing the first decade harvests, and corresponding environmental effects, of the DEIS alternatives as follows: When adjusted in accordance with the draft SEIS Preferred Alternative, the harvest volumes associated with the Mt. Hood's DEIS alternatives change:

Alternative A ASQ becomes similar to the unadjusted ASQ of Alternative E.
 Alternative B ASQ becomes similar to the unadjusted ASQ of Alternative D.
 Alternative C ASQ becomes similar to the unadjusted ASQ of Alternative B.
 Alternative D ASQ becomes similar to the unadjusted ASQ of Alternative E.

The effect on the remaining alternatives' harvests is not as pronounced because they are not departure alternatives. From FORPLAN, it was found that the expected effect of the draft SEIS Preferred Alternative is one of dropping first decade harvests 14% for departure alternatives and 4% for non-departure alternatives. The effect on LRSYC is about 1% for either departure or non-departure alternatives.

B. Changes in Terms of Other Land Uses

The tradeoff which would result from implementing the draft SEIS Preferred Alternative essentially involves giving up harvests (14% for departures, 4% for non-departures) in favor of the benefits gained from managing an additional 1,200 acres per SOHA for wildlife purposes. Since SOHA management is compatible with other Category A Management Area standards, this tradeoff enhances the probability that all Category A objectives are met. The following table addresses the tradeoff in terms of acres which would otherwise have been suitable for timber management.

Table F-2 Acres Suitable for Timber Harvests
 Which Are Effected by the Draft SEIS

Alt	Suitable Acres, Which Would Otherwise Have Been Available During The First Decade For Harvests, Comprising Additions To SOHAs			
	Category B Management Areas		Management Area C1	Total
	Subject To 4%	Subject To 8%	Subject To 32%	
	Modeling Proxy	Modeling Proxy	Modeling Proxy	
A	3,800	3,900	24,600	
B	1,200	0	34,100	35,200
C	1,400	0	39,200	40,600
D	3,200	1,400	26,600	31,200
E	3,200	1,000	27,600	31,800
F	5,400	14,200	10,400	30,000
G	3,200	1,000	27,600	31,800
H	1,500	4,200	8,000	13,700
I	5,400	14,400	8,400	28,200

C. Benefits And Costs

The value of assigning these acres to SOHA (non-timber) management is reflected in the additional positive environmental outputs (such as viewsheds and riparian acres) and reduced negative consequences (such as increased risk of sedimentation or earth flows). Since it costs less to manage these acres for non-timber objectives, the total cost of each alternative is reduced:

Table F-3 Affect of the Draft SEIS Preferred Alternative on the Budget

Alternative	Average Annual Budget, First Decade (Millions Of Dollars)		
	Without SEIS Preferred Alt	Change	With SEIS Alt
A	26.1	- 1.1	25.0
B	37.0	- 3.0	34.0
C	42.8	- 3.5	39.3
D	34.2	- 2.7	31.5
E	31.9	- 2.4	29.5
F	25.4	- 0.5	24.9
G	28.7	- 0.6	28.1
H	18.5	- 0.2	18.3
I	24.9	-0.4	24.5

These reduced expenditures primarily relate to the timber and engineering costs associated with the harvests which would be foregone if the draft SEIS Preferred Alternative is implemented:

Table F-4 Effect on Harvests of the Draft SEIS Preferred Alternative

Alternative	Average MMBF/YEAR During The First Decade (ASQ, Green)		
	Without SEIS Preferred Alt	Change	With SEIS Alt
A	229	- 9	220
B	335	- 47	228
C	393	- 55	338
D	287	- 40	247
E	255	- 36	219
F	166	- 7	159
G	222	- 9	213
H	62	- 2	60
I	136	- 5	131

The change in MMBF equates to changes in jobs in the local communities served by the Mt. Hood National Forest. Comparing Table F-1 of this Appendix to similar tables in the DEIS, it is concluded that the implementation of the draft SEIS Preferred Alternative would cause the following loss of jobs:

Alt A = 177 fewer jobs	Alt F = 138 fewer jobs
Alt B = 925 fewer jobs	Alt G = 177 fewer jobs
Alt C = 1,091 fewer jobs	Alt H = 39 fewer jobs
Alt D = 788 fewer jobs	Alt I = 99 fewer jobs
Alt E = 709 fewer jobs	

IV. SENSITIVITY OF ASQ TO THE PERIOD THAT SOHAs REMAIN AT 2,200 ACRES

FORPLAN has been used to examine the effects on timber harvests of holding the additional acres out of timber production for (a) just the first ten years and (b) for the entire planning horizon. The results of these analyses are as follows:

Table F-5 Effects On Timber Harvests ^{1/}

Alternatives	Average Percentage Drop In Harvest Volumes			
	1,200 Acre Increments Not Harvested For 10 Years		1,200 Acre Increments Not Harvested For 150 Years	
	First Decade	LRSYC	First Decade	LRSYC
Non-Declining Even Flow Alternatives (A,F,G,H,I)	4%	1%	8%	8%
Departure Alternatives (B, C, D, E)	14%	1%	14%	8%

^{1/} Percentages are the average for the alternatives considered.

Effects on Long Term Sustained Yield Capacity (LTSYC)

The LTSYC of both non-declining even flow and departure alternatives is affected by about the same amount, 7%, by holding the increments out of timber production for an additional 140 years. In other words, the capability of the forest to sustain timber harvests under any alternative is diminished by roughly the same amount (7%).

Effects on First Decade Harvests

Non-declining even flow alternatives: These alternatives do not harvest as many acres during the first decade as do their departure counterparts. Even flow alternatives hold acres in order to avoid declines in harvests in later decades. These acres can be harvested during the first decade if an equivalent amount are made available during the second decade. When this option is not available (e.g. the incremental acres are held out of production for 150 years), first decade harvests decline an additional 4% (compared to harvests if the acres are only held for 10 years).

Departure alternatives: These alternatives do not hold acres out of production during the first decade in order to not decline in subsequent decades. So, the effect on first decade harvests is the same (14%) whether the incremental acres are held out of production for 10 or 150 years.

APPENDIX G

APPENDIX G

SENSITIVITY ANALYSIS OF SIGNIFICANT
FOREST MINIMUM MANAGEMENT REQUIREMENTS

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This appendix has been developed to: (1) describe the background relative to the development of the minimum management requirements (MMRs) used in general Forest planning, and those used specifically on the Mt. Hood National Forest, including their inception, selection, and application; and (2) document the analysis of effects on the environment when assumptions are varied regarding the application of certain significant MMRs in selected Forest planning alternatives.

I. BACKGROUND OF MINIMUM MANAGEMENT REQUIREMENTS

A. What are Minimum Requirements and What Role do They Play in Forest Planning?

All Forest Plan alternatives must comply with applicable laws and regulations. Though many laws and regulations affect Forest Service activities, those directly affecting the planning process are generally in the regulations developed pursuant to the National Forest Management Act of 1976 (NFMA). Some of these regulations are substantive; that is, they have a definite and measurable standard for the result expected from implementation of the plan. Some are procedural, affecting the way the plan is developed.

To assure consistency in applying the laws and regulations to planning, Forest Service national and regional direction (dated October 14, 1981, and February 9, 1983, respectively) established those substantive requirements of the regulations which must be met in all alternatives. These requirements, called minimum management requirements (MMRs), were required to be included in the design and development of each alternative considered in detail. MMRs are the minimum requirements which must be met to accomplish the goals and objectives of the National Forest System, as outlined in 36 CFR 219, National Forest Management Act regulations.

1. Management of the National Forests

In the past, Congress has traditionally given the Forest Service broad discretion on how to manage the National Forests. This discretion has been interpreted and defined through regulations, Forest Service Manual direction, and other internal directives, into an integrated policy for managing the National Forests.

Over the last several decades there has been an increasing interest in the use of the resources on the National Forests, and an increasing controversy over the way that the Forest Service is managing these resources. One result of this was passage of the NFMA, which gave more specific direction about how to manage the National Forests than any previous statute.

2. NFMA and the NFMA Regulations

NFMA arose largely out of controversies surrounding the use of clearcutting on the National Forests. When the Fourth Circuit Court of Appeals affirmed a District Court ruling (Izaak Walton League vs. Butz) that clearcutting violated the Organic Act of 1897, a decision which had the potential to halt clearcutting throughout the Forest Service, Congress entered the picture. It did more than alter language in the Organic Act that had led to the Court decision. Congress, at the urging of interest groups, considered the broad spectrum of Forest Service management responsibilities and activities.

The Congressional debate centered both on specific Forest management issues and on overriding philosophical questions of Congress's role in National Forest management. Substantive issues focused on clearcutting, watershed protection, land suitability, harvest flows, diversity, and stand type conversion. With respect to Congress's role in National Forest management, two philosophies were advocated. One faction in Congress favored the establishment of very specific statutory standards. The other faction preferred generally broad guidelines (with a few specific standards) for the Forest Service to adapt to varying conditions on the ground.

After vigorous debate, the Act that passed as NFMA adopted the latter approach. The Forest Service was given some broad policy direction within which to develop standards that would meet the expectations of Congress. The Secretary of Agriculture, in concert with a Committee of Scientists, and with broad public and professional involvement, was directed to develop regulations to define these standards in detail.

3. The Minimum Management Requirement Concept

NFMA requires National Forests to develop Forest Plans. In doing so, Forests evaluate their potential to maximize different resources and objectives by doing "benchmark" analyses. Such benchmark calculations often serve as the basis for alternatives, but the benchmarks themselves are not alternatives because they do not reflect budgetary, geographical, or environmental considerations. Much of this evaluation of benchmarks, and the subsequent development of alternatives, is done using a linear programming model (called FORPLAN) to stimulate the possible interactions among resource uses of a Forest over time.

In February of 1982, the Chief of the Forest Service directed that all Forest Planning benchmarks and alternatives comply with the minimum requirements of applicable laws and regulations. This was to ensure that evaluation of the potentials to produce

resources and resolve issues realistically reflected the legal, nondiscretionary mandates that the Forest Service must meet in implementing Forest Plans on the ground. The Chief did not want Forests to give the impression that something was a realistic, implementable option if, in fact, it was not. Thus, the concept of "Minimum Legal Requirements," later called Minimum Management Requirements (MMRs), ensured that Forest planning analyses fully reflected the requirements of laws and regulations.

While MMRs were designed to ensure Forest planning complied with legal requirements, they were not meant to establish a final or appropriate level of management. Instead, the MMRs set a "floor" for the alternative levels of management considered during Forest Plan development. They indicate the level below which management will not normally be considered (unless a NEPA alternative is considered outside of the ability of the agency to implement), and above which management will normally be developed and selected. Forest Plan alternatives will adopt management levels and standards and guidelines at or above the MMR level consistent with the goals and objectives of particular alternatives. MMRs are but one step in the process for defining a selected level of management.

4. The Role of MMRs in Forest Planning in Region 6

Regional direction elaborated upon the Chief's direction to ensure that: (1) all legal requirements were being appropriately recognized in Forest planning, (2) at least the minimum requirements were being applied to all benchmarks and alternatives, (3) the requirements were being interpreted and applied consistently, and (4) maximum flexibility for evaluating and selecting options for managing the National Forest was being maintained.

Regional direction for MMRs, like the National direction, focused on those substantive legal requirements that affected the Forest planning analysis. The only MMRs defined at the Regional level were those requirements which were Regional in nature and might significantly impact the range of alternatives being evaluated to address issues, concerns, and opportunities.

The following information concerns MMRs and their development and application in the planning process. The information includes the specific provisions of laws and regulations that the MMRs address with supporting rationale for the judgment that the MMR will result in meeting the particular law or regulation. In defining MMR characteristics, the degree of uncertainty due to lack of scientific information is described as well as when professional judgment was exercised. The nature and sources of information used in MMR development and process of developing the MMRs together with any alternative approaches are also noted.

Those methods and rationale used to incorporate the MMRs in the planning model which have substantial limitations on other resource values are discussed; together with any analysis that considered alternative approaches to minimize adverse effects on other resources. Any development, coordination with adjacent Forests with similar conditions, and rationale on those MMRs with substantial limitations is also discussed.

a. Development Process for Wildlife MMRs

(Note: Specific MMR information is separated by species.)

(1) Development of Basic Wildlife MMR Direction

(a) Direction.

Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure it's continued existence in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area. (36 CFR 219.19).

All management prescriptions shall provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species... 36 CFR 219.27(a)(6).

(b) Emphasis on Wildlife MMRs.

The Region spent more time developing MMRs for wildlife than for any other MMR. The magnitude of this effort was the result of several factors: (1) the Forest Service had no previous experience with these requirements and, therefore, had to interpret, understand, and consider how best to achieve them; (2) a wide spectrum of wildlife species had to be considered and data was often lacking, and (3) meeting the wildlife requirements could significantly impact Forests' ability to produce other resources. Consequently, considerable thought and effort was devoted to exploring ways of meeting wildlife requirements.

Regional standards originally proposed for wildlife MMRs (June 11, 1982) did no more than reference the NFMA Regulations and advise the Forests to specify the standards and assumptions they chose to use in meeting these requirements. Because the potential for inconsistency between Forests was high with such an approach, more specific direction was warranted. After several meetings, Forest and Regional Office staff presented draft MMR directions establishing broad principles to the Regional Forester on August 9, 1982. This direction was based upon Regional Office policy on viable populations developed to meet the requirements of the Regulations.

The Regional Forester decided that the wildlife portion of the MMR direction needed to be strengthened to ensure consistency in formulation of the FORPLAN linear programming model. Wildlife biologists and Forest planners met on August 17, 1982, to discuss how best to approach this additional level of detail. They decided to focus only on those species genuinely threatened with a loss of viability and possible placement on the Federal Threatened and Endangered Species List.

To provide some form of protection for these vulnerable species, the group decided to: (1) focus on those habitats that were likely to be limiting in the future (in short supply either in total acreage or in distribution), and (2) identify particular species that could be used to represent all species dependent on those habitats. Habitats selected were based on broad seral stages of groups of plant communities which based on Kuchler's classification system. For example the pileated woodpecker was selected to represent mature and old-growth timber in 12 different plant communities. The mature and old-growth seral stages were selected because they were expected to be in short supply unless provided by management direction. This identification was done on a subregional basis, to recognize the variability of situations within the Region. Deletions and additions to this identification, with Regional Forester approval, allows further recognition of the variability of situations within a subregion. Once the MMR species were identified, the Region defined habitat requirements and biological characteristics for the species.

