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Final Environmental Impact Statement

Land and Resource Management Plan

Siuslaw National Forest

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE LAND AND RESOURCE MANAGEMENT PLAN

Siuslaw National Forest

Benton, Coos, Douglas, Lane, Lincoln, Polk, Tillamook, and Yamhill Counties, Oregon

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ABSTRACT

This Final Environmental Impact Statement describes 10 alternatives for managing the 631,000 acres of land administered by the Siuslaw National Forest Each alternative responds differently to the issues and concerns identified

- Alternative NC (No Change) continues management under the 1979 Timber Resource Plan, amended in 1984 to comply with legislation that established Wildernesses on the Forest, but without adjustment for requirements of the National Forest Management Act (NFMA) of 1976.

- Alternative A (Current Direction or 'No Action') continues management of the Forest according to current plans and policies, with levels of outputs and activities updated to reflect current knowledge and compliance with Management Requirements of NFMA.

- Alternative B emphasizes production of wood fiber

- *Alternative B-Departure (RPA) responds to the 1980 Resources Planning Act program.* This alternative meets the RPA timber goal for the 1st decade by departing from a nondeclining flow harvest schedule

- Alternative C emphasizes recreational opportunities and production of wood and big game habitat.

- Alternative D emphasizes production of commodity resources, such as timber, commercial fish, and developed recreation.

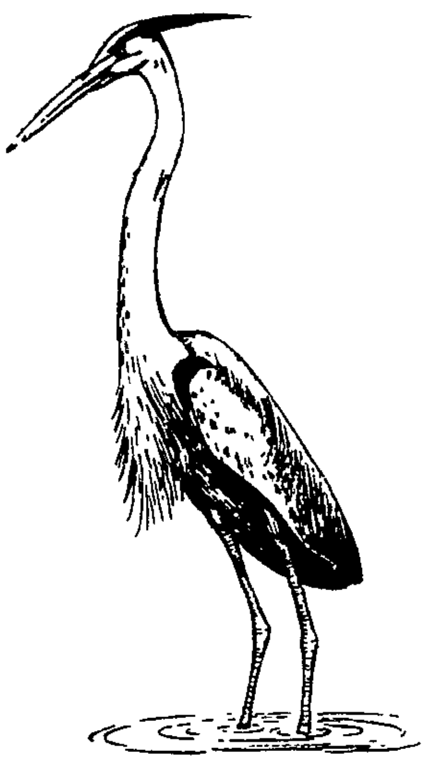
- Alternative E is the Preferred Alternative (PA), which emphasizes fish habitat protection, recreational opportunities, and production of wood This alternative was modified from the draft EIS, Alternative E, to respond to public comment on the Proposed Forest Plan.

- Alternative F provides a range of recreational opportunities while protecting scenery and fish and nongame wildlife habitats.

- Alternative G emphasizes protection of amenity values such as water quality, game fish and wildlife habitats, dispersed recreation, and scenery

- Alternative H emphasizes preservation of natural systems, fish and nongame habitats, old-growth stands, and watersheds

Short and long-term estimates of Forest resource outputs and environmental consequences are analyzed for each alternative, but the alternative adopted as the basis for the Forest Plan would apply for 15 years or less Forest plans are amendable under NFMA through the National Environmental Policy Act (NEPA) process if future requirements or changes are deemed necessary.



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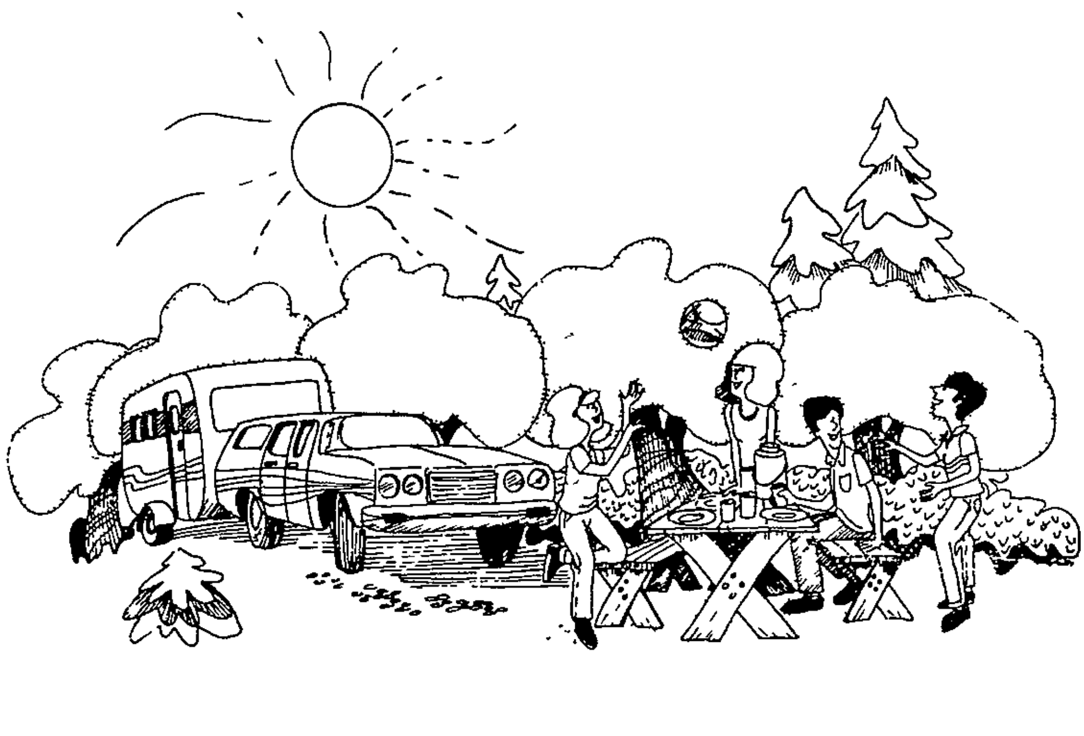
CHAPTER I
Purpose and Need



CHAPTER I

PURPOSE AND NEED

INTRODUCTION

Preparation of a Forest Land and Resource Management Plan (Forest Plan) is required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976 The purpose of the Forest Plan is to direct and guide all resource management activities on the Siuslaw National Forest for the next 10 to 15 years, unless conditions or demands change significantly. Implementation of the Forest Plan will assure multiple use, sustained yield and protection of Forest resources

The preparation of an Environmental Impact Statement (EIS) is required by NFMA and the National Environmental Policy Act (NEPA) of 1969 In accordance with NEPA, an EIS is required because the implementation of a Forest Plan is a "major federal action significantly affecting the quality of the human environment." Its purpose is to disclose to decision makers and the public alternative ways to manage the land and resources of the Siuslaw National Forest, and to aid the decision maker in selecting a course of action

This Final Environmental Impact Statement (FEIS) describes 10 alternatives, including a Proposed Action, for the future management of the Forest The FEIS also describes the affected environment and the environmental consequences of implementing the Proposed Action and alternatives.

Each alternative provides a different way to address management concerns and public issues of local, regional, and national importance Thus, each alternative generates a different mix of goods and services from the Forest Every alternative was evaluated to determine its potential to provide a sustained yield of goods and services in a way that maximizes long-term net public benefits Net public benefit is an overall expression of the value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index

The Proposed Action is the alternative that, in the opinion of the Forest Service, provides for a level of goods and services that maximizes long-term net public benefits and is the Forest Service Preferred Alternative. The Preferred Alternative (PA) is the basis for the Forest Plan which is described in a separate document

CHANGES BETWEEN DRAFT AND FINAL

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (Forest Plan) were released to the public November 15, 1986 Chapter I in this FEIS differs from the DEIS Chapter I in a few ways. The issues identified in the DEIS are the same, but new information is presented to reflect public comments received on the DEIS. Through the comments, the issues, concerns and opportunities (ICOs) were reconfirmed. Some of the issues received new emphasis; aspects of others were clarified as the result of meetings with individuals and public interest groups. The Forest's planning interdisciplinary team has made changes to keep the ICOs current and within the scope of the planning process

Changes since the DEIS was published are incorporated in this chapter and include: issuance of a Supplement to the DEIS and subsequent public comment, establishment of Marys Peak Special Interest Area, five additional Wild & Scenic river eligibility studies conducted, and Congressional legislation in 1988 allowing the Mapleton Ranger District to offer new timber sales in FY89 prior to completion of the final EIS and Forest Plan

The final Supplement to the EIS (SEIS) for an Amendment to the Pacific Northwest Regional Guide (USDA Forest Service 1988a) was issued in July, 1988 and provides Regional guidelines for maintaining viable populations of northern spotted owls. The new management direction was incorporated in the FEIS resulting in changes in the habitat network and standards and guidelines The effect of the change was to reduce the number of acres suitable for timber production in all alternatives.

The Pacific Northwest Region's FEIS for Managing Competing and Unwanted Vegetation (USDA Forest Service 1988b) was released since the DEIS. Changes were made to the standards and guidelines to be consistent with the guidelines presented in the FEIS and to reflect a reduced emphasis on herbicide use.

PLANNING PROCESS

To be able to put Forest planning in perspective, one should have a general understanding of the overall Forest Service planning process. Forest planning occurs within the overall framework of both national and regional planning as required by RPA, NFMA and the planning regulations [36 Code of Federal Regulations (CFR) 219].

National and Regional Planning

At the National level, the RPA program establishes long-range resource objectives based on the present and projected supply of and demand for various resources. A portion of each national resource objective included in the RPA program is assigned to each of the nine Forest Service regions.

At the Regional level, a Regional Guide is developed The Regional Guide assigns a portion of the national objective to each National Forest In addition, the Regional Guide establishes regional management standards and guidelines directing how the Forests are to meet these objectives The Regional Guide for the Pacific Northwest Region (USDA Forest Service 1984) provides this management direction for the Siuslaw National Forest Standards and guidelines for management of spotted owl habitat are established in the SEIS (USDA 1988a). The EIS for Managing Competing and Unwanted Vegetation (USDA 1988b) provides direction for vegetation management for the Pacific Northwest Region.

Planning is a repetitive process with information flowing from the Forest up to the national level where it is incorporated in the RPA Program. The information then flows back to the Forest The RPA Program and Regional Guide are updated every 5 years.

Forest Planning Process

At the Forest level, a Forest Plan is prepared A range of resource objectives are considered as alternatives; one or more of these alternatives would meet or exceed the current RPA Program resource objectives in the Regional Guide.

The Forest Plan shall ordinarily be revised on a 10 year cycle, but no later than 15 years from the date of approval of this Plan [36 CFR 219.10(g)] It also may be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Plan have changed significantly or when changes in RPA policies, goals, or objectives would have a significant effect on the Forest's programs. In the monitoring and evaluation process, the interdisciplinary team may recommend a revision to the Forest Plan at any time Revisions are not effective until considered and approved in accordance with the requirements for the development and approval of a Forest Plan.

The planning process specified in the NFMA implementing regulations and the environmental analysis process specified in the CEQ regulations were used in developing the FEIS and the accompanying Forest Plan The planning steps employed are:

1 Identification of purpose and need.

2. Preparation of planning criteria.

3. Collection of inventory data and information.

4 Analysis of the management situation

5 Formulation of alternatives

6. Estimation of the effects of alternatives

7 Evaluation of alternatives

8 Recommendation of the preferred alternative.

9. Implementation of the plan

10 Monitoring and evaluation.

The results of the environmental analysis (steps 1 to 8 above) are documented in this FEIS. It ensures that environmental information is available to public officials and citizens before decisions are made and before actions are taken

Government agencies and the public were consulted for comments on the DEIS and the accompanying proposed Forest Plan. Comments received were used to evaluate how well the first seven planning steps were accomplished and were used in preparation of the final EIS and Proposed Action. Appendix K describes the public involvement process between the DEIS and FEIS, and it summarizes the comments received

This FEIS will be used by the Regional Forester to make a decision regarding approval of the Forest Plan. The decision will be documented in a Record of Decision (ROD) which will be available to the public. Issuance of the ROD will complete Planning Step 8 and initiate the last two Planning Steps.

Upon implementation, the FEIS will be used for "tiering" in accordance with the federal regulations. Tiering means that environmental analysis conducted for site-specific projects arising from the Forest Plan will refer to the FEIS and associated documents rather than repeat information from those documents In this way, the environmental documents prepared for a site-specific project will need only to concentrate on issues unique to that project and, thereby, minimize repetition of information contained in documents having broader authority or coverage (40 CFR 1508 28).

The Forest Plan supersedes the following Siuslaw National Forest land and resource management plans: the Hebo, Alsea, and Marys Peak Unit Plans; the *Ten-Year Timber Resource Plan*; and the Seven-Year Timber Resource Scheduling Plans for all Ranger Districts The existing direction for the Congressionally designated Oregon Dunes National Recreation Area (ODNRA) and the Cascade Head Scenic-Research Area (CHSRA) will be incorporated without change in the Forest Plan. The Forest planning process will be used to provide mandated direction for the Wildernesses which will have separate Wilderness management plans.

During implementation, forest management activities will comply with the Forest Plan. Appropriated budgets may alter the schedule of activities. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System lands and resource uses must conform to the Forest Plan [36 CFR 219.10(e)]. Such documents shall be revised where needed as soon as practicable, subject to valid existing rights This updating will generally be done within 3 years.

This document contains a glossary, a list of acronyms used in the text, and a list of references cited in the text. The reader will find it useful to consult both the alternative and resource maps when reviewing the FEIS. The alternative maps are in a separate envelope accompanying the FEIS and the resource maps are found in the text.

FOREST OVERVIEW

The Siuslaw National Forest is located in the coast range of western Oregon adjacent to the Pacific Ocean The Forest contains over 630,000 acres extending south from Tillamook to Coos Bay. Primarily steep forest land covers some 604,000 acres, while 27,000 acres of sand dunes and wetlands stretch along the coast from Heceta Head, south of Yachats, to Coos Bay

The Forest Supervisor's Office is in Corvallis, Oregon Ranger District offices are in Hebo (Hebo Ranger District), Alsea (Alsea Ranger District), Waldport (Waldport Ranger District), Mapleton (Mapleton Ranger District), and Reedsport (Oregon Dunes NRA) These locations are shown on the vicinity map (Figure I-1).

The principal resources found on the Forest are trees, habitat for wildlife and anadromous fish, clean water, unique scenery, and recreation along the Oregon coast The Siuslaw is one of the highest producers of wood fiber of any Forest in the nation. It also has steeper and more unstable terrain, compared to most National Forests. The mild and wet climate encourages rapid plant growth, hence the presence of dense stands of tall trees, primarily conifers, a thick undergrowth of vegetation, and a diversity of wildlife habitat. The mild climate also attracts year-round recreation use, especially to the coastal areas

In 1985, approximately 654,500 people lived in the eight-county area of Benton, Coos, Douglas, Lane, Lincoln, Polk, Tillamook, and Yamhill Counties, which makes up the zone of influence where Forest resources are primarily used Two cities are located within 12 to 20 miles of the eastern edge of the Forest: Corvallis, with a population of about 40,000, and Eugene-Springfield, a city of about 147,000 To the west, and adjacent to the Forest are the coastal cities and towns of Tillamook, Lincoln City, Newport, Waldport, Reedsport, North Bend, and Coos Bay with populations ranging from 2,500 to 14,000. Smaller communities border main roads throughout the Forest. The coastal strip relies on

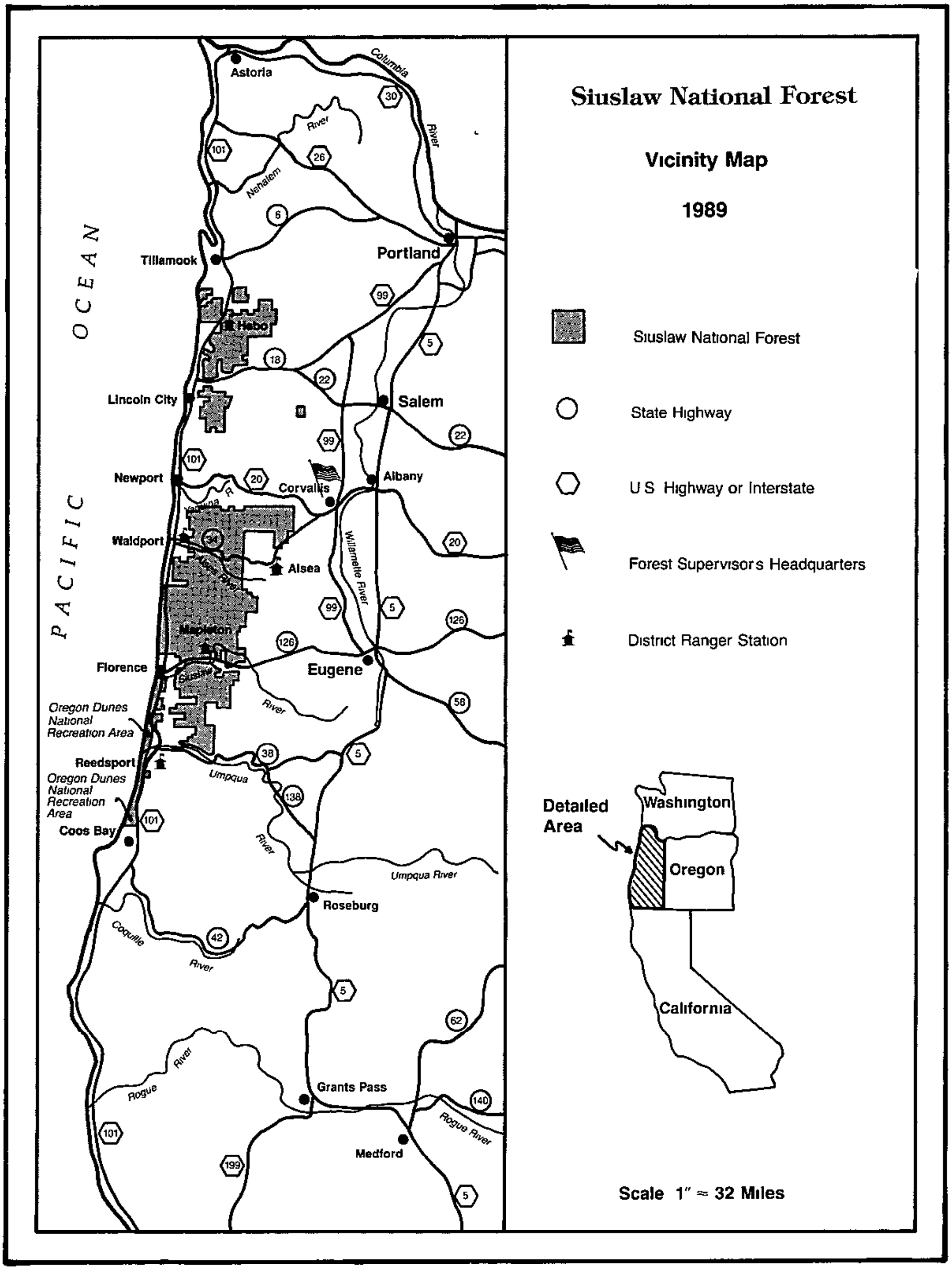


FIGURE I-1. LOCATION OF THE SIUSLAW NATIONAL FOREST fishing, tourism, and wood products; other communities are closely tied to the timber uses and amenities associated with forested land in western Oregon.