These are the basis for providing for species habitat, and also deciding how best to represent the species' needs in the planning process and in the FORPLAN model. These MMR species are included in the list of Management Indicator Species (MIS) that the Forests would address in Forest planning and subsequent monitoring.

After considerable review, including Regional Office Staff Directors, Washington Office Wildlife Staff, and a Regional Office Task Force specifically established to review the MMR question in the Region, final MMR direction was adopted and sent to the Forests on February 9, 1983.

As a result of a report prepared in response to a request by the Deputy Assistant Secretary of Agriculture in his March 8, 1985, decision on an appeal of the Region 6 Regional Guide, the Regional Forester modified his instructions for Wildlife MMRs. These modifications will be included in the Final Environmental Impact Statements and Forest Plans if not in Draft EISs or Plans.

The following is a matrix that displays the current Regional Direction regarding a) limited habitats, b) sub-Regional zones, and c) the MMR Wildlife species.

SPECIES MATRIX FOR ADDRESSING MINIMUM MANAGEMENT REQUIREMENTS
FOR WILDLIFE AND THREATENED AND ENDANGERED SPECIES

ZONE	Zone 1 NORTH COASTAL	Zone 2 WESTSIDE CASCADES	Zone 3 EASTSIDE CASCADES	Zone 4 BLUE MOUNTAINS
HABITAT				
Mature and Old-Growth (Seral stages V & VI)	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker Northern 3-toed Woodpecker	Marten Pileated Woodpecker Northern 3-toed Woodpecker
Dead and Defective	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators
Riparian	<p>The Forest determined and documented as part of the planning records, whether it needed to address wildlife in addition to fish, and if so, which wildlife species would represent the riparian habitat.</p> <p>Coordination of this process with adjacent Forests was necessary to determine consistency.</p>			
Big Game		Mt. Goat	Mt. Goat (Wenatchee)	
T & E Species	Bald Eagle Peregrine Falcon Brown Pelican Aleutian Canada Goose	Bald Eagle Peregrine Falcon	Bald Eagle Peregrine Falcon Grizzly Bear Woodland Caribou (Colville)	Bald Eagle Peregrine Falcon

(2) Development of specific direction for individual MMR species

As described above, part of the definition of MMRs for wildlife involved the identification of MMR species which would be the focus of management and monitoring, as a way of ensuring the viability of these species and the other species which they represent. Protection for these species is based upon the habitat requirements of the MMR species. Requirements are defined using the best information available at this time. The following discussion first describes the general nature of the habitat requirement information included in the existing Regional direction, and then focuses on the definition of habitat requirements for individual MMR species. This latter discussion also documents the scientific basis for management of these species.

(a) Wildlife MMR Species' Habitat Requirements
(General Overview)

The Wildlife Species' Habitat Requirements sent to the Forests on February 9, 1983, provided the Forests with the habitat requirements to be used in incorporating wildlife MMRs into the Forest planning process. This direction defined the habitat conditions, habitat dispersal, and habitat size necessary for each MMR species. Information from existing research was used whenever possible. When information was available, but did not exactly fit the MMR context, professional judgment was used to apply the information in estimating habitat needs. When information was not available, habitat needs were developed using professional judgment of a number of the most knowledgeable biologists on the subject.

This information for each species is divided into four categories, which are described below:

(i) Principal Habitats Used

Information about which seral stages and Kuchler vegetation types a species uses is documented in many research papers on each of the species. Information as to which Kuchler type and/or seral stage are primary or secondary habitat, and the amount of dependency upon each habitat, is based mostly on professional judgment. (Guenther and Kucera 1978, Phillips et al., 1981)

(ii) Dispersal Distance Between Habitats

Dispersal distance is established using the ability of the MMR species to travel to the next habitat often enough to prevent isolation of subpopulations. Distances are adjusted to consider the network and overlap of habitat formed by MMR species (e.g., pileated woodpecker and marten). Usually no research information is available for dispersal distance. As a result, dispersal distance is often based upon observations, experience, and professional judgment.

(iii) Size of Area to Which Wildlife Prescriptions Apply

The size of individual habitat areas provided for each MMR species is based on the habitat needed to support the basic social or reproductive unit of the species, i.e., breeding pairs or herd units. Both home range and species density information are used to estimate the needed size of habitat area. This was supplemented with professional judgment where no data was available for the specific habitat types being managed.

(iv) Habitat Requirements to be Used in Analysis

What follows are discussions of the specific Regional MMR direction for individual MMR species and the scientific foundation of that direction. Also included are the relevant versions of the Wildlife Species Habitat Requirements Tables (initially in the February 9, 1983, Regional MMR direction) (Appendix 3) that indicate recommended, existing, and past direction on how these species should be managed. Direction is based on information that was current at the time that final Wildlife MMRs were documented in June, 1986.

(b) Wildlife MMR species habitat requirements (specific).

MARTEN

Principal Habitats Used

The marten uses seral stages III-VI (Thomas, 1979; Guenther and Kucera, 1978; Phillips et al., 1981). The Kuchler types used are from Geunther and Kucera (1978). The principal habitat for the marten is seral stages V and VI.

Some low elevation Douglas-fir habitat on the west slopes of the Cascade Mountains of Oregon is secondary habitat. Because this habitat is important for distribution of marten and other species, distribution of MMR areas will reflect the actual marten use (Johnson, 1983).

Dispersal Distance Between Habitats

Burke (1982) recommends that the dispersal distance between habitat areas for marten should be two miles. This distance was selected because marten travel overland and the chance of finding the next site is low at two miles. The April 16, 1984, Regional Office Wildlife MMR Clarification letter (Appendix 4), changed the dispersal distance from two miles to three miles. This change was made because it was felt it was not necessary to have marten habitats as close as two miles when there is more than one adjacent habitat available for dispersal. This change has been reviewed by a number of biologists within and outside the Forest Service and most agree that it would appear not to create a problem for represented species. In June of 1986, modifications were made to the dispersal distance for the Marten habitat which resulted in one habitat for every 3,000 to 5,000 acres (the acreage of a circle whose diameter is 3 miles), to allow greater flexibility in application.

Size of Area to Which Wildlife Prescriptions Apply

In the professional judgment of the biologists listed in Phillips and Roberts (1985), a breeding female marten can be supported on 160 acres of quality habitat. Research is variable as to the size of area needed, but the female marten's home range is estimated to be 160 acres (Campbell, 1978).

Habitat Requirements to be Used in Analyses

The biologists listed in Phillips and Roberts (1985) judged that this area should be contiguous

to ensure that there would be enough habitat within the home range of the female. They also judged that crown closure should equal or exceed fifty percent. Research papers indicate that areas with low crown closure receive little or no use by marten. Therefore, to ensure an adequate crown closure, a minimum requirement of 50 percent closure was selected.

Research shows that marten require dead and down material for foraging, cover, and denning. Six down logs/acre (Burke, 1982) was selected as the down material requirement. The number and d.b.h. of snags required was selected to ensure that the amount of down material was achieved.

PILEATED WOODPECKER

Principal Habitats Used

Pileated woodpecker need mature and old-growth stands of timber for nesting and feeding. Habitats listed were identified in Bull and Meslow (1977), Guenther et al. (1978), and Thomas (1979).

Dispersal Distance Between Habitats

The 5-miles dispersal distance between habitats is the result of professional judgment documented in Phillips and Roberts (1985). In June of 1986, modifications were made to the distance between habitats. This changed to one habitat for every 12,000 to 13,000 acres (the area of a circle whose diameter is 5 miles), to allow greater flexibility in application.

Size of Individual Habitat Areas to Which Wildlife Prescriptions Apply

The size of nesting areas in Region 6 for the pileated woodpecker has been identified as a range of 100 to 540 acres. The establishment of 300 acres as a Region-wide requirement will meet the needs of pileated woodpecker both east and west of the Cascades. Three hundred acres appears to be an average for different habitats. As more data becomes available, specific to westside and eastside habitats (eastside may be divided into east slope of Cascades and Blue Mountains) the size of the nesting area may be adjusted (Bull and Meslow, 1977; Bull, 1975; Mannan, 1982).

Habitat Requirements to be Used in Analyses

The specific habitat requirements are the results of integrating the above mentioned references. The 1000 acre unit was established as a minimum defense territory; this was determined from research data. Snag size and density was taken from Thomas (1979), and acreage figures from Bull (1975), and Bull and Meslow (1977).

b. Development Process for Dispersal of Created Opening MMRs

The National Forest Management Act requires that:

...cuts designed to regenerate an even-aged stand of timber will be used as a cutting method on National Forest System lands only where...there are established according to geographic area, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: Provided, That such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm... (Sec. 6(g)(3)(F)(iv)).

36 CFR 219.27(d) of the NFMA Regulations further elaborates requirements for addressing even-aged management in Forest planning.

The NFMA Regulations require that the Region develop standards in the Regional Guide for controlling the size and dispersal of created openings. The Regional Guide (through the NEPA process) established those standards. Both of these sources of direction established legal requirements that are beyond the discretion of the Region to change or violate. Thus, they fit the definition of MMRs. While the Regulations and the Regional Guide standards allow flexibility by permitting exceptions to the maximum opening sizes, these are truly exceptions to the standards, not relief from the standards themselves. These exceptions are considered when deciding how the standards should be reflected in the planning process, not if they should be reflected.

Unlike the wildlife MMR direction, the Regional direction relating to dispersion did not focus on how the Forests should interpret the requirement of the regulation. Rather, the Regional direction repeated the dispersion requirements

of the Regional Guide, recommended computer modeling techniques, and established documentation and review procedures. The Regional direction deferred to the Forests the responsibility for determining how to meet the dispersion requirements.

The Region's initial effort in addressing dispersal of opening requirements was to focus on how to develop a harvest dispersion factor to be applied in FORPLAN to represent the limitation on harvest location that dispersion requirements would impose. This factor was intended to represent the percentage of lands which could be assigned to a regeneration timber harvest prescription creating an opening in a single FORPLAN period. A recommended process was developed for Forests to use if they chose, or for Forests to use as a check on any other process they thought would serve the same purpose. The recommended process consisted of developing a theoretical harvest dispersion factor based upon specific Forest conditions, and then testing this factor on sample areas of the Forest to verify or adjust it.

This testing was designed to recognize the limitations of the theoretical factor. First, the theoretical factor assumed that the area to be harvested was homogeneous, when in fact most acres outside roadless areas have existing patterns of harvesting that affect flexibility to lay out harvest units. Second, the theoretical factor assumed that all harvest units were the same size, when in fact the size of logical harvest units necessary to separate created openings does not have to be the same. Therefore, Forests were advised to examine their own situations to determine if the theoretical results could be applied to a sample area for the first harvest period. If harvesting up to the theoretical percentage was difficult, they were to look for possible reasons why, and adjust the dispersion factor accordingly.

Once an appropriate factor was determined to ensure compliance with the requirements for dispersal of created openings, a corresponding constraint in FORPLAN was applied as a maximum percentage of the acres allocated to any timber harvest prescription that could be final harvested by period in each geographic area. This constraint was applied Forest-wide, unless an important planning issue or concern could be addressed by applying the constraint over fewer acres.

This direction was developed largely on the input of Forest Service professionals determining how that which is required by the Regional Guide dispersion requirements could be

represented best in the planning effort, so that compliance with the direction could be ensured during Forest Plan implementation.

The Region reviewed the Dispersion Direction as it was being supplied by the Forests. A Regional Office task force report dated May 3, 1985, found that the Forests largely followed the Dispersion Direction for planning but with some differences between Forests. These differences were addressed in the November 10, 1983, Regional Office Planning Direction package.

The Dispersion Direction includes 1) a maximum size limit of created openings (60 acres in the Douglas-fir type of the coastal Douglas-fir zone and 40 acres in all other National Forest lands in the Pacific Northwest Region) with some exceptions allowed; 2) a dispersion requirement for created openings, 3) a definition of when a created opening is no longer an opening (when prescribed tree stocking is at or above 4 1/2 feet) and some modeling direction that leads to the establishment of a dispersion factor (maximum percentage of an area which could be in created openings in a decade).

c. Development Process for Water Quality and Riparian MMRs

MMRs for water quality and riparian areas are different than the MMRs previously discussed because they are based upon requirements that previously existed, not new requirements resulting from the National Forest Management Act (NFMA). Consequently, not only are interpretations and processes for meeting these requirements already established, but they are currently being met on the ground. In addition, compliance with these requirements is in large part a result of cooperation with the states. To change the criteria for meeting the requirements might well require new state certification processes.

(1) Water Quality MMRs.

The water quality MMR is based upon Section 219.23(d) of the NFMA Regulations (formalizing existing policy) requiring the Forest Service to comply with all requirements of the Clean Water Act.

These requirements state: Forest planning shall provide for compliance with the requirements of the Clean Water Act, the Safe Drinking Water Act, and all substantive and procedural requirements of Federal, State, and local governmental bodies with respect to the provision of public water systems and the disposal of waste water (36 CFR 219.23(d)).

The requirement of the Clean Water Act that most affects Forest management activities is the Section 208 requirement covering nonpoint source pollution. Region 6 has worked with the States of Oregon and Washington (which manage the Implementation of the Act in the respective states) and the Environmental Protection Agency (EPA) to agree on compliance with the Act. This agreement, contained in Memoranda of Understanding between the Forest Service and the respective states, established a process whereby each state certifies Best Management Practices (BMPs) as Forest Service management practices that meet or exceed those necessary to comply with state water quality standards. The Forest Service then agrees to meet or exceed these BMPs. These BMPs are the basis for compliance with the Clean Water Act. Each Forest incorporates them into its Forest Plan.

The guidelines for addressing water quality requirements include:

- (a) Requirements of the Clean Water Act will be met by applying Best Management Practices. (See FSM 1561.5, R-6 Supp. 47 (3/79) and 48 (8/79). Agreement with States of Oregon and Washington to meet requirements of the Clean Water Act by applying Best Management Practices.)
 - (b) Within the concept of Best Management Practices, cumulative effects should be addressed, and impacting activities scheduled and dispersed, when water quality might be unacceptably impacted. This is particularly important for high risk areas where management activities have been or might be concentrated over a short period of time. (See FSM 2405.13 and FSH 2526.)
 - (c) Within the bounds of the above direction, Forests should address water quality in their analysis in the manner most appropriate given their information base and particular conditions. The methodology chosen by a Forest was presented to the Regional Office for review at an early stage in the planning process.
- (2) Riparian MMRs.