The dominant employers in the area are the trade and government sectors, which accounted for about 45% of the total employment in 1987. Timber industry employment accounts for about 13%. That proportion has been declining for the past several years, while trade and services are providing a greater share of local employment.

A more complete description of the affected environment can be found in Chapter III of this document

ISSUES, CONCERNS, AND OPPORTUNITIES (ICOs)

Introduction

The Siuslaw National Forest has a variety of natural resources that can be managed for different mixes of outputs, uses, and environmental conditions. Various individuals and groups prefer to see the Forest managed to emphasize resources. Since the resources are interrelated, emphasizing one resource could result in changes to others. In some cases these interactions are complementary, managing one resource can enhance other resource outputs or uses. In other cases these interactions are not complementary and tradeoffs occur between the resources.

The identification of the public issues, Forest management concerns, and resource opportunities (ICOs) is an important first step in identifying the scope of the Forest planning process. A public **issue** is any subject of widespread public interest relating to the management of Forest resources A management **concern**, identified by Forest personnel, is a condition that can potentially limit the way the resources are managed. A resource **opportunity** can be identified by the Forest Service or the public, and is an option to improve or maintain the present condition The purpose of identifying ICOs is to determine what people want from the Forest in the form of goods, services, uses, and environmental conditions.

The process of identifying ICOs for consideration in the Forest planning process began in September 1979 The Forest Planning Interdisciplinary Team (IDT) compiled a potential set of ICOs from information gathered in previous planning efforts and from discussions with the public and Forest Service employees

To identify the ICOs to be assessed in the planning process, the IDT considered whether an ICO was: 1) required by law and within the jurisdiction of the Forest Service, 2) a land management or administrative concern, 3) currently valid, 4) related to the Siuslaw National Forest, 5) resolvable, and 6) whether resolution would result in significant long-term effects

The preliminary ICOs were distributed for review by individuals, adjacent landowners, agencies, and organizations. The IDT analyzed and assessed the comments received and developed a revised set of preliminary ICOs In August 1980, the Forest Supervisor presented a list of recommended ICOs to the Regional Forester. The Regional Forester approved it later that month

Over the past 9 years, the IDT has continued to assess, evaluate, and in some cases update the ICOs based on periodic meetings with groups and individuals and changes in policy and procedures. The ICOs were reconfirmed as the result of the extensive public comment received after publication of the DEIS and proposed Forest Plan. The Forest received a total of 3,660 responses during the 120-day review period.

Several ICOs received renewed emphasis, and aspects of some ICOs were clarified as the result of meetings with agency officials, interest groups and individuals. Appendix K describes the public involvement process between the draft and final EIS; it also summarizes public comments received and the Forest response to those comments.

This chapter contains the latest list of ICOs addressed in this planning process It is from this list that the alternatives contained in the FEIS were designed, assessed, and evaluated This list is also the basis for selection of the preferred alternative. Additional information on how the ICOs were compiled, evaluated and selected for inclusion in the planning process is presented in Appendix A A description of the resources that these ICOs address is provided in Chapter III

Some issues are treated the same way in the design of all alternatives, i e., the alternatives were not designed specifically to resolve the issues, although the associated outputs and effects will vary depending on the objectives of the alternative. The first 15 ICOs are treated differently by alternatives. The remaining 10 ICOs are treated the same way by each alternative.

Issues Addressed

1. Timber

How much and what kind of timber will be harvested? Where, with what practices, and on what schedule will it be harvested?

The primary issue for the Forest continues to be what balance should be struck between managing the land for timber and for other resources such as fish, wildlife, undeveloped recreation, and old growth The Forest lies in the heart of the most productive lands for growing conifers in the country (Waring and Franklin 1979). On a per-acre basis, the Siuslaw is the most productive National Forest in the country. Receipts from the sale of timber have far exceeded costs for timber and road management, and provide income to the U S Treasury and local county governments

Public opinion is sharply divided on whether or not timber sale levels allowed by past plans should be continued. Many individuals and timber industry groups feel the Forest should maintain or increase the annual timber sale level to help sustain local economies and maintain community stability. They would like to see most of the Forest managed intensively for maximum timber production and feel the other resources will remain in satisfactory condition On the other hand, numerous concerns were expressed in the comments on the DEIS about the effects of timber management on resources, such as fisheries, water quality, and wildlife habitats There is also concern about the Forest's ability to maintain site productivity, meet the growth and yield projections, and maintain plan and animal diversity if the Forest continues to harvest timber at past levels. Several environmental interest groups would like the amount of timber harvest reduced to benefit wildlife, fisheries, and recreational resources or to preserve natural ecosystems

There is general disagreement on the role the National Forest lands should play in supplying timber to the Pacific Northwest market Some timber industry associations and the Oregon Departments of Forestry and Economic Development would like the Siuslaw to provide enough timber volume to make up some of the expected decline in the supply from private lands until the state-owned Tillamook Burn and other previously harvested areas become available between 2000 and 2020 To meet the current demand for timber would mean the Forest should harvest timber at a higher level in the near future and plan for a decline in harvest volume in future decades. Departing from nondeclining flow could help sustain local economies, but opponents feel this would pose unacceptable risks of adverse environmental impacts by harvesting at a higher level for short-term economic gain.

There is also disagreement on the role National Forest land plays in the economics of the timber industry in the Pacific Northwest, as well as in the future demand for wood products. Evaluation of recent data and information indicates that demand for timber will increase at a moderate rate, in contrast to the slowdown of the early 1980s.

A small segment of the timber industry is concerned that the hardwood volume will not be sufficient to meet increased demands for hardwood species. Red alder and mixed deciduous-conifer stands occur on about 20% of the forested acres, but most of the hardwood volume has lower value in today's market and much is unmerchantable or not readily accessible. Conversion to conifers would increase commercial timber potential However, hardwood and mixed stands benefit some wildlife species and contribute to diversity on the Forest. Many individuals and groups and the Oregon Department of Fish & Wildlife feel the deciduous-mix stands should be maintained in a natural condition to provide noncommercial values

National, regional and local expectations from timber interests indicate that the Forest should continue to supply a significant amount of timber. Between 1979 and 1988, the Forest sold 350 million board feet (MMBF) annually. According to the Pacific Northwest Region's distribution of timber targets for the 1980 RPA program, the Forest's share of the timber supply should be about 430 MMBF per year (or about 79.8 MMCF per year). Recent analysis of the potential timber supply indicates the Forest could sustain only about 377 MMBF per year (71 6 MMCF per year) in the 1st decade and maintain a nondeclining harvest flow and meet management requirements of NFMA. The timber supply potential on the Forest is lower than expectations and lower than past projections have indicated

Management of timber is closely related to management of other resources; it can be complementary to some resources and competitive with others Harvesting of timber can benefit elk and deer by providing forage in harvest units, but can be unbeneficial to species dependent on mature conifer forests or old-growth stands Timber management reduces unroaded and undeveloped recreation opportunities, and can adversely affect scenery. Intensive timber management, using shorter rotations of 60 to 80 years can be more cost efficient, but may adversely affect fish resources (Everest and Meehan 1981).

In some cases, protection or enhancement of resources other than timber requires land be excluded from timber harvest activities and in other cases less intensive management must be practiced. Managing for fish resources, old growth, some wildlife habitat, unroaded areas, Special Interest Areas, and Research Natural Areas reduces the number of acres available for timber harvest and hence the potential sale volume Managing for municipal watersheds, scenic protection, and some wildlife habitats, can reduce potential timber volume by requiring less intensive timber management practices be used. Less intensive practices include harvesting timber on long rotations (greater than 80 to 90 years), restricting the use of fertilizers and herbicides, and limiting the volume that can be harvested from some areas.

The responsiveness of the alternatives to this issue can be evaluated by considering the number of acres allocated to timber production (suitable timber acres), the Allowable Sale Quantity (ASQ), the long-term sustained yield capacity (LTSYC, see Glossary), the number of acres managed on extended rotation lengths or reduced yields, and the tree species harvested.

2. Old-Growth Forest

How much of the existing old-growth stands will be maintained?

The future of old-growth stands on the Forest is an issue that has gained interest Originally a spotted owl habitat concern, it has now assumed additional scope.

Some members of the public became concerned in the early 1980s when inventories of tree age classes revealed that less than 5% of the Siuslaw National Forest had old-growth characteristics and that future timber sales would further reduce this amount Large forest fires in the late 1800s and early 1900s, coupled with accelerated timber harvest beginning in the late 1940s, contributed to this scarcity

Many environmental groups and individuals value old-growth trees and older forests for maintenance of diversity and site productivity, protection of watersheds, and for aesthetic and recreational purposes. Old-growth stands provide habitat for numerous species of wildlife, including the spotted owl, which is *proposed for federal listing as a threatened species*

Timber industry interests, on the other hand, feel that enough land is removed from timber management through Wilderness, Research Natural Areas, Special Interest Areas and, recently, Spotted Owl Habitat Areas, to provide adequate amounts of old growth for future generations Removing more land from timber production or placing land in extra long rotation reduces the opportunity to use the land for faster timber growth Old-growth stands generally produce little net growth and in some cases incur a net loss due to decay and mortality

The issue is confounded by the lack of a widely accepted definition of old growth To many individuals, old growth includes mature stands of trees that are aesthetically pleasing To ecologists, an old-growth forest must meet several specific physical criteria Few, if any, older stands on the Siuslaw would qualify under the recent ecological definitions of old growth

The current old-growth inventory for the Forest indicates there are about 34,000 acres of old growth, but the inventory was not developed using old-growth criteria considered important today. Many comments on the DEIS expressed dissatisfaction with the adequacy of the Forest's old-growth inventory. The inventory data is not adequate to distinguish old growth from other mature stands. Therefore, although the majority of acres classed as old growth do exhibit old-growth characteristics, some areas do not These small inclusions of other classes does not render the overall areas unsuitable as old-growth habitat for wildlife

Of the 34,000 acres identified in the 1976 inventory, 3,200 acres are in areas protected from timber management, i.e., Wilderness and Cascade Head Scenic Research Area, another 17,600 acres are in areas unsuitable for timber management not programmed for harvest

The responsiveness of the alternatives to this issue can be evaluated by comparing the amount of additional old growth that would be retained through land allocations, and by the rate of harvest of old-growth areas that would be available for timber management.

3. Watersheds

How will land be managed to maintain stable watershed conditions and meet state water quality standards?

To comply with federal laws and regulations, the Forest must conserve soil and water resources to ensure no significant impairment of the productivity of the land. Protection must be provided streams and streambanks from detrimental changes in water temperatures, blockages of water courses and deposits of sediment where timber harvests are likely to seriously and adversely affect water conditions. In addition, the Forest must implement Best Management Practices that, at a minimum, meet state water quality standards and comply with the Clean Water Act of 1972, as amended in 1977 and 1987 (Appendix J, Best Management Practices).

The issue becomes one of how best to manage the watersheds (the soil and water resources) for stability and to meet water quality standards. A few timber interest groups, including the Northwest Forest Resource Council and Northwest Forestry Association, expressed concern that the Forest's proposed practices were unnecessarily more restrictive than the State of Oregon's plan to comply with the Clean Water Act They are particularly dissatisfied with the removal of headwall acres from timber production to reduce landslide potential, feeling that there is not enough scientific evidence to justify such extreme measures.

On the other hand, environmental groups are concerned about the effects of new road construction and harvest activity on erosion and sedimentation. Numerous concerns were expressed through comments on the DEIS about harvest activities on steep, unstable slopes with attendant sedimentation of streams. Water quality is also critical to the maintenance of fish habitat, both in Forest streams and in estuaries.

The City of Yachats, S.W. Lincoln County, has recently expressed concern about timber management in municipal watersheds The stricter state regulations for municipal water supplies could pose financial burdens on small cities if water quality declines and treatment for sedimentation becomes necessary Concerns have also been raised by Yachats and other municipalities about recreation use and applications of fertilizers and herbicides within watershed boundaries

Water quality is influenced primarily by sediment entering the streams and by increased exposure to sunlight. Sources of sediment are: 1) natural landslides and landslides associated with roads and timber harvest, and 2) natural surface erosion and surface erosion associated with road construction and slash burning. Timber harvesting with the resultant loss of root strength in the soil, increases the risk of landslides on steep unstable slopes. Road construction, by undercutting unstable slopes and altering the movement of water on the slopes, increases risk of erosion and landslides. Burning of slash from areas that have been logged can greatly increase surface erosion. Timber harvesting next to streams may remove some or all of the vegetation shading streams, leading to increased water temperatures

All alternatives are designed to meet water quality standards established by the Clean Water Act. This is accomplished by leaving vegetation intact on steep unstable slopes, by maintaining shading vegetation along streams, and by limiting the amount of land that can be harvested in a watershed each decade. The watershed issue is resolved primarily by applying different levels of these protective measures in the alternatives, including a minimum level maintained in all.

The responsiveness of the alternative to this issue can be evaluated by considering the number of acres removed from timber production for headwall and riparian protection, the estimated number of landslides associated with timber harvesting, the estimated amount of sediment produced, the timber harvest dispersion limits, and the amount of protection afforded municipal watersheds

4. Fish Habitat

What quantity and quality of anadromous fish habitat will be provided?

The commercial fishing industry, anglers, resource management agencies, and the public have an interest in maintaining productive fish habitats in Forest streams and in the estuaries into which the streams flow. The Forest covers portions of five of the seven coastal Oregon watersheds producing the largest numbers of anadromous fish (Kunkel and Janik 1976). Numerous small streams which originate on the Forest drain directly into the ocean.

Over 1200 miles of perennial stream provide spawning and rearing habitat for salmon, steelhead, and searun cutthroat trout An additional 2,000 miles of perennial streams and 5000 miles of intermittent streams directly influence the downstream habitats of anadromous fish Seven major estuaries are dependent upon the quality of water flowing from Forest watersheds While at times available fish habitat is not fully used because of reduced spawning runs, it is assumed that there is generally a *scarcity of available habitat These year-to-year differences in the degree of use of the habitat form no* consistent pattern and are thus unpredictable

Spawning habitat on the Forest is estimated to produce about 245,000 pounds of commercial harvest and 37,700 sport fishery user days Demand for both commercial and sport fish is expected to increase 22% by the year 2000 (USDA Forest Service and ODFW 1979). Several coastal communities depend on commercial fishing as an important part of their economy.

Fish habitat is highly dependent on water quality Water temperature, sedimentation and the presence of large woody debris are critical to the maintenance and protection of the fisheries habitat Some timber harvest practices can harm anadromous fish habitat Timber harvest on steep, unstable slopes and road construction can result in landslides which may overload the stream systems with sediment and fill pools or spawning beds. Removing stream-shading vegetation can raise the water temperature to a level harmful to fish. Logging near streams removes trees which, if left undisturbed, might eventually fall into the streams to form the type of pools where fish live and hide. Salvage logging sometimes removes logs and other habitat-producing debris from the stream. The removal of these large logs from small streams results in higher flow velocity. This causes the stream channel to become unstable, and the swifter moving stream quickly flushes food and spawning gravel through the system rather than gradually dispensing them

Many environmental groups and individuals expressed concerns through comments on the DEIS about the adverse effects of timber harvest and road building on fish habitats. Many feel these activities should be reduced or excluded from parts of the Forest to ensure protection of fish and wildlife habitat The Oregon Department of Fish and Wildlife is concerned about allowing any timber harvest in riparian areas, even on long rotations, as they feel this would degrade fish and wildlife habitat. Tree removal, however, for fish habitat structural improvements would be acceptable

Others feel the Forest should explore ways to protect water quality and fish resources without removing land from timber production. Various timber industry groups feel that the fish resources can be protected through applications of available management practices, including placement of logs in stream channels during timber sale operations

Management of soil and water resources is closely related to fisheries management Therefore, responsiveness of the alternatives to this issue should be evaluated by considering the factors that affect watershed conditions as well as these additional factors· the amount of protection given unstable slopes and riparian areas, and the conditions of fish habitat measured by an index (Coho Smolt Habitat Capability Index, CSHCI) representing numbers of young anadromous fish.

5. Wildlife and Threatened and Endangered Species Habitat

How much habitat will be provided for wildlife species, and how and where will these habitats be managed?

The Forest is inhabited by more than 300 species of wildlife, of which about 50 species are classified as "game" or "furbearers." The Oregon Department of Fish and Wildlife is responsible for management of wildlife populations, while the federal land management agencies, such as Forest Service and Bureau of Land Management, are responsible for management of habitat

Regulations (36 CFR 219) developed pursuant to the National Forest Management Act of 1976 require national forests to provide wildlife habitat suitable for maintaining viable populations of vertebrate species. All Forest Plan alternatives must meet the minimum viable population requirements; some alternatives may provide more habitat

Federally-listed threatened and endangered (T&E) species found on the Forest are the bald eagle, Aleutian Canada goose, brown pelican, peregrine falcon, and Oregon silverspot butterfly. The spotted owl is proposed for federal listing as a threatened species. The Endangered Species Act requires that actions be taken to facilitate the recovery of these species.

The issue concerning wildlife focuses not on the desirability of maintaining wildlife populations, but on the appropriate level of management needed to provide habitats for various species and the appropriate balance of habitats to be maintained. Many individuals and timber industry groups are concerned that the Forest may be unnecessarily setting aside large amounts of land for species that may be more adaptable than thought. Many comments received on the DEIS stated that those wildlife species adversely affected by timber activities would be protected in lands currently unavailable to timber production, such as Wildernesses and Special Interest Areas

Numerous other comments received on the DEIS expressed concerns that timber management activities have detrimental effects on wildlife species that are dependent on mature conifer forests Cavity-nesting species are harmed by the removal of dead and defective trees that provide snags and hollow trees. Wildlife species that use mature deciduous-mix habitat could be adversely affected by the conversion of hardwood stands to conifer-dominant stands.