The MMRs for riparian areas are based upon 36 CFR 219.27(e). This provision of the NFMA Regulations states:

Special attention shall be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water. This area shall correspond to at least the recognizable area dominated by the riparian vegetation. No management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment shall be permitted within these areas which seriously and adversely affect water conditions or fish habitat.

Section 219.23 of the NFMA Regulations, and the requirement that the Forest Service comply with the Clean Water Act (33 U.S.C. 1251 et seq.) also serve the basis for providing a minimum level of protection in riparian areas.

The main effort in preparing the Regional MMR direction focused on establishing guidelines and techniques for Forests to use in planning to meet these riparian area requirements. As with the wildlife requirements discussed earlier, the first attempt at developing the MMR direction was simply to identify the requirements in the Regulations, and to leave it to the Forests to define and document on their own how they would meet the requirements and reflect that in the planning analysis. But, as was the case with the wildlife requirements, it was felt that such broad discretion on interpretation and application would lead to too much inconsistency. Consequently, the February 9, 1983, MMR direction (reproduced below) laid out additional criteria for Forests to use in meeting the requirements.

The Guidelines for addressing riparian MMRs include:

- (a) Topography, vegetation type, soil, climatic conditions, management objectives, and other factors shall be considered in determining what management practices may be performed with these areas or the constraints to be placed upon their performance. (36 CFR 219.27(e))
- (b) Best Management Practices should be used when addressing stream and wetland water quality concerns. (See 4.a. above)
- (c) See:
 - (i) FSM 2526, R-6 Supp. 42 (9/80), on managing riparian areas to meet water quality goals.

(ii) FSH 2633

(iii) 12/1/81 1920/2620 letter from the Regional Forester to Forest Supervisors addressing viable fish populations.

(d) Within the bounds of the above directions, streams and wetlands were analyzed in the manner most appropriate given the information base and particular conditions.

Regional guidelines for addressing riparian area requirements in the Forest planning analysis are based upon language in 36 CFR 219.27(e) (in addition to that quoted above), and Regional Forest Service Manual direction relating to riparian area management and compliance with the Clean Water Act, particularly with regard to the use of "Best Management Practices" (FSM 2526, R-6 Supp, 42). Additional guidelines referred Forests to Regional policy in FSM 2633.7 1/ and to a December 1, 1981, letter from the Regional Forester on addressing viable fish populations. 2/ The Regional guidelines concluded with the advice that "(w)ithin the bounds of the above direction, Forests should address streams and wetlands in their analysis in the manner most appropriate given their information base and particular conditions."

This provided a framework for deciding how best to meet the riparian area MMRs in their particular situation. To further foster coordination and consistency, a subregional coordination process was set up to review the interpretation and application of the MMRs (including those for riparian areas) among adjacent Forests. In addition, a Regional timber yield effect matrix was developed to ensure reasonable consistency.

The Regional guidelines for meeting the riparian MMR were intended to provide a focusing framework and at the same time a flexibility allowing for differences among Forests. Precise application of the MMR direction - what was needed for the Forest to meet the requirements within the structure of the Regional direction - was left to the professional judgment of the Forest staff people working on the task.

1/ This required setting measurable objectives and timeframes for achieving improvement in east-side Forest grazing allotments where improvement is needed. Such improvement may be needed to meet 36 CFR 219.20(a) (lands in less than satisfactory conditions shall be identified for restoration).

2/ This policy, reiterated in Appendix 3 of the February 3, 1983, Regional MMR direction (see Appendix 3 of this Background Document), states that "special provisions to ensure viable populations of fish need not be developed, since in most cases required compliance with the Clean Water Act (through the use of Best Management Practices) will maintain existing levels of fish habitat capability, which are sufficient to sustain viable populations of the various species of anadromous and resident fish."

B. Application of MMR Direction on the Mt. Hood National Forest

1. Overview

The Regional Forester's direction of February 9, 1983, established the basic MMRs for the Pacific Northwest Region. These have been applied on the Forest in one or both of two significant ways:

- They were incorporated into the analysis process as constraints in FORPLAN, which simulates on-the-ground compliance with the MMRs and allows analysis of resource tradeoffs associated with meeting them; and/or
- They are addressed in standards and guidelines which set the bounds for conducting management activities to assure on-the-ground compliance with MMRs.

After a review of the laws and regulations that guide Forest Service activities, regional direction (Sirmon 1983) was developed for the process of incorporating MMRs into the Forest planning process. The purpose of this direction was to represent the MMRs as they must be met when Forest Plans are implemented. In turn, each Forest used this direction to develop MMRs which would be appropriate to the specific conditions of each Forest.

Legal requirements that are procedural (such as coordination with other agencies), and those that have minor local impacts on Forest outputs (such as the protection of cultural resources), are not discussed in this section, but are discussed in other parts of the DEIS and Forest Plan.

The specific ways the Forest incorporated the MMRs into the analysis process are outlined in Appendix B and summarized below; the standards for assuring compliance with MMRs can be found in the Forest Plan; and the economic and resource tradeoffs for managing the MMRs are described in detail in the Analysis of the Management Situation (USDA, Forest Service 1985) and are summarized below. The rationale for MMRs designed specifically for the Mt. Hood National Forest (Forest) are outlined in Forest Planning Decision Documents, available for review in the Supervisor's Office in Gresham; these are also summarized below.

2. Process Used to Develop Forest MMRs

The process used to develop the MMRs included the following:

- Identification of those resource elements on the Forest requiring MMRs, based upon regional direction.
- Development of analytical models to simulate a range of levels, or objectives, including consideration of alternative ways to simulate those levels.
- Identification of the level for each resource element that must be maintained to be consistent with laws and regulations, based upon regional direction. This specified the minimum amount of land that had to be assigned to a certain condition or a minimum amount of output that had to be produced.
- Evaluation of the consequences of those objectives on other Forest resources.

Cost-efficiency was a major consideration in the development of the MMRs. Objectives were developed reflecting the fact that some types of land can be managed for more than one MMR at the same time. Rotation ages of timber stands were made available in FORPLAN that had the maximum possible net economic value while providing for MMRs. Finally, prescriptions were developed after scheduling timber management activities or by precluding scheduled timber harvest.

The following discussion outlines the development of each MMR, how it was modeled and incorporated into the alternatives, and the results or bottom-line requirements for each MMR. This is followed by a Note that the actual implementation guidelines for the resources for which MMRs were developed are outlined in the standards in Chapter IV of the Proposed Forest Plan.

C. MMRs With Potentially Significant Effects on Other Resources

1. Overview

Three general categories of MMRs have been incorporated in the forest planning analysis process because of the potentially significant effects they have on management of Forest resources:

- a. Riparian (includes Water Quality, Riparian Habitat, and Fish Populations)

"Forest planning shall provide for compliance with the requirements of the Clean Water Act, Safe Drinking Water Act, and all substantive and procedural requirements of

Federal, State, and local government bodies with respect to the provision of public water systems and the disposal of waste water" [36 CFR 219.23 (d)].

"Special attention will be given to land and vegetation for approximately 100 feet from the edges of all perennial streams, lakes, and other bodies of water . . . No management practices causing detrimental changes in water temperatures or chemical composition, blockages of water courses, or deposits of sediments shall be permitted within these areas which seriously and adversely affect water conditions or fish habitat" [36 CFR 219.27 (e)].

b. Viable Populations of Wildlife

"Fish habitats shall be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area . . . In order to insure that viable populations will be maintained, habitat must be provided to support, at least, minimum numbers of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area" [36 CFR 219.19].

c. Timber Harvest Dispersion

When openings are created by the application of even-aged silviculture, individual cuts shall conform to the Regional Guide direction on the dispersion of openings and maximum size limits for areas to be cut in one harvest operation (with some exceptions) [36 CFR 219.27 (d)].

2. Details

The three requirements are discussed below. For more information of each, see Appendix B of the DEIS.

a. Riparian

(1) Concept

Riparian management is based on three main concerns:

- Water Quality. Basically, this entails full compliance with the Clean Water Act, particularly Section 208 which deals with non-point source pollution.
- Riparian Areas. The concern is for the character and function of Forest riparian ecosystems, particularly for riparian dependent resources

(water, fish, and selected plant and animal species).

- Viable Populations of Fish. Appropriate habitat for reproduction. Distribution of habitat which allows for interaction of adults and dispersal of young. Habitat which will support a population which can survive genetic, demographic, and catastrophic risk.

There are strong links between these management concerns. Riparian dependent resources include: water, fisheries, and selected species of plants and animals.

In developing a management approach for addressing these concerns, a number of options were investigated. Separate management prescriptions for water and aquatic habitat, riparian ecosystems, fish populations and riparian dependent species of wildlife were considered. Preliminary analysis of this approach, however, indicated that a relatively large number of total acres would require "special management" as well as creating a problem of dealing with "overlap" acres (areas where two resources had requirements for the same acre). This led to the exploration of techniques which could integrate requirements of all riparian-related MMRs into a single, unified system. A general Riparian Area Management approach was developed and selected. It is based on an "ecosystem" approach. Because it is a system approach it provides the most efficient framework for meeting individual MMR requirements while allowing for other multiple use activities.

With the ecosystem concept, the first step was to assess the character and extent of riparian areas. Two major groups and five total subgroups of riparian areas were identified. These include: Group I - Running Water, with two subgroups: a) perennial and fish-bearing streams, and b) intermittent streams; and Group II - Standing Water, having three subgroups: a) lakes and reservoirs, b) wetlands (bogs, marshes, wet meadows, ponds and forested wetlands), and c) seeps/springs. Each group and subgroup was inventoried and total acreages determined. In total, approximately 15% of the National Forest land base was identified as riparian area.

(2) Relationship to Past Plans

Before proceeding with more detailed development, a review of past plans is warranted. The most pertinent plan the Forest is currently operating under: the Timber Management Plan (TM Plan), Final EIS, 1977. In general, this plan provides extensive direction regarding special management considerations for streamside areas. A Forest stream classification system and management standards are included. For example, the plan provides the following direction for riparian areas: "The management standards are intended to provide direction to meet State water quality standards and to protect the stream and its adjacent environment so as to maintain fish and other aquatic resources at high natural levels" - p. 67 TM Plan. Further on p. 15 it is stated, "Logging and road building activities in the vicinity of streams are planned and designed to protect water quality and prevent unwanted siltation and temperature increases." Finally, on page 95, it is noted:

"Streamside management units have been established along streams on the Forest. Management of vegetation in these units has as its primary objective, the protection of water quality and aquatic ecosystems. Timber yields in these areas have been programmed at the full yield level only where this will not reduce water quality and fisheries habitat. Programmed timber yields have been reduced or not programmed at all in other areas."

A total of 4,600 acres of sensitive streamside areas called "Full protection SMUs" were placed in the marginal land classification to preclude programmed timber harvest (pp. 14, 25 and 67). Additionally, provisions are included for: further site specific identification of "marginal" areas, recording of their location and extent in the Forest's in-place data base and adjustment of harvest levels as outlined in the controls section of the document (p. 89).

Regarding standing water riparian areas (lakes, reservoirs, wetlands, etc.) the TM Plan is much less specific. Such areas are acknowledged as "key habitats" and the Plan provides language to meet management objectives in these areas. The following statement is made on p. 15:

"This requires altering timber harvest practices in buffer areas adjacent to key habitats such as meadows, ponds, nesting sites, and natural mineral

licks. Extended rotations, partial cutting, and restricted operating seasons are most common modifications of the standard prescription when harvest activity is planned in the areas adjacent to key habitats."

This review of the current TM Plan indicated surprising consistency with the general riparian area management concept adopted for use with the MMRs. The consistency is strongest when dealing with streamside areas and weakest when looking at standing water areas such as lakes and wetlands. The acknowledgement in all areas, however, is clear in the TM Plan.

(3) Options Considered

Using the unified riparian area management concept, three major options were considered to meet MMRs. Option 1 included development of a standardized set of Forest-wide standards and guidelines which would be applied to all, or a selected subset of riparian area types. This option was relatively simple and it did provide a basis for describing desired sets of conditions on these areas. It had a number of drawbacks. It did not provide flexibility to deal with the wide range of riparian area types and conditions. It did not facilitate the modeling of resource trade-offs, especially timber, and it did not facilitate accounting and monitoring during implementation of the Plan.

Option 2 was to establish a single Riparian Area Management land allocation. This allocation could be applied to any desired subset of riparian area types. A single set of standards and guidelines could be developed and a single modeling proxy developed to reflect resource trade-offs. A sub-option seriously considered was to assume no programmed timber harvest from the selected subset of riparian areas. This approach was attractive because it minimized "manageable" disturbance levels and avoided the need to fully understand or establish threshold of change levels for this array of diverse and relatively poorly understood areas. Additionally this approach would merely entail on the ground identification of areas and would avoid costly evaluation, prescription, and logging system development associated with sophisticated timber management activities.

This option was somewhat more complicated than Option 1; however, it eliminated most of the shortcomings

previously mentioned. Its major drawback was its lack of flexibility. It would require the application of a single allocation to a wide array of riparian types and a single level of management intensity to a diverse set of resource and site conditions.

Option 3 was a combination of the "best" elements of options 1 and 2. It included multiple riparian allocations, each with different management intensities and standards and guidelines to describe desired, base level conditions (ground cover, slope stability, water quality parameters, aquatic and terrestrial habitat parameters, etc.). This option eliminated most of the drawbacks previously discussed while capturing most of the benefits. Perhaps its major weakness was the fact that it was more complex than either of the previous options. Given the diversity of riparian area types and site and resource conditions, however, this option still represented a relatively simple way of dealing with a very complex, poorly understood set of ecosystems and resources.

Option 3 was selected as the approach the Mt. Hood National Forest would use.

(4) General Development of the Selected Option

Development of Option 3 included selection of an appropriate number of riparian prescriptions to provide management flexibility over a wide range of riparian types, site and resource conditions. It also entailed development of standards and guidelines to describe desired conditions by each riparian area type. Three separate riparian prescriptions were developed. These included:

- . General Riparian - A prescription is designed to provide for basic management needs over a wide-range of riparian types and site conditions. This allocation provides for the highest relative level of intensity of other management activities, such as road building and timber harvest.
- . Special Emphasis Watersheds - This prescription is applied to entire watersheds to meet special management needs such as municipal and fish hatchery water supplies, area-wide sensitive site or resource conditions, etc. It provides an intermediate level of management intensity for non-riparian resource management.