Wildlife habitats are closely related to the management of other resources with some wildlife benefiting from vegetation disturbance and others not. Elk and deer can benefit from the forage areas created by timber clearcut units. Other species are dependent on mature or older forest habitat Undeveloped areas, Wildernesses, Special Interest Areas and scenic viewsheds can benefit species that need mature forest habitat Some species require habitat that occurs in younger successional stages, harvesting timber on rotations of about 100 years in riparian areas can provide that condition But this, in turn, can have adverse effects on fish habitat.

In some cases, habitats can be shared by different species. For example, the marten can use the same habitat as the pileated woodpecker and the spotted owl. However, since the distribution and size of habitats vary for individual species, specific designations of habitat are often required for each species.

The Forest selected certain species to serve as Management Indicator Species (MIS)-- species whose population changes are believed to indicate the effects of management activities on habitats The MIS include spotted owl for old growth habitat, marten and pileated woodpecker for mature conifer, elk for big game habitat conditions, and all T&E species

Fluctuations in the levels of each indicator species are assessed to determine the effects of alternatives on the habitats represented by the species The changes are measured by a Habitat Capability Index (HCI) that relates the amount and condition of habitat to population levels. The response of each alternative to this issue can be evaluated by considering the habitats available for each species and the total acres of habitat improvements planned.

6. Recreation

What diversity of recreational opportunities will be provided?

A broad spectrum of outdoor recreation opportunities should be provided by national forests to meet the variety of recreation demands of the public, while being consistent with the needs and demands for other major forest resources Many recreation opportunities are compatible, or even dependent on, the management of other resources For example, roads constructed for timber sales may provide access to dispersed recreation opportunities, and campgrounds are generally located in areas not suitable for timber management On the other hand, some recreation activities conflict with other resources--motorized recreation use is usually incompatible with pedestrian recreation use and management of certain wildlife habitats, provision of unroaded, undeveloped recreation areas removes land from timber management and from motorized recreational use.

The Siuslaw, because of its location at a forest-ocean interface, its unparalleled coastal settings and its closeness to the major urban areas of the Willamette Valley, has a unique potential among national forests in the United States to provide a variety of high-quality recreation opportunities The primary issue is providing the appropriate level of various recreation opportunities while recognizing the importance of the present developed recreation sites on the coast and the highly productive timber land on the inland portions of the Forest

Several environmental groups are concerned that the Forest should reflect an Oregon economy that is changing from one that is resource-based to one that will be based on service, tourism and diverse manufacturing They feel the Forest should be protecting more of its natural heritage and providing less timber for commodity purposes. The Sierra Club is very concerned that the Forest provide hiking opportunities in undeveloped areas, which are not provided in the local area by either BLM or state forest lands

Timber interests, on the other hand, feel the Siuslaw should be managed with a strong emphasis on timber production since the Forest has some of the most productive timber growing land in the country They feel that enough land has been set aside for recreation purposes through designation of Wildernesses, Cascade Head Scenic-Research Area and the existing Special Interest Areas.

Recreation has been treated in four separate issues. developed recreation opportunities (Issue 25), undeveloped area opportunities (Issue 11), semiprimitive motorized opportunities (Issue 8 and 17), and Special Interest Areas (Issue 7).

The demand for developed recreation is increasing, but since the anticipated demand for developed recreation can be met with minimal effects on other resources, the opportunities provided do not vary by alternative (see Issue 25)

Based on projections from the State Comprehensive Outdoor Recreation Plan (SCORP) of 1978 and the Pacific Northwest Regional Guide (1984), the Forest's capacity for semiprimitive nonmotorized (SPNM) recreation will be inadequate to meet demand in the 1990s. Opportunities for SPNM recreation are available in unroaded areas of at least 2500 acres that exhibit little evidence of human disturbance. Established Wilderness, as well as several undeveloped areas, are also suitable. The opportunities can be increased in two ways: 1) by maintaining SPNM conditions in undeveloped areas, and 2) by building trails in undeveloped areas or Wildernesses, since steep slopes and thick brush limit cross-country travel without trails The first has major implications to other resources, and the second more minor ones.

Demand for semiprimitive motorized (SPM) recreation opportunities, i.e., opportunities for use of off-road vehicles (ORVs) in a relatively primitive setting, is higher than the supply capability on the Forest and is expected to increase. Only a few areas on the Forest offer suitable places for ORV use--primarily the sand areas on the Oregon Dunes National Recreation Area (NRA), Sand Lake and Sutton Recreation Area.

Since provisions for developed and for SPM recreation are treated the same in all alternatives, the responsiveness of the alternatives to the recreation diversity issue can be evaluated by considering the variety of Recreation Opportunity Spectrum (ROS) acres provided and the percent of demand for SPNM opportunities that is met.

7. Special Interest Areas

How much of the Forest will be managed as Special Interest Areas (SIAs)?

This issue is part of the issue dealing with the diversity of recreational opportunities provided on the Forest (Issue 6). Classified under the authority of federal regulations, 36 CFR 294.1, SIAs possess unusual scenic, historic, research, or other special values. There is good road access to most of these areas, and the areas are managed principally for recreation in a nearly natural condition.

The Forest has two designated SIAs, Cape Perpetua (1,000 acres) and Marys Peak (924 acres), and two potential areas, Mt Hebo (1,680 acres) and Kentucky Falls (2,850 acres) There is potential to enlarge the Cape Perpetua SIA to 2,780 acres.

Designation of land for a SIA affects several resources, since the land must be managed in a nearly natural condition. Timber production is excluded and recreation developments must be designed to be compatible with the unique natural features of the areas. In addition to the special values protected, SIAs maintain habitat for wildlife, and protect fish habitat, watersheds, and scenery.

Designation of all potential SIAs received widespread support in comments on the DEIS The Sierra Club and Wilderness Society would like to see the potential Kentucky Falls area enlarged to include land along the North Fork of the Smith River.

Responsiveness of the alternatives to this issue can be evaluated by considering the number and size of SIAs recommended for designation.

8. Recreation Areas

What mix of recreational opportunities will be provided in the Sutton and Sand Lake areas and will it be compatible with wildlife and plant habitat?

This issue is part of the issue dealing with the diversity of recreational opportunities provided on the Forest. Sutton (2,700 acres) and Sand Lake (1,100 acres) are recreation complexes which consist primarily of sand beaches and dunes, offering a variety of coastal recreation opportunities. Portions of each area provide winter and nesting habitat for the snowy plover and are used occasionally by the bald eagle and osprey. A deflation plain on Sutton provides habitat for a sensitive club moss, *Lycopodium*. The northeast portion of Sand Lake contains a potential Research Natural Area, providing an example of a parabola dune ecosystem.

Open sand areas, suitable and desirable to ORV users, are limited on the Forest and are in high demand. Currently, some portions of the Sutton and Sand Lake areas are open to ORV use, or provide access for such use; some portions are closed to ORV use to protect sensitive plants and animals and provide nonmotorized recreation opportunities

The issue about the future management of Sutton is primarily a local one, although abundant comment on the DEIS indicated the issue is highly controversial Many people, including several environmental groups, recommend the Sutton Area remain undeveloped to discourage heavy recreation use and be entirely closed to ORVs Some feel dogs should be leashed to minimize disturbance to bird life. ORV use can adversely affect plant and animal habitats, but many people view this type of use as a legitimate use of National Forest land and desire equal space with pedestrian uses.

Management direction for Sand Lake was described in the Sand Lake Management Plan of 1980, a cooperative effort of the Forest Service, Tillamook County and the State of Oregon There is no current need to change that plan based on comments received on the DEIS. All alternatives to the Forest Plan adopt the Sand Lake Plan, however, the number of acres to be managed for recreation purposes is an issue

Resolution of this issue involves recommendations for the future management of the two areas. The key indicators for comparing alternatives are:

- Sutton - areas open and closed to ORV use, and the level of developed and dispersed recreational development, such as trails and parking lots

- Sand Lake - the size of the area managed for recreational purposes.

9. Visual Quality

Which areas of the Forest will be managed to maintain or enhance visual quality?

Landscapes seen from areas that are heavily used by the public, such as roads, rivers, or developed recreation sites, are called scenic viewsheds Viewsheds are more sensitive than other areas because the scenic quality may significantly affect the recreational experience of those viewing it

On the basis of criteria contained in the Forest Service's visual management handbook, approximately 13% of the Forest (located in 33 viewsheds) is moderately to highly sensitive Without careful design of management activities in these viewsheds, the visual quality could be diminished

Timber harvest activities, including road construction, can change the visual quality of viewsheds. The visual resource management issue involves determining how much and where scenic values should be protected, given costs and impacts on other activities

Many people find changes to the natural setting objectionable and feel that most or all of the viewsheds should be maintained in a natural character. From a different perspective, some people feel that reducing timber harvests on major portions of the Forest is not justified by the resulting harvest volume reduction These people feel that there are no real opportunities to apply special visual management to most viewsheds, since the Forest and private land ownerships are so intermixed. Many advocates of visual protection clarified, through comments on the DEIS or meetings after the DEIS, that viewsheds should not be protected at the expense of watershed protection or fish and wildlife habitat protection.

Protecting visual quality requires careful management of timber activities, including rotation lengths, harvest unit design, harvest methods, and species mix. This may reduce timber outputs and increase costs. However, since this lessens the intensity of ground-disturbing activities, it may benefit fish, wildlife, and recreation.

Responsiveness of the alternatives to this issue is reflected by the visual objectives assigned to the sensitive viewsheds.

10. Wilderness

How will the three Wildernesses on the Forest be managed?

In 1984, Congress established three Wildernesses on the Forest: Cummins Creek, Drift Creek, and Rock Creek, totaling about 22,200 acres. These Wildernesses provide opportunities for Semiprimitive Nonmotorized (SPNM) recreation. The areas were either too small or were located too close to roads to qualify for Primitive recreation opportunities Only about 11 miles of trail exist on two of the Wildernesses. Rock Creek Wilderness has no trails. The issue addressed in the FEIS concerns the future management of the three Wildernesses

Visitor use of the areas is severely restricted due to dense brushy conditions. Recreation capacity of the Wildernesses is directly related to the miles of trail present. The present capacity is estimated to be relatively low. Demand for SPNM opportunities is expected to exceed capacity within the next 10 years, if no additional trail developments are provided, either in the Wildernesses or in other unroaded areas of the Forest

Individuals expressed a range of attitudes about wilderness management through comments on the DEIS. Some feel no trails should be developed in Cummins or Rock Creek Wildernesses since their designation was sought primarily for protection of fish habitats. There is a desire among some wilderness enthusiasts for the present condition of the areas to remain unchanged to preserve the wilderness character for future generations. Others, including local environmental groups, feel trails should be developed in the Wildernesses, including Rock Creek, to allow the public to see and enjoy the areas.

Management options in the Wildernesses range from closure of existing trails to development of new trails and trailhead parking areas Trail design and location can influence the distribution and intensity of visitor use within a Wilderness, and thereby, the level of wilderness experience offered

Responsiveness of the alternatives to this issue can be evaluated by considering the trail management planned for the Wildernesses

11. Undeveloped Areas

Which areas of the Forest will be managed as undeveloped areas?

Besides Wilderness areas, the Forest contains undeveloped areas that could also provide SPNM recreation opportunities Undeveloped areas do not contain roads, are essentially natural, and are 2,500 acres or larger. Currently there are seven areas identified as "roadless" in the Roadless Area Review and Evaluation II (RARE II) process, totaling 46,800 acres outside of Wilderness; boundaries and current acreages are displayed in Appendix C The RARE II process recommended that six of the seven "roadless" areas be made available for nonwilderness multiple-uses

An additional 4,400 acres is available as roaded lands adjacent to the RARE II roadless areas which could revert to an undeveloped condition if present management were discontinued Also, about 3,000 acres in the North Fork Smith River area could be maintained as an undeveloped area. The issue concerns allocation and management of the undeveloped areas, i e , whether to make these areas available for timber production and other compatible resource uses or maintain them as undeveloped, roadless areas

Public comment on the DEIS indicates strong disagreement about the future management of unroaded areas Timber interests feel that removing more land from the timber base for undeveloped recreation is unnecessary and unjustified, believing that opportunities provided in Wildernesses and Oregon Dunes NRA are adequate to meet future demands

Individuals on the other side of the issue feel that unroaded opportunities are dwindling as new roads are built in previously undeveloped areas Most of the environmental groups that commented on the DEIS see a need to retain all existing undeveloped areas for future generations Many are concerned about the effects of road building and logging on unstable slopes in the Wassen Creek area The Oregon Department of Parks & Recreation is concerned that a reduction in lands available for SPNM recreation will pose a serious loss in diversity of opportunities and not meet projected demands, especially for the northwestern part of the state. Many groups and people would like the undeveloped portions of the Oregon Dunes NRA preserved as undeveloped with ORVs excluded to protect sensitive plant and animal species

Undeveloped areas provide protection for watersheds, fish streams and habitats for wildlife dependent on mature forest conditions Most of the unroaded areas are located on or near suitable spotted owl habitat The Forest can provide undeveloped recreation opportunities by allocating the unroaded areas to management that will maintain their undeveloped condition Such management may be for the primary purpose of recreation or for maintaining some old-growth habitat

Four of the undeveloped areas are on the Oregon Dunes NRA. These areas will be maintained in undeveloped condition in all alternatives to be consistent with the direction in the Oregon Dunes NRA Management Plan (1979) The areas will be evaluated for future management during review of the Oregon Dunes Plan, scheduled to occur within 3 years of Forest plan implementation

Responsiveness of the alternatives to this issue can be evaluated by considering the location and size of the areas outside of the Oregon Dunes NRA that are managed as undeveloped areas

12. Research Opportunities

Which areas on the Forest will be reserved for Research Natural Areas, and how will management direction for the Cascade Head Experimental Forest be included in the Forest Plan?

Research Natural Areas (RNAs) are physical or biological units maintained in a natural condition for the purpose of conducting scientific research. Baseline data collected from these sites can be used to compare and evaluate the impact of human activities on altered sites. To maintain the natural conditions necessary for RNAs, developments such as roads and timber harvest are excluded. The areas supplement the needs of some wildlife and fish habitats, but are too small to have major effects on other resources

Flynn Creek and Neskowin Crest RNAs, totaling 1,900 acres, have already been established by the Chief of the Forest Service. The Pacific Northwest Experiment Station of the Forest Service has identified five other areas, totalling 8,330 acres, which would fulfill national RNA needs: Sand Lake, Cummins/ Gwynn Creeks, Reneke Creek, Threemile Creek, and Tenmile Creek. Three of the potential RNAs (7,600 acres) are located in areas where these developments are prohibited by law, i.e , Wilderness and Oregon Dunes NRA.

The Oregon Natural Heritage Program has identified at least four other areas for potential study: Wassen Creek, Lily Lake, Euchre Mountain, and Table Mountain.

Several individuals and environmental groups are interested in preserving examples of different ecosystems on the Forest and feel restrictions on timber production and motorized recreation use are well-justified Others question the legitimacy of establishing RNAs, believing that advocates want them as additional Wilderness areas.

Research in RNAs contrasts with most scientific research conducted on the Forest, which focuses on the effects of human-caused changes in natural systems (manipulative research) At present, areas for manipulative research are not as limited on the Forest as those involving natural systems. The Cascade Head Experimental Forest (CHEF) (11,900 acres) was established in 1934 to provide land for manipulative research related to tree growth in spruce-hemlock forest stands

Management direction contained in the current plan for CHEF will be incorporated without change in the Forest Plan. All alternatives will allocate the same number of acres to the CHEF Management Area.

Recommendations for the two potential RNAs in the Oregon Dunes NRA will be deferred until the Oregon Dunes Management Plan of 1979 is reviewed. This will allow more opportunity for the various public interest groups to participate in the decison-making process and analysis of more site-specific information. The Dunes Plan revision is scheduled to occur within 3 years of Forest Plan implementation.

The responsiveness of the alternatives to this issue can be evaluated by considering the number and size of the three remaining potential areas to be recommended for RNA establishment.

13. Minerals and Energy

How much and where will mineral resources be developed and what management direction is needed for leasing and development of energy minerals?

The issue concerns the amount of land that would be available for oil and gas leasing and for common mineral extraction The few people who expressed concerns about this issue in the DEIS have divergent opinions. Some feel the Forest should not allow any mining or oil leases, while others feel the Forest needs to recognize minerals as a multiple-use resource to be managed on a par with other resources.

There are no known locatable minerals (hard rock) on the Forest, and the probability of finding valuable deposits is considered low. Over 300,000 acres of the Forest were under lease for oil and gas as late as 1987. Recently, most leases were relinguished. No significant amount of oil and gas exploration has taken place, and none is foreseen in the immediate future Rock and gravel for road surfacing is extracted from 22 quarries on the Forest.

Mineral exploration, development, and production is integrated with other resources through use of reasonable measures for the protection of surface resources Sources of mineral resources will be located by industry through self-initiation under the 1872 Mining Laws. Except where prescribed by law or regulation, access restrictions for management areas do not constitute withdrawals from mineral entry.

The responsiveness of the alternatives to this issue can be evaluated by considering the amount of land withdrawn from oil and gas leasing or with high restrictions and the accessibility for mineral exploration and development For example, alternatives in which large blocks of land are not accessible would have more restrictions on exploration and development than would alternatives in which most acres are accessible.

14. Local Communities

How will management of Forest resources affect local communities?

Forest management activities and resulting outputs influence job opportunities, incomes, and the quality of life of residents in local communities There is concern that changes in Forest outputs and activities may adversely affect local economies and community stability.

Siuslaw National Forest resources support several local industries including lumber and wood products, commercial fishing, and tourism The current (1984-1988) levels of timber harvest, wildlife and fish populations, and recreational use provide an estimated 8,490 jobs in the eight counties where the Forest is located These jobs include 2,100 in the lumber and wood products industries and 4,200 in trade and service industries (See FEIS, Appendix B, "Social and Economic Impact Analysis.")