- . Key Site Riparian - A prescription is applied to selected sites having unique riparian resource characteristics, unusually high riparian resource values, and/or a high degree of sensitivity to disturbance from ground vegetation altering activities. This prescription provides maximum emphasis for riparian resources and allows the minimum relative intensity of other multiple use activities.

Standards, describing base level conditions for each major riparian area sub-group, were developed using an interdisciplinary team (ID Team). Disciplines on the team included soils, hydrology, botany, wildlife, fisheries, silviculture, and forestry/logging systems.

(5) Water Quality/Quantity

Streams are delivery mechanisms for a watershed. Included in the mechanism are seeps/springs, wetlands (marshes, wet meadows, etc.), standing waterbodies (ponds, lakes, and reservoirs), and the associated stream or river system. This system delivers water (along with sediment and dissolved constituents) from adjacent upland areas to the ocean. The entire system of aquatic habitats exists in a state of "dynamic equilibrium." That is, a change in conditions at an upper point in the watershed are reflected downstream. The degree of response is a function of the overall stability of the system and the magnitude of the change in condition. Responses range from unmeasurable to a complete morphologic change in channel condition with substantial declines in water quality, and, in some instances, changes in water quantity as well.

National Forest land management activities have the potential to affect several water quality parameters. However, there are a few "key" variables that are most likely to show measurable responses. These include water temperature, sediment/turbidity, and channel (aquatic habitat) and floodplain structure.

(a) Sedimentation

Sedimentation and the resulting turbidity have a significant impact on fish, water users, and recreational activities. While numerical standards do not specifically address sediment, they do limit the increases in turbidity (which is usually closely related to sediment). Mass wasting (landslides), surface erosion, and channel

scour all contribute to sedimentation. While landslides cause periodic sediment problems on the Forest, accelerated surface erosion (from management activities) and accelerated channel scour (also from management activities) are the leading sources.

(b) Temperature

Water temperature increases have a significant impact on the quality of the aquatic environment. Salmonid fish species are especially sensitive to elevated water temperatures. Oregon State Water Quality Standards allow varying increases in water temperature, depending on the initial baseline temperature (the warmer the water, the less increase is permitted). The maximum increase allowed in streams is 2 degrees Fahrenheit.

(6) Channel/Floodplain Structure

Channel/floodplain structure plays a dominant role in maintaining dynamic equilibrium on the Forest. Structure is key to maintaining channel stability, protecting banks, providing both areas of deposition and scour, and for providing complexity in the channel system to promote favorable conditions of water flow, as directed in the enabling legislation establishing the Forest.

While structure can be provided by large boulders, most stream reaches on the Forest are in a shortage category. Rather, structure is most often provided by large woody debris.

Where large wood is lacking or removed, channel banks and bottom are subjected to scour. This often leads to channel incision and widening that isolates the floodplain from all but extreme events. Elevated water temperature, reduced channel complexity, and increased sediment/turbidity (at high flow events) result.

Large woody debris in stream associated floodplains also plays important roles. By reducing water velocity during flood events: 1. sediment deposition instead of scour, occurs, 2. ground water recharge is encouraged promoting good baseflow conditions, and 3. the peak of the flood hydrograph is reduced due to detention storage. This large wood component also ensures adequate structure for promoting dynamic equilibrium for channel location changes.

Removal of this component through timber salvage or timber harvest activities has required a heavy investment in restoration dollars. Most of the expenditure has been incurred from re-establishing large woody debris in channels. In riparian areas that have been clearcut, repeated expenditures will be required as introduced structure decays. The need for periodic investments will continue until natural recruitment from the new stand begins to occur. This is likely to require 200-250 years.

(7) Riparian Areas

Riparian areas are, by definition, closely associated with water. Riparian areas on the Mt. Hood NF are tied to the same areas and connected in the same way as discussed in the previous section, Water Quality/Quantity. That is, of the seeps/springs, wetlands, standing waterbodies, and stream systems occurring on the Forest, most have aquatic habitats and all have associated riparian areas. Due to the interdependence and relationships, the riparian ecosystem actually includes riparian areas and aquatic areas and an influence zone of the adjacent upland area.

Riparian areas provide the vegetative structure required for dynamic equilibrium and large woody debris as previously discussed.

(8) Diversity

Providing vegetative diversity is recognized in 36 CFR 219.26 and 36 CFR 219.27(g). The National Forests are directed through Forest Planning to "... provide for diversity of plant and animal communities...consistent with overall multiple-use objectives"... and "...to the extent practicable, shall preserve and enhance the diversity of plant and animal communities...so that it is at least as great as that which would be expected in a national forest"...

Although they represent only a small share of the total land base, riparian areas are a critical source of diversity for the Forest ecosystem. With the elevations and climatic variability of the Mt. Hood NF, greater diversity occurs than might be expected on adjacent National Forests. Conditions range from west side rain dominated areas to the east side snowmelt zone. The result is a myriad of riparian plant communities ranging from old-growth conifer dominated systems to willow/sedge areas.

Because of the diversity afforded, several species of wildlife and plants are directly dependent upon them. Riparian areas provide some of the most important wildlife habitat in the Forests of Western Oregon and Washington. More habitat niches are provided in riparian areas than in any other type of habitat (Management of Wildlife and Fish Habitats in Forests of Oregon and Washington, Part 1, USDA Forest Service, 1985). Of the estimated 265 species of wildlife on the Forest, 208 use riparian areas regularly. Forty species depend on them directly. All 48 species of fish on the Forest rely on riparian areas to keep the water livable. Twenty species of sensitive plants survive because of them. Riparian ecosystems are not only responsible for much of the Forest's biological diversity, they are also the single most productive and diverse component of forest and range resources.

As seen from this discussion, consideration of Forest plant and animal diversity is an important secondary consideration when developing any management approach for riparian areas.

As discussed in a previous section, water quality and quantity are dependent on riparian areas. They provide shade (temperature), structure (channel stability/complexity), and ground water recharge areas, as well as the other items previously mentioned.

(a) Viable Fish & Wildlife Populations

Fish (salmon, steelhead, trout). As a group, salmonids inhabit the bulk of the aquatic resource occurring on the Mt. Hood NF. All of the species comprising this group have similar biologic requirements. They are also quite sensitive to changes in aquatic habitat. Consequently, salmonids were selected as the indicator group for aquatic habitat condition. Habitat capability, the capacity for habitat to support populations of salmonids is largely a function of the quantity and quality of available aquatic habitat. Both are prerequisites for supporting a viable population. For example, 6 miles of potential stream habitat (quantity) is useless if stream water temperatures (quality) frequently exceed lethal levels.

The aquatic habitat quality variables that National Forest management activities are most likely to affect are: 1. water temperature, 2.

sediment/turbidity, and 3. structure (large woody debris). It is not surprising that the key variables for water quality/quantity are the same for fish since they are really physical and biologic components of the "aquatic resource."

Because they are closely tied, practices developed to maintain water quality/quantity will provide for minimum viable populations of fish. In fact, R-6 direction states "special provisions to ensure viable populations of fish need not be developed, since in most cases required compliance with the Clean Water Act (through the use of Best Management Practices) will maintain existing levels of fish habitat capability, which are sufficient to sustain viable populations of the various species of anadromous and resident fish."

(b) Wildlife

As mentioned in the Riparian Area section, wildlife frequent and use these zones quite heavily. Because of their location on the landscape, habitat niches provided, and the way they are connected, uses include travel and migration corridors, feeding and foraging, nesting, etc. These zones also provide a key ingredient that most of the wildlife on the Mt. Hood NF require daily, water.

Though use and dependence by some species is heavy, a specific indicator species was not selected. Rather, providing for water quality/quantity, diversity, and fish will meet the needs of other wildlife.

(9) Selection of the MMR Management Level

The ID Team started with the frame-work of a "unified" management strategy to deal with the management of riparian areas and dependent resources, especially water and fisheries. Inherent in this approach is the assumption, that to manage these areas and resources, a systems approach is necessary to acknowledge their inter-connectedness. There was also general agreement by the Team that minimum riparian dependent resource requirements are met by management which emphasizes maintenance or improvement of terrestrial and aquatic habitat diversity. Conditions which are emphasized include: relatively diverse assemblages of plant communities; multiple canopy layers; frequent, small

openings; ample ground and bank/shoreline; ground cover; complex aquatic habitats; and a diverse well distributed supply of standing and down large woody material. The location, type, extent, duration and/or magnitude of management activities is intended to maintain these general conditions over the long term (50 years +).

The team decided that riparian area subgroups including perennial and fish-bearing streams, lakes/reservoirs, and wetlands comprise the critical portion of the full system of riparian areas defining the quality and condition of aquatic resources, particularly water quality and fish habitat. Secondarily, this subset of areas was judged to provide a base level of habitat and habitat diversity for riparian dependent animal and plant species - particularly large numbers of sensitive plant species.

The General Riparian allocation was selected to guide base level management for these areas (perennial/fish bearing streams, lakes/reservoirs, and wetlands). As noted previously this allocation provided the minimum level of management intensity for riparian dependent resources and had the lowest relative constraints on other multiple use activities.

To accommodate critical, site-specific management needs the Key Site Riparian Habitat management allocation was applied to a select number of sites having: outstanding habitat diversity and complexity of riparian ecosystem types; relatively high natural quality; and notable capability for the production of multiple riparian resources. A strategic network of these areas was identified to provide a minimum geographic distribution and representation of most riparian area types - perennial and fish bearing streams, lakes, and wetlands. Very often each individual area contains complexes of two or more of these types closely interacting with each other. Selected management areas have been located on a 1" = 1 mile map and on 1:12,000 resource photos. Actual management area boundaries will be defined by site-specific conditions including slope, vegetative character, etc. during project level field reconnaissance planning activities.

Standards defining base level conditions were applied to areas contained in each allocation. These are designed to address previously defined critical variables such as sediment input, water temperature, channel (aquatic habitat) and floodplain structure, and habitat diversity. These standards are organized into major groups: soils, water storage, aquatic habitat, terrestrial habitat, and water quality/quantity. They are designed to prescribe management activities that will promote conditions necessary to meet primary and secondary riparian-related MMR considerations. Within each allocation, additional standards further refine specific activities.

To account for cumulative effects of management, as related to the MMRs in the remaining subgroups - seeps/springs and intermittent streams, a separate group of standards was developed. These assume a secondary role of these areas in controlling the ecologic/hydrologic function of the entire riparian/aquatic ecosystem. These standards were aimed primarily at maintaining the general, long-term integrity of ground cover, slope and channel stability, and water quality.

Standards for site specific standards were developed with enough flexibility, and in broad enough terms, to define all riparian conditions and can be applied on an area-wide basis. For streams, this assessment unit is the drainage or sub drainage. For other areas it is the most manageable aggregation of individual units - wetlands, lakes, etc.

(a) Trade-off Modeling

To develop modeling proxies for MMR allocations and standards, a team including silviculturists, planners, hydrologists, and biologists convened. This team reviewed requirements of the allocations and standards and agreed on appropriate modeling proxies primarily to reflect timber trade-offs.

For General Riparian management areas a modeling proxy of 4% per decade was selected. This provided for extended rotation timber management while meeting primary requirements for the riparian MMRs.

No chargeable timber harvest (a modeling proxy of 0% per decade) was assigned to Key Site Riparian management areas. It is assumed that timber

management activities will occur to the extent necessary to accomplish riparian management objectives as necessary on individual areas. Management emphasis will favor natural ecosystem processes associated with each area.

For the remaining areas (seeps/springs and intermittent streams) levels of timber harvest were left "unconstrained." However, a number of mitigation measures are assumed. These include but are not limited to: area specific delineation and evaluation during planning; special falling, yarding, and suspension requirements; leaving of dead and downed trees, culls and/or whips; and special fuel management and site preparation techniques.

(b) Coordination with Adjacent Forests

General, Region-wide criteria were provided for development of MMRs relating to water quality, riparian areas, and fish and wildlife populations. To coordinate efforts in the development of riparian related MMRs, meetings were held with two adjacent National Forests - the Gifford Pinchot and the Willamette. Forest planners, soil scientists, hydrologists, botanists, and fish and wildlife biologists were present. There was broad general agreement that some form of extended rotation timber management was appropriate in stream, lake, and wetland riparian areas, to address riparian-related MMRs. However, a number of factors surfaced which precluded full coordination for MMR development. The most pertinent of these include:

- . Differences in the level of inventory and resource data available on the Forests.
- . High degrees of variability in the nature and relative importance of riparian resource issues, concerns, and opportunities between National Forests.
- . Differences in the physical and biologic features of riparian areas between the National Forests. For example, the Mt. Hood National Forest is the only Forest with a substantial semi-arid land area occurring east of the Cascades. This introduced a

number of elements complicating riparian management on the Mt. Hood, not present on the other National Forests.

- . Each Forest was at a different point in their timeline for Forest Plan development. As a result, the flexibility to "back track" and gather new data or correlate existing data regarding riparian areas and their resources was prohibitive.

Each Forest agreed to continue to communicate, as Forest Plan development proceeded, and to standardize as possible. The net result appears to be an approach to riparian-related MMRs which is generally and conceptually similar. However, differences in approaches to land allocation and modeling proxies do exist. This process is consistent with Regional direction which generally states that National Forests should address water quality and riparian area MMRs in the manner most appropriate given their information base and particular conditions.

On the Forest, water quality is principally affected by temperature and sediment. Stream structure is affected by the large organic debris in the channels and the amount of scouring and deposition resulting from landslides. The adjacent vegetation is affected by timber harvest and site preparation activities.

The MMR for riparian area management is met with the same management practices which provide the MMRs for water quality (discussed above), and the effects of reducing the levels of protection below MMRs are the same as those stated for water quality. For these reasons, the riparian area MMR was not included in the sensitivity analysis of Forest MMRs.

b. Viable Populations of Wildlife

The MMR for wildlife habitat is "to manage to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area . . . In order to insure that viable populations will be maintained, habitat must be provided to support, at least, minimum numbers of reproductive individuals and that habitat must be well-distributed so that those individuals can interact with others in the planning area" [36 CFR 219.27 (d)]. The

Forest Service is responsible for providing the habitat while the State of Oregon is responsible for management of the animals.