In addition to providing resources for local industries, 25% of receipts from the sale of Forest resources is paid to counties to finance schools and roads From Fiscal Years 1984 to 1988, an average of $12 million (in 1982 dollars) was paid annually to the eight counties. In addition, a portion of the annual Forest operating budget, averaging $24 million in Fiscal Years 1984 to 1988, was spent annually in the local area on supplies, services, and salaries Payments to counties and Forest Service expenditures provide an estimated 950 jobs, primarily in the trade and service industries and in local and federal government

People employed by the timber and wood products industries and those who benefit from that source of income feel the Forest should maintain or increase the emphasis on commodity production to ensure community stability. In recent years, the timber industry has experienced a comeback from the recession of the early 1980s, and those who have benefited would like to see timber-related incomes remain high There is much local concern that revenues from timber are needed to finance roads and schools or else property taxes would rise

The Forest also has other resources that are important to many local residents, though the resources do not provide direct income to the counties. Several individuals expressed their concerns through comments on the DEIS that the Forest should place a high emphasis on maintaining the amenity resources, such as clean water, wildlife and fish habitats, visual quality and recreation. These people feel that the provision of jobs should not be more important than protection of the Forest environment. Many local residents value the opportunity to use the Forest for firewood cutting, hunting, fishing and recreation.

Production of resources valued by some groups may conflict with management of resources valued by others. For example, providing timber for the lumber and wood products industry could remove some land from undeveloped recreation opportunities and damage some fish and wildlife habitats. In other cases, management of resources is complementary. For example, timber management provides access roads for hunting and dispersed recreation, and can benefit some species of wildlife that use created openings to forage

The alternatives explore the effects of variations of Forest Service activities on local communities. Some alternatives would provide high levels of timber, which may support jobs in the lumber and wood products industries and increase payments to counties. Some alternatives would provide high levels of recreation, visual quality, and wildlife and fish habitat, which support jobs and lifestyles dependent on tourism and fishing, as well as preserving amenity values

Responsiveness of the alternatives to this issue can be evaluated by considering the changes in employment and community income, and amount of payments to counties.

15. Economic Value

What economic value will Forest resources generate in the future?

There is national and local concern about the economic value of Forest outputs in terms of net receipts to the Forest Service, as well as long-term investment value The issue involves not only how much money Forest resources generate but also how efficiently those resources are produced.

This issue is closely related to the balance of commodity and amenity resources to be provided. Some people feel commodity resources on the Siuslaw should be managed to maximize net receipts to provide jobs and income to local communities, as well as monies to the U S. Treasury. Other people are concerned that the Forest Service places too much importance on maintenance of high receipts through intensive timber management without enough knowledge of the long-term effects on other resources.

Annual receipts from Forest outputs exceed costs to manage the Forest In Fiscal Years 1984 to 1988 annual receipts averaged $47 million (in 1982 dollars), of which 99% were from timber sales. Between fiscal years 1984 and 1988 the total cost of operating the Forest averaged $24 million per year of which over 62% was for timber management and road construction

Because most of the net monetary value of the Siuslaw National Forest comes from timber, management objectives which would significantly change the level of timber harvest would also significantly change the overall present net value (PNV) of the Forest. In addition, changes in the types of timber activities will influence the efficiency of Forest management Generally, timber has a high net dollar value and, on an economic basis, out competes other resources

Responsiveness of the alternatives to this issue can be evaluated by considering the PNV, which is a relative indicator of economic efficiency, and total cash flow (net receipts) PNV measures the priced benefits and costs of all management practices and activities, while cash flow indicates projected actual dollar returns above operating costs

Issues Having the Same Resolution for All Alternatives

16. Mapleton Court Decision

How will the Forest comply with the U.S. District Court Decision concerning the Mapleton Ranger District?

As a result of a lawsuit filed in the U.S. District Court on July 29, 1983 by the National Wildlife Federation and two other groups, the Mapleton District timber sales program has been limited The plaintiffs prevailed on some of their National Environmental Policy Act (NEPA) claims, and the Mapleton District was enjoined from proceeding with its timber sale program in April of 1984, except for a small amount (5 MMBF) authorized by the judgment. Subsequently, Congress passed legislation in 1985 (P.L. 99-88, August 15) which allowed the sale of some buyback and defaulted timber on the Mapleton District. Congress later passed legislation in 1988 (P.L. 100-446, September 27) which allowed the District to offer new sales of 90 MMBF in Fiscal Year 1989. The recently passed Appropriation bill for FY 1990, Sect 318 (P.L. 101-121, October 1989) anticipates the District will contribute timber sale volume to the targets established for FY 1990

In complying with the intent of the court's judgment, the Forest examined the issues raised in the lawsuit and contained in the final opinion An analysis of the effects of the alternatives on the Mapleton District is provided in Appendix E of this FEIS

17. Cultural Resources

What standards will be used to guide the management of cultural resources?

Federal laws and regulations require protection of significant cultural and historical resources on public lands for future generations (Antiquities Acts of 1906 and 1974; Historic Preservation Act of 1966 and 1980 amendment)

Forest Plan alternatives have varying levels of site-disturbing activities, but standards for the protection of cultural resources are the same The Forestwide Standards and Guidelines, applicable to all alternatives, specify procedures for complying with all mandates of federal law, acts, executive orders and federal regulations Cultural resource inventories will be conducted for proposed ground-disturbing activities. Sites will be evaluated for their potential to be nominated to the National Register of Historic Places. Eligible sites will be nominated to the Register and management plans prepared to ensure their protection. Ineligible sites will be evaluated for their potential research or interpretive values Interpretive plans will be prepared for sites selected for public use

18. Congressionally Established Areas

How will the management direction for congressionally established areas other than Wilderness (i.e., Oregon Dunes National Recreation Area and Cascade Head Scenic and Research Area) be included in the Forest Plan?

Management direction in the plans for each of these areas will be incorporated without change in the Forest Plan. New issues concerning the management of the Oregon Dunes NRA, such as the public concern over the amount of land open and closed to ORV use, will be evaluated during the scheduled revision of the Oregon Dunes NRA Management Plan (see discussion of this issue in Appendix A)

When changes are made to the existing plans, the Forest Plan will be amended to reflect the new management direction

19. Land Ownership Adjustment

What land ownership adjustments will be made to support resource management goals?

A land ownership adjustment plan for the Forest was developed in 1967, and updated in 1978 and 1979, to establish guidance for land exchanges, land purchases, land donations and land transfers with other Federal agencies. The most recent adjustment plan is described in the Forest Plan, Appendix C.

Forest Plan alternatives will not affect the land purchase program which is authorized and funded annually by Congress Land exchange opportunities are also not expected to vary with Plan alternatives, though the need for land exchanges and the amount of available land for exchange will vary by alternative.

20. Corridors, Electronic Sites, and Facilities

What areas will be suitable for utility corridors, electronic sites, and roads; and how will they be designed, developed and maintained?

The existing utility corridors and electronic sites will be maintained in all alternatives Proposals for future utility lines will be analyzed by an interagency group after consideration of the existing corridors Potential electronic sites are the same for all alternatives

Descriptions of the corridors and sites are provided in the FEIS, Chapters II and III Management direction is described in the Forest Plan, Chapter IV "Standards and Guidelines."

The roads issue is primarily a management concern about the need for consistency between resource objectives and road design to ensure cost effectiveness Locations of roads will vary by alternative depending on the areas selected for timber production and undeveloped recreation, however, the overall standards for road design and maintenance would be the same in all alternatives. Roads will be designed and maintained to the minimum standard required for the safety of users, for intended uses, and to meet all the resource objectives for an area Specific management direction for roads is described in the Forest Plan, Chapter IV "Standards and Guidelines."

21. American Indian Religious Freedom

How will Native American Indian religious freedom be assured on National Forest Land?

Forest Service policy requires that the setting and location of sites once important for religious purposes are protected from disturbance and are available for use by American Indians Forest personnel will continue to cooperate with the Tribes in identifying and maintaining traditional uses of the Forest.

22. Soil Productivity

How will soil productivity be maintained?

Federal regulations based on the National Forest Management Act of 1976 require Forests to conserve soil and water resources and not allow significant or permanent impairment of the productivity of the land. Timber harvesting and slash burning can reduce the soil productivity. For that reason, specific prevention and mitigation measures were developed to protect soil productivity and would apply to all alternatives The measures are described in the Forest-wide standards and guidelines (Forest Plan, Chapter IV) and include reference to Best Management Practices, which are described in FEIS, Appendix J.

23. Herbicide Use

How will herbicides be used?

Prior to 1984 herbicides were used on the Forest to control brush and trees that competed with commercially valuable trees However, some members of the public feel the use of herbicides may pose long-term adverse environmental effects and human health risks A court injunction was issued in 1984 that banned the Forest Service from using herbicides to manage vegetation on National Forests in Oregon and Washington

The issue grew beyond the scope of the Forest Plan It has been dealt with in separate environmental analyses and NEPA documents at the Regional level The court injunction was lifted in May 1989, however, any additional consideration of this issue will be through similar processes at the Regional level, or through Forest environmental analyses tiered to the Pacific Northwest Region's FEIS for Managing Competing and Unwanted Vegetation (USDA Forest Service 1988b)

During implementation of the Forest Plan, the Forest will comply with the Record of Decision issued by the Regional Forester in November 1988 The decision provides for use of all vegetation management techniques, including herbicides, but allows for use of herbicide only when other methods are ineffective or will increase project costs unreasonably Emphasis must be given to prevention and early treatment of unwanted vegetation, as well as, to full and ongoing public participation in all aspects of project planning and implementation

24. Wild and Scenic Rivers

What rivers are eligible for Wild and Scenic River classification and how will these areas be managed?