To assure viable wildlife populations, (1) appropriate habitat must be provided for reproductive adults, (2) the distribution of that habitat must allow interaction of adults and dispersal of young, and (3) the total amount of habitat must provide for a population that can survive genetic, demographic, and catastrophic risk. In reviewing the need for minimum habitat requirements, all species and their habitats were identified on the Forest. While some habitats are abundant without special provisions, others could be reduced below levels necessary to maintain viable populations.

The implementing regulations for NFMA require the Forest Service to "maintain viable populations of existing native and desired nonnative vertebrate species in the planning area." Each National Forest contains hundreds of vertebrate species. Approximately 276 are known to occur on the Mt. Hood National Forest. Trying to track the effects of management activities on all species on a given National Forest would be very complex. Consequently the concept of management indicator species is used.

An indicator species is one which is one or all of the following: (1) hunted, fished, or trapped; (2) threatened or endangered; or (3) representative of a group or guild of species also dependent to address species whose viability was considered to be at risk if no management actions were taken to protect their habitats. When MMRs were developed to fulfill the needs of the third category above, the concept was that by so doing we would assure the continued existence of other species dependent on that habitat.

An example is the mature conifer MMR represented by the pileated woodpecker and pine marten. Approximately 40-50 wildlife species are known to depend on or prefer mature conifer habitat during some part of their life cycle on the Mt. Hood National Forest. By providing a dispersion of mature conifer habitat sites for the pileated woodpecker and marten, with given minimum acres in each site, we are assuming that the other species preferring mature conifer habitats will have adequate habitat (total acres and adequate distribution) to maintain viable populations throughout the planning period.

It is important to keep in mind that as we consider decreasing the MMR requirements for marten and pileated woodpeckers we may be driving other species dependent upon

mature conifer habitat toward greater risk of extinction. Part of the cost of decreasing the MMR for marten and pileated woodpeckers may be additional analysis for viability of additional species. The point is that in the process of analyzing the potential effects of providing various levels of mature conifer on the marten or pileated, we should not lose sight of the ultimate objective of providing the mature conifer habitat condition. One could break the components of a mature conifer ecosystem (number and dispersion of acres, size/species of trees, etc.) into enough pieces to ultimately destroy the system itself. These same concerns hold true for other MMRs.

The process used to develop the MMRs for the indicator species (or guilds of species) included: (1) establishing an appropriate distribution pattern, (2) determining the minimum amount of habitat that would support reproductive adults, and (3) developing prescriptions for managing for the desired habitat conditions.

The following outlines (1) the background development and intended use of each wildlife MMR, (2) how the MMR was incorporated into the alternatives, (3) the results, including the number of habitat sites and acres, and (4) alternative means which were considered in order to minimize the effects of wildlife MMRs on other resource groups.

(1) Special Habitats and Sensitive Species

(a) Background.

Special habitats tend to be small; however, they are rich in a variety of species and have a limited distribution in the planning area. The habitats include lakes and ponds, freshwater marshes, and talus slopes. They are considered in planning so that management direction can be developed to maintain habitat diversity.

Sensitive species are those species recognized by the State of Oregon and the Regional Forester as needing special management to prevent their being placed on Federal or State lists as endangered or threatened species.

Sensitive species on the Forest include the northern spotted owl and many plant species. Habitats for all sensitive species are given special treatment to ensure population viability and to prevent trends toward endangerment that would result in the need for Federal listing.

(b) Incorporation into Alternatives.

All known special habitats were designated as unsuitable for timber production. Activities that could adversely affect their condition is not allowed.

Habitat needed by sensitive species (except for the spotted owl - see following section for a separate discussion of this species) are on lands which are classified as unsuitable for timber production.

Sensitive plant species are found throughout parts of the Forest and are identified and protected during site-specific project planning.

Special habitats and sensitive species habitat (except for the spotted owl) were not modeled in FORPLAN or other analysis models due to the insignificant amount of land.

(c) Results.

The MMR for sensitive species except for the spotted owl is being met through Forest-wide standards (see the Proposed Forest Plan), which prohibit activities that would adversely affect the habitats.

(2) Spotted Owl

(a) Background.

The northern spotted owl is listed as threatened by the State of Oregon and as sensitive by the Pacific Northwest Region of the Forest Service. The spotted owl requires well-spaced, old-growth and mature conifer habitat of a certain size and distribution pattern to maintain its viability. The spotted owl also serves as an indicator for other species that require older forest environments.

(b) Incorporation into Alternatives.

Old-growth habitat is made up of multilayered stands with large, dead and defective trees - both standing and fallen. Normally, this condition occurs late in the natural succession of a stand. The MMR was defined as 51 sites, distributed

across the Forest, which met the following criteria:

- At least 1,000 acres of habitat.
- The foraging habitat consists of patches that are at least 40 acres in size and within 1.5 miles of the center of the nesting area.
- The 1,000 acres are contiguous to the extent possible.

NOTE: A Supplemental EIS for an amendment to the Northwest Regional Guide is currently being prepared which may result in a change in the MMR for spotted owls; see Appendix F for more details.

The number of sites and their locations were determined by first overlaying a grid of the required spacing on a map of the Forest. Within the parameters associated with locating the grid, locations were chosen which minimized impacts on timber production while meeting the requirements of the owl. For example, to the extent possible, tentatively unsuitable (from a timber perspective) land was included in SOHAs. Site locations were then adjusted within specified limits to insure that as many sites as possible contained spotted owls. The MMR was modeled in FORPLAN by assigning the identified habitats to the "Owl Rip" prescription in the appropriate analysis areas (or parts of analysis areas).

The desired habitat conditions and applicable management standards are in the Proposed Forest Plan.

(c) Results.

Fifty-one sites of 1,000 acres each (for a total of 51,000 acres) were needed. Approximately 18,000 of the 51,000 acres are located on lands which would otherwise be designated unsuitable for timber production under the Preferred Alternative.

(3) Threatened and Endangered Species

Federally-listed threatened or endangered species are not known to nest/breed on the Forest.

(4) Pileated Woodpecker and Marten (Mature Conifer Habitat)

(a) Background.

The Regional Office did considerable work in developing a set of wildlife MMRs which are used consistently throughout the Pacific Northwest Region. One of the habitats which was determined to be potentially limiting (in such short supply, either in total acreage or in distribution, that the viability of the species dependent on it is threatened) is mature conifer stands (seral stages V and VI). In the North Cascade Zone, the pileated woodpecker and the pine marten were chosen as the wildlife species which would represent this limiting habitat, and thus became the MMR species.

Once these species were chosen, the habitat needs were determined. These habitat characteristics and biological requirements were developed by Regional Forest Service biologists by reviewing the available literature and discussing the habitat needs of the species with acknowledged experts outside the Forest Service.

Definition - On the Mt. Hood National Forest, mature conifer habitat requires a stand of predominantly conifers which are in excess of 100 years old.

Distribution - Based on the need for the habitat to be well distributed throughout the planning area, standards were used to distribute habitat areas throughout the Forest. For the pileated woodpecker, there must be one 600-acre site having at least 300 acres of mature conifers every six miles. Each site should be within six miles of three other sites. For the marten, there must be one 320-acre site having at least 160 acres of mature conifer every three miles. Each marten site should be within three miles of three other marten sites.

Overlap - Because the type of habitat needed for the pileated woodpecker is the same as for the marten, marten habitat areas can overlap the pileated woodpecker areas. In addition, where the locations established by distribution requirements coincide, both the marten and pileated woodpecker habitat areas can overlap habitat areas established for the spotted owl, or areas set aside for Wildernesses or undeveloped areas

(provided the mature conifer condition is present).

Within the parameters associated with locating the pileated woodpecker and pine marten, locations were chosen which minimized impacts on timber production while meeting the requirements of the woodpecker and marten. For example, to the extent possible, tentatively unsuitable land for timber production was included in woodpecker and marten areas.

Each woodpecker area will be 600 acres. At least 300 acres of the area will be native conifers 100 years or older. The area will be managed on a 250-year rotation. These areas will be about six miles from three or more areas.

Each marten area must be at least 320 acres. At least 160 acres will be mature conifers 100 years or older. The areas will be managed on a 250-year rotation. Each area will be within three miles of three or more areas.

The number of sites and their locations were determined by overlaying a grid with the required spacing on a map of the Forest. The constraint was modeled in FORPLAN by assigning parts of analysis areas which were being considered as suitable for timber production to the mature conifer prescription. The amount of land assigned to the prescription reflected (1) the amount of habitat provided on lands not suitable for timber production, such as wildernesses and spotted owl habitat areas, and (2) the amount of immature stands needed to provide habitat in the future.

(c) Results.

Meeting the MMRs for pileated woodpecker and marten resulted in the designation of 105 pileated woodpecker habitat areas and 231 pine marten habitat areas. The following table shows that the designation of these areas encompasses 141,503 acres with others, the net effect on tentatively suitable timber areas is only 21,535 acres.

Table G-1 ACREAGES OF WOODPECKER AND MARTEN AREAS

	Acres in Preferred Alternative		
	Pileated Woodpecker	Pine Marten	Total
Gross Acres	62,710	78,793	141,503
Overlapped with Management Areas Which Preclude Harvesting	35,852	40,891	76,743
Overlapped with Management Areas Which Reduce Harvests to the Same Extent that Woodpeckers/Marten Do	16,396	18,829	35,225
Marginal Effect of the Woodpecker/Marten (Gross Acres)	10,462	19,073	29,535
Marginal Effect (Suitable Acres)	7,629	13,906	21,535

(6) Dead and Defective Tree Habitat

(a) Background.

Between 50 and 70 species (including downy and hairy woodpeckers, flickers, and bluebirds) depend upon dead and defective trees. Such trees are usually abundant after fires and in old-growth stands. This habitat is potentially limited on the Forest and is a Regional MMR (Sirmon 1984). A group of primary cavity excavators has been identified as the indicator for the habitat.

(b) Incorporation into Alternatives.

Dead and defective tree habitat is provided in all management areas. The habitat would be at natural levels in Management Areas A2 (Wilderness), A3 (Research Natural Areas), A4 (Special Interest Areas), A5 (Unroaded Rec.), A7 (Old-Growth), A8 (Spotted Owl), and A9 (Key Site Riparian). The amount of habitat in the other management areas varies, but must provide enough habitat for

distribution across the Forest. Therefore, all prescriptions which allow timber harvest were designed to support at least 60% of the potential population capability of species dependent on dead and defective trees.

(c) Results.

The estimated affect on timber sales was less than 1%, therefore no reduction to FORPLAN yield tables was made.

(7) Alternatives Considered for Incorporating Wildlife MMRs

In deciding what management strategy to use in meeting habitat objectives for the MMR species (Spotted Owl, Pileated Woodpecker, and Pine Marten), two major options (alternatives) were considered, dedication or extended rotation. Discussions with biologists on adjoining Forests (Gifford Pinchot, Willamette, and Siuslaw) resulted in the conclusion that we were not sure what management/silvicultural prescription would result in maintenance or reestablishment of the old-growth ecosystem that seems required to sustain viable populations of spotted owl. The effect of managing vs dedication on the PNV was estimated (Gifford Pinchot and Willamette) to be small. Based on these two considerations, lack of knowledge on how to grow/maintain old-growth and the small difference in PNV between managed or dedicated areas, the Forest chose to dedicate SOHAs.

Based on the idea that we have some experience in managing for mature forest habitat and that we could learn more at less risk to pileated or pine marten population viability, the Forest opted to manage these habitat areas.

The Willamette National Forest is dedicating spotted owl, pileated woodpecker, and pine marten areas. This alternative provides the least risk for population viability. The Gifford Pinchot National Forest will both manage and dedicate SOHAs and manage pileated and pine marten areas.

c. Timber Harvest Dispersion

The following is a synopsis of a November 20, 1984, Process Paper titled "Dispersion."

(1) Time to Regenerate a Created Opening

Given average growth characteristics on the Mt. Hood, National Forest it was determined that created openings would have trees 4.5 feet tall in 10 years (5 years for "regeneration lag" plus 5 years to grow 4.5 feet).

(2) Sample Size

The initial sample comprised what was judged to be a representative logging plan (7 square mile area). Then, for subsequent sensitivity analysis, the process for quantifying the dispersion MMR was extended to an area four times as large (28 square miles).

(3) Process for Determining Limits Per Drainage

Given the sample and the time to regenerate an opening, a process was employed which essentially became an exercise in geometry. An initial unit was chosen at random. Then, given that two units could not touch, as many additional units were "packed in" as possible. This process was repeated with different random starts and statistics were derived regarding how many units could be cut without having created units touching one another. If units could not touch and if all of them initially had merchantable trees on suitable ground, then it was found that 30 percent of the units was all that could be harvested in a given decade. This finding did not vary when different units were chosen as a starting point.

The 30 percent did vary in accordance with the amount of the area which existed in newly cut-over units. For example, it was found that not more than 25% of the remaining units could be harvested if 20% of the area was already cutover. These findings were extended to drainages because statistics exist regarding the extent that drainages are cutover.

(4) Application in the FORPLAN Model

The applicable limit for each drainage was computed. This ranged from 30 percent in the Bull Run drainage to 23.5 percent in the Hot Springs Fork of the Collawash drainage. So, for example, the 30 percent limit was placed on each Analysis Area in the Bull Run drainage.

D. Effects of MMRs on Other Resources (in Benchmarks)

1. Overview

The effects of varying the levels of significant MMRs by plus or minus 20 percent in selected alternatives is discussed later in this Appendix.

The total resource and economic consequences of the MMRs were determined by developing and analyzing six variations of the PNV Benchmark. This benchmark allocates all non-MMR areas to intensive timber management. The results are summarized in the table on the following page.

2. Effects on Timber Production

Without any MMRs, average timber production under the PNV Benchmark could increase 9.6 MMCF/year over the 150-year planning horizon. This would represent about a 15% increase in the Allowable Sale Quantity of the Maximum PNV Benchmark. Note that the Spotted Owl MMR accounts for about one third of this increase.

3. Effects on Wildlife Habitat

Without any MMRs, there would be no spotted owl habitat outside of reserved areas (e.g. wildernesses) by the 14th decade, deciduous mix habitat would be too poorly distributed to maintain viable populations of dependent species, and there would not be enough mature conifer habitat to maintain viable populations of dependent species.

Table G-2 MMR EFFECTS ON THE MAX PNV BENCHMARK'S HARVESTS AND ECONOMICS
Changes Are Indicated Within Parentheses ()

MMR	HARVEST TRADEOFFS				ECONOMIC TRADEOFFS (Millions of Dollars)			Percent Change in PNV
	LTSYC		First Decade, Average Annual ASQ (Green)		PNV	Benefits	Costs	
	MMCF	%	MMBF	%				
Reference Without MMRs	66.2	100	336	100	2784	3781	997	100
Harvest Dispersion	(-0.8)	(-1)	(- 4)	(-1)	(- 74)	(- 76)	(- 2)	(-3)
Spotted Owl	(-3.6)	(-5)	(-18)	(-5)	(- 94)	(-207)	(-113)	(-3)
Key Site Riparian	(-0.7)	(-1)	(- 4)	(-1)	(- 18)	(- 39)	(- 21)	(-1)
Woodpecker & Marten	(-2.4)	(-4)	(-12)	(-4)	(- 63)	(-138)	(- 75)	(-2)
General Riparian	(-1.8)	(-3)	(- 9)	(-3)	(- 45)	(-100)	(- 55)	(-2)
All MMRs	(-9.6)	(-14)	(-47)	(-14)	(-294)	(-560)	(-266)	(-11)

4. Effects on Riparian Resources

Without any MMRs, the Aquatic Habitat Stability Index of the PNV Benchmark would rapidly decline to zero by the 5th decade in all non-reserved areas.

5. Economic Consequences

a. Threatened and Endangered Species

This MMR would not have economic consequences because there are no such species relative to the Mt. Hood National Forest.

b. Spotted Owl

Where possible, the habitats were located in areas withdrawn from timber production. Even so, this MMR would have economic consequences because timber harvest would be prohibited on 15,901 acres which would have otherwise been harvested with full yields and an additional 6,532 acres which would have otherwise been harvested at reduced rates under the DEIS Preferred Alternative. The MMR could also be met by managing the sites on 300-year rotations. For example, 2.5 acres of land managed on 295-year rotations could provide 1 acre of old-growth habitat in all decades. However, it was more efficient to prohibit timber production on the minimum amount of habitat than to extend rotations on more land.

As incorporated into the Max PNV Benchmark, this MMR costs about 18 MMBF. If each MMBF affects 15 jobs, then this MMR affects 270 jobs. This MMR causes the Max PNV Benchmark's PNV to drop \$94 MM (3%).

c. Pileated Woodpecker and Marten

This MMR would have economic consequences because, on about 30,000 acres, it delays timber harvest beyond the point which maximizes present net value (PNV). The longer rotations produce larger trees of better quality and value than shorter rotations, but the effects of discounting these values back to the present negate any increases. Mature conifer habitat could also be provided by prohibiting timber harvest on certain areas. However, delaying harvest for several decades beyond the culmination of mean annual increment was more efficient than prohibiting harvest, even though more land is needed.

As incorporated into the Max PNV Benchmark, this MMR costs about 12 MMBF and about 180 jobs. This MMR drops the PNV by \$62 MM (2%).

d. Riparian MMR

This has economic consequences because it reduces harvests on about 19,000 acres and precludes harvests on an additional 10,000 acres. This drops Max PNV harvests by 13 MMBF (4%), jobs by 195, and PNV by \$63 MM (2%).

e. Dispersion

Without any MMRs, the PNV of timber could increase \$74 MM (3%), 4 MMBF/Yr more timber would be produced, and about 60 more jobs would result.

f. Total of All MMRS

Without any MMRs, the PNV of timber could increase \$567 MM (20%), 49 MMBF/Yr more timber would be produced, and about 735 more jobs would result.

II. PURPOSE OF THE MMR SENSITIVITY ANALYSIS

There is always some uncertainty in making resource use decisions, since knowledge of available resource quantities, their value, interrelationships between resources, and the sensitivity of resource values to perturbation is not perfect. Where there are significant values at risk (whether they be economic, social, or environmental), it is appropriate to examine the potential effects of changes in values which are interrelated. This analysis can illustrate to the decision-maker the margin of safety being considered in making decisions which involve trade-offs between resource values.

The analysis in this appendix examines the potential effects that differing MMR levels would have on resource values and ecosystem protection. This is accomplished by changing the variables used to incorporate MMRs into the alternatives (using the FORPLAN linear program model described in Appendix B) to reflect varying levels of protection for the values that the MMRs were designed to protect. These levels of protection represent different levels of risk that the appropriate law or regulation would or would not be met during Forest Plan implementation. As the level of protection changes, two important questions are examined: (1) what are the effects on the value which the MMR was designed to protect, and (2) what are the effects on other resource values? The answers to the two questions are the marginal effects of a change in risk -- some will be positive and some will be negative.

Since one value often gains only at the expense of another, both decreases and increases in the levels of protection must be examined. In some alternatives, management objectives for other resource values for the alternative provide an increased level of protection for some MMR values. There is also some overlap between the protection measures provided for certain MMRs. Therefore this analysis is designed to fill the gaps by looking more closely at decreased levels of protection.

A range of alternatives was used to measure the effects of changes in the levels of protection. Alternatives, rather than benchmarks, were examined since alternatives represent the actual management that would occur on the ground, and they account for the overlaps in management that may occur between MMRs. The range of alternatives used in this sensitivity analysis was designed to show the range of effects that could occur if different levels of risk in meeting laws and regulations were assumed. The alternatives considered for use in the analysis included the no-action (current direction) alternative, Alternative A; the preferred alternative, Alternative E; a high commodity alternative, Alternative B; and a high amenity alternative, Alternative I. Marginal changes were measured for a variety of outputs and effects, based on values at risk and the issues being addressed in the Forest Plan.

One important MMR was not included in this analysis: the MMR for spotted owls. This MMR was a Regional MMR for all Forests and was included in the Regional Guide, and it is currently being addressed on a Regional basis in

a supplement to the environmental impact statement for the Regional Guide. Any changes in the current MMR direction for the spotted owl would affect the marginal changes shown in this analysis.

III. PROCEDURE

A. Overview of the Approach to the Analysis

The following MMRs were analyzed with respect to the following Alternatives:

MMRs = Riparian, Pine Marten, Pileated Woodpecker
(See the following page for an explanation of why the Dispersion MMR was not analyzed.)

Alternatives = A, B, E, I

Alternatives B and I were near the opposite ends of the commodities - amenities decision spaces formed by the entire set of 10 alternatives considered in detail. Alternatives A (No Action) and E (Preferred) were chosen as more "middle of the road" alternatives.

In addition to evaluating the sensitivity of these MMRs individually, their collective effects on ASQ were also studied. The following three step process of analysis was employed regardless of whether individual or collective MMRs were studied:

STEP ONE: The variability of the data used to construct, model, and evaluate the MMR(s) was estimated by the interdisciplinary team (ID Team) to be within 20%. In other words, the Team judged that individual variations in the certainties of the types of data and techniques they used caused their predictions of MMR effects to be accurate plus or minus 20%.

STEP TWO: Using data from the FORPLAN model, the variance in MMR(s) necessary to affect a plus or minus 1% change in the alternative's first decade ASQ was determined.

STEP THREE: The relationship of the 20% to the change necessary to alter ASQ by 1% was evaluated.

If this variance was greater than 20% then it was concluded that, even if the ID Team's highest estimate of uncertainty was correct, ASQ still would not be affected by as much as 1%. Given this relative insensitivity, no further analysis was performed.

If, on the other hand, this variance was equal to or less than 20% then it would have been concluded that, if the ID Team's highest estimate of uncertainty was correct, ASQ

might be affected by 1% or more. Had this been the case, then the affects on the MMR(s) and ASQ would have been analyzed and reported.

As a result of this process, it was found that protection for each of the three MMRs had to be reduced by more than 20% before any of the four alternatives' ASQs could be increased 1%. It was therefore concluded that the ASQs were not sensitive enough to the three MMRs (individually or collectively) to warrant further analysis.

B. Rationale for Not Selecting the Two Other MMRs for Assessment

1. Dispersion

The FORPLAN solution for the four alternatives was analyzed with respect to the effect of the Dispersion constraint. This was done by determining whether acres could be harvested during the first decade without violating the constraint. This was the case relative to each of the alternatives. So, it was concluded that Dispersion was having no affect on the ASQ for any of the four alternatives. For this reason, the Dispersion MMR was not selected for further analysis.

2. Protection of Habitat for the Northern Spotted Owl

This MMR is currently being assessed in the Supplemental Environmental Impact Statement for the Pacific Northwest Regional Guide, and therefore is not addressed in this analysis. Habitat for the spotted owl has not been changed and remains the same as that shown for the DEIS alternatives.

IV. DETERMINATION OF WHETHER FURTHER ANALYSIS IS REQUIRED

A. Alternative A (No Action)

Note: One percent of this alternatives' average annual, first decade ASQ is 0.479 MMCF.

1. Riparian MMR

For modeling purposes, the Riparian MMR was divided into two components, "key site" and "general" riparian. The following table answers the question, "If these Riparian MMR components did not exist in Alternative A, how would the areas be managed to contribute to the ASQ?"

Table G-3 Riparian Allocations In Alternative A

ASQ Harvest Prescription	Tentatively			Unsuitable			Total		
	Suitable Acres			Acres			Acres		
	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total
No Chargeable	1818	6804	8622	2452	19972	22424	4270	26776	31046
Limited Harvest	918	2748	3666	1172	1672	2844	2090	4420	6510
Full Harvest	2445	42841	45286	1520	11721	13241	3965	54562	58527
GRAND TOTAL	5181	52393	57574	5144	33365	38509	10325	85758	96083

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative A, would pertain if the riparian MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Key Site Riparian areas were modeled as having the "no chargeable"; i.e. charged against ASQ, harvesting prescription. Therefore the harvest on the 1,818 acres shown in Table G-3 is unaffected by removing standards pertaining to Key Site Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

General Riparian areas were modeled as having the "limited" harvest prescription. So, the ASQ from the 6,804 acres having "no chargeable" and 2,748 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to General Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based On Table G-3 And FORPLAN Data

Site-specific occurrences of the Riparian MMR often coincide with occurrences of the Pine Marten or Woodpecker MMR or with occurrences of other management areas in Alternative A which limit or preclude harvesting. For this reason, it takes a 34 percent change in the amount of acres allocated to the Riparian MMR to affect a 1% change in the Alternative A's ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Riparian MMR on Alternative A has not been undertaken.

2. Pileated Woodpecker MMR

The following table answers the question, "If the Pileated Woodpecker MMR did not exist in Alternative A, how would the areas be managed to contribute to the ASQ?"

Table G-4 Pileated Woodpecker MMR Allocations In Alternative A

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	14,414	19,094	33,508
Limited Harvest	11,949	5,177	17,125
Full Harvest	8,714	3,362	12,077
GRAND TOTAL	35,077	27,633	62,710

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative A, would pertain if the Pileated Woodpecker MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pileated Woodpecker areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 14,414 acres having "no chargeable" and 11,949 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pileated Woodpecker management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-4 and FORPLAN Data

Site-specific occurrences of the Pileated Woodpecker MMR often coincide with occurrences of the Pine Marten or Riparian MMR or with occurrences of other management areas in Alternative A which limit or preclude harvesting. For this reason, it takes a 211 percent change in the amount of acres allocated to the Pileated Woodpecker MMR to affect a 1% change in the Alternative A's ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pileated Woodpecker MMR on Alternative A has not been undertaken.

3. Pine Marten MMR

The following table answers the question, "If the Pine Marten MMR did not exist in Alternative A, how would the areas be managed to contribute to the ASQ?"

Table G-5 Pine Marten MMR Allocations In Alternative A

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	14,109	23,795	37,904
Limited Harvest	13,599	6,236	19,835
Full Harvest	14,904	6,150	21,054
GRAND TOTAL	42,612	36,181	78,793

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative A, would pertain if the Pine Marten MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pine Marten areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 14,109 acres having "no chargeable" and 13,599 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pine Marten management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-5 and FORPLAN Data

Site-specific occurrences of the Pine Marten MMR often coincide with occurrences of the Pileated Woodpecker or Riparian MMR or with occurrences of other management areas in Alternative A which limit or preclude harvesting. For this reason, it takes a 124 percent change in the amount of acres allocated to the Pine Marten MMR to affect a 1% change in the Alternative A ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pine Marten MMR on Alternative A has not been undertaken.

4. Sensitivity to Changes in the Dispersion MMR

Analysis of FORPLAN discloses that the ASQ of Alternative A is not sensitive to the individual Dispersion MMR. The Dispersion MMR also does not affect the joint sensitivity of the other three MMRs.

5. Combined Sensitivity of the Riparian, Woodpecker, and Pine Marten MMRs

Analysis shows that these MMRs would have to be changed as a group by 37 percent before the ASQ of Alternative A would change 1 percent. Since this is greater than the 20 percent variability which these MMRs are judged to have, no further analysis of the sensitivity of the combined MMRs on Alternative A has been undertaken.

B. Alternative B (RPA)

Note: One percent of this alternatives' average annual, first decade ASQ is 0.688 MMCF.

1. Riparian MMR

Table G-6 Riparian Allocations In Alternative B

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>			<u>Unsuitable Acres</u>			<u>Total Acres</u>		
	<u>Key Site</u>	<u>Gen-eral</u>	<u>Total</u>	<u>Key Site</u>	<u>Gen-eral</u>	<u>Total</u>	<u>Key Site</u>	<u>Gen-eral</u>	<u>Total</u>
No Chargeable	739	6788	7527	1418	17445	18863	2157	24233	26390
Limited Harvest	907	3257	4164	761	1710	2471	1668	4967	6635
Full Harvest	3535	42348	45883	2965	14210	17175	6500	56558	63058
GRAND TOTAL	5181	52393	57574	5144	33365	38509	10325	85758	96083

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative B, would pertain if the riparian MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Key Site Riparian areas were modeled as having the "no chargeable" harvesting prescription. Therefore the harvest on the 739 acres shown in Table G-6 is unaffected by removing standards pertaining to Key Site Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

General Riparian areas were modeled as having the "limited" harvest prescription. So, the ASQ from the 6,788 acres having "no chargeable" and 3,257 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to General Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-6 and FORPLAN Data

Site-specific occurrences of the Riparian MMR often coincide with occurrences of the Pine Marten or Woodpecker MMR or with occurrences of other management areas in Alternative B which limit or preclude harvesting. For this reason, it takes a 46% change in the amount of acres allocated to the Riparian MMR to affect a 1% change in the Alternative B-departure ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Riparian MMR on Alternative B has not been undertaken.

2. Pileated Woodpecker MMR

The following table answers the question, "If the Pileated Woodpecker MMR did not exist in Alternative B, how would the areas be managed to contribute to the ASQ?"

Table G-7 Pileated Woodpecker MMR Allocations In Alternative B

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	14,204	17,492	31,696
Limited Harvest	11,857	5,760	17,617
Full Harvest	9,016	4,381	13,397
GRAND TOTAL	35,077	27,633	62,710

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative B, would pertain if the Pileated Woodpecker MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pileated Woodpecker areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 14,204 acres having "no chargeable" and 11,857 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pileated Woodpecker management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-7 and FORPLAN Data

Site-specific occurrences of the Pileated Woodpecker MMR often coincide with occurrences of the Pine Marten or Riparian MMR or with occurrences of other management areas in Alternative B which limit or preclude harvesting. For this reason, it takes a large (293%) change in the amount of acres allocated to the Pileated Woodpecker MMR to affect a 1% change in the Alternative B ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pileated Woodpecker MMR on Alternative B has not been undertaken.

3. Pine Marten MMR

The following table answers the question, "If the Pine Marten MMR did not exist in Alternative B, how would the areas be managed to contribute to the ASQ?"

Table G-8 Pine Marten MMR Allocations In Alternative B

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	13,829	21,130	34,959
Limited Harvest	13,440	7,026	20,466
Full Harvest	15,343	8,025	23,368
GRAND TOTAL	42,612	36,181	78,793

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative B, would pertain if the Pine Marten MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pine Marten areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 13,829 acres having "no chargeable" and 13,440 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pine Marten management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-8 and FORPLAN Data

Site-specific occurrences of the Pine Marten MMR often coincide with occurrences of the Pileated Woodpecker or Riparian MMR or with occurrences of other management areas in Alternative B which limit or preclude harvesting. For this reason, it takes a large (173%) change in the amount of acres allocated to the Pine Marten MMR to affect a 1% change in the Alternative B ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pine Marten MMR on Alternative B has not been undertaken.

4. Sensitivity to Changes in the Dispersion MMR

Analysis of FORPLAN discloses that the ASQ of Alternative B is not sensitive to the individual Dispersion MMR. The Dispersion MMR also does not affect the joint sensitivity of the other three MMRs.

5. Combined Sensitivity of the Riparian, Woodpecker, and Pine Marten MMRs

Analysis shows that these MMRs would have to be changed as a group by 36 percent before the ASQ of Alternative B would change 1 percent. Since this is greater than the 20 percent variability which these MMRs are judged to have, no further analysis of the sensitivity of the combined MMRs on Alternative B has been undertaken.

C. Alternative E (Preferred)

Note: One percent of this alternatives' average annual, first decade ASQ is 0.530 MMCF.

1. Riparian MMR

Table G-9 Riparian Allocations In Alternative G

ASQ Harvest Prescription	Tentatively Suitable Acres			Unsuitable Acres			Total Acres		
	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total
No Chargeable	1403	10294	11696	2157	21655	23812	3560	31949	5509
Limited Harvest	1964	6821	8785	1409	2827	4236	3373	9648	3021
Full Harvest	1814	35278	37092	1578	8883	10461	3392	44161	7553
GRAND TOTAL	5181	52393	57574	5144	33365	38509	10325	85758	6083

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative E, would pertain if the riparian MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Key Site Riparian areas were modeled as having the "no chargeable" harvesting prescription. Therefore the harvest on the 1,403 acres shown in Table G-9 is unaffected by removing standards pertaining to Key Site Riparian management in these areas and managing them to meet the objectives of the underlying management areas. General Riparian areas were modeled as having the "limited" harvest prescription. So, the ASQ from the 10,294 acres having "no chargeable" and 6,821 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to General Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-9 and FORPLAN Data

Site-specific occurrences of the Riparian MMR often coincide with occurrences of the Pine Marten or Woodpecker MMR or with occurrences of other management areas in Alternative E which limit or preclude harvesting. For this reason, it takes a 44% change in the amount of acres allocated to the Riparian MMR to affect a 1% change in the Alternative E ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Riparian MMR on Alternative E has not been undertaken.

2. Pileated Woodpecker MMR

The following table answers the question, "If the Pileated Woodpecker MMR did not exist in Alternative E, how would the areas be managed to contribute to the ASQ?"

Table G-10 Pileated Woodpecker MMR Allocations In Alternative E

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	16,245	19,607	35,852
Limited Harvest	11,203	5,193	16,396
Full Harvest	7,629	2,833	10,462
GRAND TOTAL	35,077	27,633	62,710

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative E, would pertain if the Pileated Woodpecker MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pileated Woodpecker areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 16,245 acres having "no chargeable" and 11,203 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pileated Woodpecker management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-10 and FORPLAN Data

Site-specific occurrences of the Pileated Woodpecker MMR often coincide with occurrences of the Pine Marten or Riparian MMR or with occurrences of other management areas in Alternative E which limit or preclude harvesting. For this reason, it takes a 267% change in the amount of acres allocated to the Pileated Woodpecker MMR to affect a 1% change in the Alternative E ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pileated Woodpecker MMR on Alternative E has not been undertaken.

3. Pine Marten MMR

The following table answers the question, "If the Pine Marten MMR did not exist in Alternative E, how would the areas be managed to contribute to the ASQ?"

Table G-11 Pine Marten MMR Allocations In Alternative E

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	15,973	24,918	40,891
Limited Harvest	12,733	6,096	18,829
Full Harvest	13,906	5,167	19,073
GRAND TOTAL	42,612	36,181	78,793

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative E, would pertain if the Pine Marten MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pine Marten areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 15,973 acres having "no chargeable" and 12,733 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pine Marten management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-11 and FORPLAN Data

Site-specific occurrences of the Pine Marten MMR often coincide with occurrences of the Pileated Woodpecker or Riparian MMR or with occurrences of other management areas in Alternative E which limit or preclude harvesting. For this reason, it takes a 146% change in the amount of acres allocated to the Pine Marten MMR to affect a 1% change in the Alternative E ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pine Marten MMR on Alternative E has not been undertaken.

4. Sensitivity to Changes in the Dispersion MMR

Analysis of FORPLAN discloses that the ASQ of Alternative E is not sensitive to the individual Dispersion MMR. The Dispersion MMR also does not affect the joint sensitivity of the other three MMRs.

5. Combined Sensitivity of the Riparian, Woodpecker, and Pine Marten MMRs

Analysis shows that these MMRs would have to be changed as a group by 47 percent before the ASQ of Alternative E would change 1 percent. Since this is greater than the 20 percent variability which these MMRs are judged to have, no further analysis of the sensitivity of the combined MMRs on Alternative E has been undertaken.

D. Alternative I

Note: One percent of this alternatives' average annual, first decade ASQ is 0.290 MMCF.

1. Riparian MMR

Table G-12 Riparian Allocations In Alternative I

ASQ Harvest Prescription	Tentatively Suitable Acres			Unsuitable Acres			Total Acres		
	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total	Key Site	Gen-eral	Total
No Chargeable	2409	18043	20452	2392	24699	27091	4801	42742	47543
Limited Harvest	1789	8449	10238	1775	3035	4810	3564	11484	15048
Full Harvest	983	25901	26884	977	5631	6608	1096	31532	33492
GRAND TOTAL	5181	52393	57574	5144	33365	38509	10325	85758	96083

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative I, would pertain if the riparian MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Key Site Riparian areas were modeled as having the "no chargeable" harvesting prescription. Therefore the harvest on the 2,409 acres shown in Table G-12 is unaffected by removing standards pertaining to Key Site Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

General Riparian areas were modeled as having the "limited" harvest prescription. So, the ASQ from the acres having "no chargeable" and 1,789 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to General Riparian management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-12 and FORPLAN Data

Site-specific occurrences of the Riparian MMR often coincide with occurrences of the Pine Marten or Woodpecker MMR or with occurrences of other management areas in Alternative I which limit or preclude harvesting. For this reason, it takes a 33 percent change in the amount of acres allocated to the Riparian MMR to affect a 1% change in the Alternative I ASQ. Since this is greater than the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Riparian MMR on Alternative I has not been performed.

2. Pileated Woodpecker MMR

The following table answers the question, "If the Pileated Woodpecker MMR did not exist in Alternative I, how would the areas be managed to contribute to the ASQ?"

Table G-13 Pileated Woodpecker MMR Allocations In Alternative I

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	19,398	15,242	34,640
Limited Harvest	9,941	7,810	17,751
Full Harvest	5,778	4,541	10,319
GRAND TOTAL	35,077	27,633	62,710

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative I, would pertain if the Pileated Woodpecker MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pileated Woodpecker areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 19,398 acres having "no chargeable" and 9,941 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pileated Woodpecker management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-13 and FORPLAN Data

Site-specific occurrences of the Pileated Woodpecker MMR often coincide with occurrences of the Pine Marten or Riparian MMR or with occurrences of other management areas in Alternative I which limit or preclude harvesting. For this reason, it takes a 35% change in the amount of acres allocated to the Pileated Woodpecker MMR to affect a 1% change in the Alternative I ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pileated Woodpecker MMR on Alternative I has not been undertaken.

3. Pine Marten MMR

The following table answers the question, "If the Pine Marten MMR did not exist in Alternative I, how would the areas be managed to contribute to the ASQ?"

Table G-14 Pine Marten MMR Allocations In Alternative I

<u>ASQ Harvest Prescription</u>	<u>Tentatively Suitable Acres</u>	<u>Unsuitable Acres</u>	<u>Total Acres</u>
No Chargeable	23,427	19,892	43,319
Limited Harvest	2,065	1,754	3,819
Full Harvest	17,120	14,535	31,655
GRAND TOTAL	42,612	36,181	78,793

NOTES:

The above table shows the harvest prescriptions which, due to other allocations in Alternative I, would pertain if the Pine Marten MMR did not exist.

The grand totals shown above do not change by alternative. The distribution of these totals among harvest prescriptions does vary by alternative.

Pine Marten areas were modeled as having the "limited" harvesting prescription. So, the ASQ from the 23,427 acres having "no chargeable" and 2,065 acres having "limited" harvesting prescriptions would be unaffected by removing standards pertaining to Pine Marten management in these areas and managing them to meet the objectives of the underlying management areas.

a. Analytical Findings Based on Table G-14 and FORPLAN Data

Site-specific occurrences of the Pine Marten MMR often coincide with occurrences of the Pileated Woodpecker or Riparian MMR or with occurrences of other management areas in Alternative I which limit or preclude harvesting. For this reason, it takes a 65% change in the amount of acres allocated to the Pine Marten MMR to affect a 1% change in the Alternative I ASQ. Since this is in excess of the 20% variability which the MMR is judged to have, further analysis of the sensitivity of the individual Pine Marten MMR on Alternative I has not been undertaken.

4. Sensitivity to Changes in the Dispersion MMR

Analysis of FORPLAN discloses that the ASQ of Alternative I is not sensitive to the individual Dispersion MMR. The Dispersion MMR also does not affect the joint sensitivity of the other three MMRs.

5. Combined Sensitivity of the Riparian, Woodpecker, and Pine Marten MMRs

Analysis shows that these MMRs would have to be changed as a group by 23 percent before the ASQ of Alternative I would change 1 percent. Since this is greater than the 20 percent variability which these MMRs are judged to have, no further analysis of the sensitivity of the combined MMRs on Alternative I has been undertaken.

APPENDIX H

APPENDIX H

INTERPRETATION OF LAND USE PLANS OF OTHER AGENCIES
WITHIN THE INFLUENCE ZONE OF THE MT. HOOD NATIONAL FOREST

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I. INTRODUCTION

Coordination with other public land management or land use planning agencies is required by 36 CFR 219.7. As a part of the coordination requirement, the Forest has reviewed the plans of these other agencies. Following are synopses of the agencies plans as they may affect the Mt. Hood National Forest.

II. SYNOPSES OF PLANS

A. Multnomah County Comprehensive Framework Plan

Adopted: September 6, 1977

Last Updated: September 6, 1983

The county plan calls for intergovernmental cooperation with all agencies. The plan specifically stated, as a policy, that it would attempt to maintain the integrity of this plan if it is affected by the actions of an adjacent jurisdiction which may have off-site impacts. The plan calls for encouragement of economic development, including those industries which process natural resources. At the same time, it calls for management of growth and minimizing the conflicts between urban and natural resource uses. The plan classified four categories of natural resource lands, of which, Commercial Forest and Multiple Use Forest would most concern the Mt. Hood.

Commercial Forest land is that land which has the following characteristics: 1) Site I, II and III soils (for Douglas fir, as classified by the U.S. Soil Conservation Service); 2) Suitability for commercial forest use; 3) Ownership predominately by private corporate timber companies or public agencies and in commercial forest use; 4) Not impaired by urban uses; and 5) Cohesive forest areas with large parcels. Other areas which are necessary for watershed or habitat protection, subject to erosion or land failure, potential recreational areas of scenic significance may also be classified as Commercial Forest lands. The policy of the county is to restrict incompatible use on these lands and to allow forest management and compatible uses. Under the strategy for Commercial Forest Lands the zoning code limits residential use to that which is resource related. Conditional residential uses may also be permitted. The plan calls for setting standards to conserve natural resources and for protection from hazards.

Multiple Use Forest areas are similar to Commercial Forest Lands except for the following differences: 1) The land is suitable for forest use and small woodlot management, but it is not in predominately commercial ownership; and 2) The areas is provided with rural services sufficient to support the allowed uses, but is not impacted by urban level services. Size of parcels is not mentioned as a characteristic. The policy is to allow forestry uses, as well as non-forestry uses such as agriculture or cottage industries, provided the uses are compatible with adjacent forest lands. Under Multiple Use Forest Areas the zoning code permits residential uses under conditions similar to those of Commercial Forest Lands. In

addition, uses such as processing of agricultural products, commercial recreational uses and community facilities are permitted. Conditional use of planned rural development is also allowed.

Multnomah County's plan calls for a policy of limiting development or requiring mitigation under the following circumstances: 1) Where slopes exceed 20%; 2) Where there is a severe potential for erosion; 3) Within hundred year flood plains; 4) Where seasonal water tables are high (defined as within 0-24 inches of the surface for three or more weeks a year; 5) Where the fragipan is less than 30 inches from the surface; and 6) Where the land is subject to slumping, earth slides or movement.

Their plan designates areas of Significant Environmental Concern, including three specific areas which directly or indirectly affect the Forest. Areas of significant Environmental Concern are those with characteristic such as special wildlife habitat; scenic, recreational or historical values and hazardous conditions. The Columbia Gorge, the Sandy Scenic River and parts of the Mt. Hood National Forest have been designated as areas of Significant Environmental Concern. The policy of the plan is to protect such areas by: 1) Maintenance of an inventory of data which delineates their boundaries and pertains to their values; 2) Requirement of a special review for certain types of development to ensure minimum impact on their values; and 3) Primarily emphasizing the protection of each area's value factors.

B. Clackamas County Comprehensive Plan

Comprehensive Plan Update: June 26, 1980
Mount Hood Community Plan: August 5, 1982

With the exception of the Mt. Hood Community, most of that land in Clackamas County which is in the vicinity of the Mt. Hood has been designated as Forest. This designation is defined as existing and potential commercial forest lands suitable for such uses, as well as lands needed for watershed and habitat protection and those in hazardous areas. According to the policies of the plan, the criteria for the Forest Land Use Designation are: 1) Land with sites identified as I, II, III, IV and V as determined by the State and the Forest Service; 2) Areas with parcels 20 or more acres in size; and 3) Land that is generally in forest use. Land which is environmentally sensitive should be designated as Forest and land which serves as a buffer between areas of differing intensities of use may be designated as Forest. Allowable uses are those related to Forest management. Land uses which would conflict with forest related uses will not be allowed, although housing will be limited, not prohibited. The grouping of dwellings is encouraged.

The Clackamas County Comprehensive Plan states that the county shall apply zoning districts to the Mt. Hood National Forest which are consistent with the Forest's land allocation and management plans. The plan also has declared several Forest roads to be scenic. The plan states, as a policy, that the county supports visual management techniques of Federal lands within the County. There is no conflict with the County's designation of scenic roads and the Forest's Visual Resource Inventory.

The main area of concern on land use issues between Clackamas County and the Forest is the series of settlements and villages, located on the west flank of the mountain, known as the Mt. Hood Community. Private land extends along State Hwy 26, well up the side of the mountain. Several areas of private land are completely surrounded by Forest lands. Clackamas County has developed an additional land use plan with special emphasis on the Mt. Hood Community.

The plan has applied the following Comprehensive Plan designations for the Mt. Hood Community: 1) Forest; 2) Agricultural; 3) Rural; 4) Rural commercial; 5) Urban Low Density Residential; 6) Community Commercial; and 7) Open space. The Mountain Recreation Designation may also be applied. The three village districts are treated somewhat separately. The main differences are in the intensities allowed in the Mountain Recreation Zone as applied to the three villages. Mountain Recreation may not be applied outside of these three villages.

The Mountain Recreation Designation provides for overnight recreational housing as well as a higher density than that permitted in Low Density Residential. Allowable uses are multi-family housing, resorts and motels. Incidental commercial use would be allowed on a limited basis. The criteria for the designation is that the area: 1) Is within a village district; 2) Has available public water and sewer; and 3) Has a character and pattern of previous development that would not be adversely affected by the designation. The density of development is termed "intensity" and is based on floor area. The plan designates the Village District of Government Camp as high density in character, the Village District of Rhododendron as low intensity in character and the Village District of Wemme-Welches as medium density in character. Further, in the Village District of Wemme-Welches, new development is encouraged to be located away from Hwy 26.

In addition to the Mountain Recreation Designation, housing is provided for the Recreation Residential and Low Density Residential zones. Recreational Residential is allowed in areas designated as rural and on parcels generally two acres or less, if the area is already significantly affected by development. There may not be natural hazards within this designation. Low Density Residential is allowed within the Mt. Hood Urban Area Designation and is confined to the Village Districts. The criteria are the same as in the county comprehensive plan except that the maximum density is four units per acre. Density may be increased by density bonuses which can be awarded if the development meets certain criteria such as providing for low income housing or public recreation.

Community uses are allowed in the Community Commercial Designation within the Urban Area. Only the Rural Tourist Zone will apply. The Rural Commercial Designation applies to the areas outside the urban areas. The purpose of this designation is to allow already existing uses to remain without being a non-conforming use.

The Resource Protection Open Space Designation is applied to 100 year flood-plains and slopes of 25% or more. Development is permitted only under strict conditions. Fragile and hazardous areas are a component of the Open Space Designation and are to be established within the Mt. Hood urban area. This designation applies to 100 year flood plains, identified

land movement areas, slopes over 25% and wetlands. Except for single family residences on lots of record, development is not permitted on fragile and hazardous areas. However, in stated cases, bonus density points may be awarded to permit more dense development of other portions of a given parcel that may be partially in a fragile or hazardous area.

Except possibly for the Mt. Hood Community, there are no conflicts between the Clackamas County Comprehensive Pland and the Forest, ability to manage its lands. The urbanization of the Mt. Hood Community is cause for some concern. This concern was addressed in the Responses to the ICO's in Chapter V of the AMS. While the county plan provides a framework for development and some control on where the most intense development may occur, it does allow for an increase in the population and urbanization in the Mt. Hood Community. As stated in the Responses to the ICO's, pressures caused by the increase in growth can affect the forest.

C. Hood River County Land Use Plan

Comprehensive Land Use Plan Update: December 1984

Most of the lands in Hood River County adjacent to the Forest, and nearly all of them on the Forest, have been designated as Primary Forest and zoned F2. Some of the area around Parkdale near the Forest has been designated as Forest and Farm, zoned Exclusive Farm Use. North of Parkdale is a small area designated as Rural Residential.

Areas on the Forest and adjacent to it which have special designation are the Parkdale Lava Beds and the Columbia Gorge. The Lava Beds are designated as a Natural Area. The face of the Columbia Gorge is zoned Scenic Protection, while the talus slopes and streams have been designated as Environmental Protection. An area off the Forest which includes land three miles to the east and west of Hood River is zoned the Columbia Gorge Combining Zone.

The Primary Forest Designation is made in those areas where the site classification for the majority of the lands is 3 through 7, with most of the lands being site 3, and the average parcel size is 282 acres. The lands may be at higher elevations and may be in more rugged areas. Public access roads are generally limited and housing developement almost non-existent. The goal is to encourage the management of forest commercial lands and to conserve them. Most of the permitted uses are those associated with timber management and harvest, although other resource management uses such as gravel extraction and farm uses are also permitted. Certain other uses such as recreational sites and the processing of wood products may be permitted as conditional uses. Minimum lot size is 40 acres.

The Forest designation is for areas which are buffers between Farm and Rural Residential. The average parcel size is between 29 and 49 acres and they are usually not owned by timber companies, serving instead as woodlots. The goal is to minimize conflicts with urbanization and the uses are similiar to those in Primary Forest. Minimum lot size is 40 acres. The Farm designation is for areas in which the principle use is farming.

The goal is to protect farmland. Minimum lot size is 20 acres. The Rural Residential designation is for those areas in which the primary use is residential and which are already committed to non-resource use. These lands are outside the Urban Growth Areas. Rural services are present and rural housing does not conflict with agricultural and forestry. Minimum lot sizes vary from 1/2 acre to 5 acres.

The goal of the Natural Area designation is to conserve, preserve and protect natural areas. The Natural Areas of concern to the Forest are the Parkdale Lava Beds and three areas (Elk Meadows, Tanner Butte Mountain Goat Area and Chinidere) now in Wilderness. A policy statement supports the Forest Service and the Nature Conservancy in their efforts to maintain and preserve the Parkdale Lava Beds. The plan also supports the coordination of management plans with the affected property owners. The plan supports the Mt. Hood and its plan management designations for the three previously mentioned areas to be in Wilderness. Apparently, despite the recent update of the plan, many statements were left in the plan which reflects the situation as it was in 1977.

The purpose of the Scenic Protection Zone is to protect and enhance the significant scenic protection. Much of this zone is in public ownership. Permitted uses are farming, maintenance and rehabilitation of recreational facilities and roads, selective cutting timber harvest and one single family dwelling per lot. Minimum lot size is 40 acres. Conditional uses include new recreational facilities and public utilities. All development must meet standards designed to preserve the scenic quality of the gorge. There are special standards for clearcutting in the gorge.

The Environmental Protection Plan designation is intended to protect life, prevent economic hardship and to protect watersheds and fish and wildlife habitat. It is implemented by the Environmental Protection Zone, the Floodplain Zone and the Geological Hazard Zone. Permitted uses are those which are low intensity in character and permanent buildings are limited and must meet specific conditions.

Other plan statements of interest to the Forest include the following: 1) A list of scenic roads, most of which agree with the Forest's scenic inventory. The Old State Highway is not on the scenic inventory; 2) A statement supporting the Forest's management plans for the Cloud Cap Inn - Tilly Jane Recreation areas; 3) A statement supporting the protection of the Mt. Hood Wilderness Area; 4) A statement supporting the placement of the Barlow Road on the list of Historic Places; and 5) A statement saying the Mt. Hood "should cooperate with the county in the development of the Oregon Trail System".

In conclusion, there are no conflicts of any consequence between the Hood River County Comprehensive Land Use Plan and the management of the Forest's lands.

D. Wasco County Land Use Plan

Comprehensive Land Use Plan Adopted: February, 1982

Latest Amendments: April, 1984

By far the greatest amount of land in Wasco County which is on the Forest and adjacent to it is designated as Forestry and zoned either F1 or F2. A few small areas near the Forest are zoned Agricultural-Residential and Forest-Farm. One parcel of the former is an in-holding on the Forest. A small area of land zoned Rural-Residential is near the Forest.

That land which is designated as Forestry is all publicly and privately owned commercial forest land which has a productivity greater than 20 cubic feet per year. The purpose of the designation is to provide for all commercial and multiple use compatible with sustained yield. The permitted uses on land zoned F1 are those which are related to the management and harvest of forest resources and the processing of wood products. Farming and conservation uses are also permitted uses. Conditional uses include the extraction of gravel, water treatment and utilities. Subdivisions are prohibited. The minimum lot size is 80 acres. Uses permitted on land zoned F2 are similar to those in F1. In addition, certain signs and the maintenance and rehabilitation of recreational sites is also permitted. More conditional uses are allowed in F2 than in F1. They include such uses as recreational facilities, ski resorts and single family residences. However, subdivisions are prohibited. The minimum lot size is 80 acres.

The purpose of the Agricultural-Residential Zone is to provide for outdoor recreational areas and to allow controlled growth to continue in already existing rural communities. Agriculture, highly developed recreational facilities, recreational vehicle parks and single family dwellings are among the permitted uses. Subdivisions are also permitted. The purpose of the Forest-Farm Zone is to allow for small scale or hobby farms by permitting dwellings in relation to farm use, while at the same time preserving open space. Permitted uses are agriculture and single family residences. The minimum lot size is 10 acres. The purpose of the Rural-Residential Zone is to provide for low density residential and agricultural uses which will not conflict with commercial farming operations. Permitted uses include subdivisions and planned unit developments.

The comprehensive plan listed several areas as outstanding scenic areas. Included were the White River within the River Canyon. This area is on the Forest. Portions of the White River may be considered for recommendation as a wild and scenic river. Historical sites were also listed including the Barlow Road, Bear Spring Camp Shelter and the Old White River Station Camp. Although the plan stated that the Bear Spring Camp Shelter was owned by the Forest Service, this is no longer true. That site is now on the Warm Springs Reservation. The Old White River Station Camp is on the Forest and is one of the associated sites on the Barlow Road. As such, that site is, along with the Barlow Road itself, on the National Register of Historic Places and is protected. The site no longer has any structures on it, but it still has archeological value.

The Dalles Municipal Watershed is of particular concern to the Forest, the City of The Dalles and Wasco County. There is a comprehensive plan for the watershed. Protection of the soil and water resources is a primary objective. Those uses which do not conflict with the primary objective may be permitted.

There is no conflict with Wasco County's designation of Forest on most of the lands in the vicinity of the Mt. Hood and the ability of the Mt. Hood to manage its land. However, those areas which have been placed in zones that permit subdivisions pose a problem. Suburban development has occurred near the boundaries of the Forest. This situation is discussed further in the Responses to the ICO's in Chapter V of the AMS.

E. The Comprehensive Plan of the Confederated Tribes
of the Warm Springs Reservation

Warm Springs Reservation Comprehensive Plan: 1983

Most of the lands on the reservation adjacent to the Forest are designated as Forest Land. Development on these lands is limited to roads, transmission lines, old mill sites, ranger stations, lookouts and recreation sites. Housing on these lands does not exist. Timber management and harvest is the primary use. Compatible secondary uses are maintaining fish and wildlife habitat, gathering of traditional foods and grazing livestock. Incompatible uses are any which reduce that reduce the land base for timber production.

Adjacent to the Mt. Hood and south of the Forest designation are lands which are designated Recreation Lands. Tribal members are expected to be the main users of these lands. The primary uses are recreational pursuits which preserve the natural and scenic features of the area. Compatible secondary uses are maintaining fish and wildlife habitat and gathering traditional foods. Incompatible uses include most types of development and intensive resource use. This area is adjacent to the Olallie Area on the Mt. Hood and the uses for this designation are compatible with the uses of the Olallie.

Further south is an area which has been designated as Wilderness. The presence of the Wilderness is important to many tribal members. This designation is adjacent to the Mt. Jefferson Wilderness on the Mt. Hood and the Deschutes. There is no conflict between the Wilderness Designation and the uses on the adjacent National Forests. To the east of the Forest boundary are lands which are designated as Rangelands. The main use is the grazing of livestock. Roads, powerlines, fences and scattered rural housing are the developments present. Again, there is no conflict with the management of the Mt. Hood.

The Forest has a policy of coordinating with the Confederated Tribes of the Warm Springs. More of this coordination is discussed in the AMS in the Responses of the ICO's in Chapter V.

F. Plans of the State and Other Federal Agencies

The BLM was contacted in December of 1984 and that agency indicated that there were no problems of incompatibility in the management of our adjacent lands. The Oregon Department of Fish and Wildlife and the Forest continuously coordinate on the management of fish and wildlife habitat. This coordination is discussed in Chapter II of the AMS and in the Responses to the ICO's in Chapter V. The Bonneville Power Administration was contacted in December of 1984. That agency has no plan, as such, for their transmission lines. It is not expected that they will require any new rights-of-way. This issue is also discussed in the Responses to the ICO's.