Of the rivers listed on the National Park Service Nationwide Rivers Inventory, three on the Siuslaw National Forest (the Alsea, Nestucca, and Siuslaw) were determined to be eligible as potential "Recreation" rivers, but not eligible as "Wild" or "Scenic" rivers because of the amount of adjacent development. One of the rivers on the list, the Little Nestucca, was found to be ineligible.

The Nestucca and Alsea Rivers were considered but not included in the final Oregon Omnibus Rivers Act of 1988. The Siuslaw River was not considered in the legislation.

Since the DEIS, the Oregon Rivers Council requested six additional rivers be studied for Wild and Scenic River status. Other public input and additional Forest Service review identified another three rivers to be studied. Of the nine rivers identified as having potential, segments of five were studied to determine eligibility. The other four rivers were not studied because they have less than 20% frontage along Forest land. Results of the eligibility studies indicated 4 of the 5 newly studied rivers were eligible as potential "Recreation" and/or "Scenic" rivers. One river, Three Rivers, was found to be ineligible.

All alternatives will maintain the eligibility and potential classification of all rivers determined to be eligible Forest-wide standards and guidelines which specify the management direction for lands adjacent the rivers are described in the Forest Plan, Chapter IV. The classification of "Recreation" rivers allows a "full range of agricultural and forestry uses", therefore, few restrictions on activities considered in the range of alternatives are required

Suitability determinations, which must be made for all the eligible rivers, will be conducted during Plan implementation.

25. Developed Recreation

How many developed recreation opportunities will be provided and how will they be managed?

The Forest presently has 88 developed recreation sites, which include campgrounds, picnic grounds, observation sites and a visitor center, with a combined capacity of 9,660 people at one time Most of the developed sites are located along the Pacific Coast on Highway 101 A few are located along the highways between the Coast and the Willamette Valley and others are located in the interior of the Forest

All alternatives provide for construction of enough new developed recreation sites to keep pace with demand so that developed recreational opportunities do not vary by alternative. Management direction for planning, constructing and maintaining developed sites will be the same for all alternatives and is described in the Forest Plan, Chapter IV "Forest-wide Standards and Guidelines " In general, the sites will be managed to provide full-service maintenance, added conveniences and improved visitor information programs.

Indicators of Responsiveness

The quantitative measure of the Forest's ability to respond to each ICO is referred to as an **indicator**. Indicators include the outputs, uses, or conditions that can be measured and described to judge how well the various alternatives resolve issues Table I-1 provides a summary of the indicators for each of the ICOs that had alternatives designed to specifically resolve the issues

Table I-1. Indicators of Responsiveness to ICOs

ICOs/Indicator	UNIT OF MEASURE
1. TIMBER PRODUCTION	
Land Suitable for Timber Production	M Acres
Allowable Sale Quantity, Average annual	MMCF
Allowable Sale Quantity, 1st Decade	MMBF
Long-Term Sustained Yield (LTSYC)	MMCF
Percent Acres by Rotation Length	Percent
Hardwood Volume in ASQ	MMCF
2. OLD-GROWTH FOREST	
Retained Acres, 1st Decade	M Acres
Retained Acres, 5th Decade	M Acres
Rate of Harvest, 1st Decade	M Acres
3. WATERSHEDS	
Protection of Unstable Slopes	Mgmt practices
Estimated Landslides Associated with Harvesting	Number
Estimated Annual Sediment Produced	M Cu Yd
Allowable Harvest in a Watershed per Decade	% watershed acres
Protection of Municipal Watersheds	Mgmt practices
4. FISH HABITAT	
Protection of Riparian Areas -	Mgmt practices
Relative Amount of Riparian Area Protected	Percent
Avg Buffer Width by Stream Class	Feet
Index of Fish Habitat Capability (CSHCI)(1)	HCI
Change in Habitat Capability, Present to 5th Decade	% change
5. WILDLIFE AND T&E SPECIES	
Habitat for	
Spotted Owl	M Acres
Mature Conifer species (Marten, Pileated Woodpecker)	M Acres
Elk Populations	Individuals
Dead & Defective Tree Habitat	% biol potential
Mature Deciduous-Mix Habitat	M Acres
Bald Eagle Sites	Number & Acres
Habitat Improvements	Acres
6. RECREATION	
ROS Classes Provided	M Acres
Percent of Demand for SPNM(2) that is Met	%
7. SPECIAL INTEREST AREAS	
SIAs Recommended for Designation	Number M Acres
8. SUTTON & SAND LAKE RECREATION	
Sutton	
ORV areas open	Acres
ORV areas closed	Acres
Recreation development	Types & PAOT(3)
Sand Lake	
Size of recreation area	M Acres

ICOs/Indicator	UNIT OF MEASURE
9. VISUAL QUALITY	
VQ Objectives for sensitive viewsheds	VQO
10. WILDERNESS	
Trail management	Miles
11. UNDEVELOPED AREAS	
Specific Unroaded Areas Maintained	Number
Unroaded Condition Maintained	M Acres
12. RESEARCH OPPORTUNITIES	
Research Natural Areas Recommended for Designation	Number
13. MINERALS AND ENERGY	
Area Accessible to Leasing with Few Restrictions	M Acres
14. LOCAL COMMUNITIES	
Employment Opportunities	Number of jobs
Local Income	MM$
Payments to Counties	MM$
15. ECONOMIC VALUES	
Total Cash Flow, 1st Decade	MM$
Total Cash Flow, 5th Decade	MM$
Present Net Value	MM$

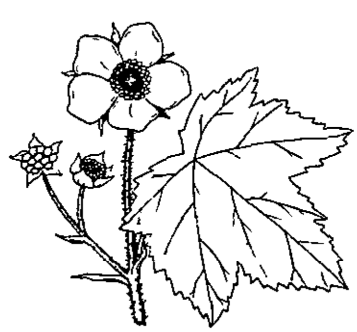
(1) Coho Smolt Habitat Capability Index (CSHCI) is a relative index of the potential of stream habitat to produce coho salmon smolts

(2) Semiprimitive Nonmotorized (SPNM) is one class of recreation opportunity defined by the Recreation Opportunity Spectrum (ROS)

(3) Persons At One Time (PAOT) is a measure of the recreation capacity of a site

PLANNING RECORDS

All the documents and files that chronicle the planning process (including the environmental analysis) of the Siuslaw National Forest are available for review at the Supervisor's Office, 4077 SW Research Way, Corvallis, Oregon 97333 These documents and files, or "planning records", contain the detailed information and decisions used in developing the FEIS and the Forest Plan The planning records are referenced at appropriate points in the text, in the appendices of this FEIS, and in the Forest Plan.



CHAPTER II
Alternatives

CHAPTER II

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter is the heart of the Environmental Impact Statement (EIS). Alternate ways of managing the Forest (the alternatives) are presented with their resource outputs and major environmental effects. How these alternatives were developed and how they compare with each other and the way the Forest is presently being managed are also discussed.

This chapter consists of three parts - a summary of the analysis conducted while developing the alternatives (a much more detailed presentation of this analysis is in Appendix B); a description of the objective, management emphasis, and consequences of each alternative, and a comparison of the alternatives. This comparison, in both narrative and tables, shows the response to issues, emphasized land uses, resource outputs, environmental effects, tradeoffs between resources, and economic costs and benefits that would occur with each alternative Following the tables displaying this information are tables and a narrative which compare differences among alternatives

CHANGES BETWEEN DRAFT AND FINAL

After documentation of the alternative analysis in the DEIS, and identification of the Forest Service Preferred Alternative, the DEIS and Proposed Forest Plan documents were released for public review. (The public review process and comments received during the review period are described in FEIS, Chapter I and Appendix A) Once the public comment period had closed and analysis of content of responses was complete, the Forest interdisciplinary team (IDT) explored alternative ways to respond to concerns of the public

Next IDT members agreed to propose several changes in land allocations, management prescriptions, and standards and guidelines (S&Gs) they felt would best address both the public's concerns and needs to provide balanced management of the Forest. The IDT then revised the alternatives, in particular DEIS Alternative E(PA) and the Forest Plan, to incorporate these proposals, and evaluated the effects of the revisions The revised Plan and FEIS were submitted to the Regional Forester for review

Following is a summary of revisions made between draft and final EIS to respond to concerns expressed during the public comment period These revisions included fine-tuning objectives, design, and analysis used to develop the original alternatives

General Changes

- Alternative NC, the "No Change" alternative suggested by the Northwest Forest Resource Council, has been incorporated in the FEIS from the Supplement to the DEIS This alternative represents a continuation of the Timber Resource Plan of 1979, as amended by the 1984 Oregon Wilderness Act, without adjustments to either meet NFMA regulations or comply with the Pacific Northwest Regional Guide's spotted owl amendment

- The Pacific Northwest Region's FEIS for Managing Competing and Unwanted Vegetation was released after the DEIS. Changes were made to management direction to be consistent with the guidelines presented in the FEIS and to reflect a reduced reliance on herbicide use.

- Alternative E(Departure) received few public comments and was not needed to improve the range of alternatives, so it was dropped from the FEIS.

- A summary of the analysis of Management Requirements (MRs) having significant effects on other resources is included in "Management Requirements" in this chapter. Details are presented in Appendix H, which is a revision of Appendix K, Supplement to the DEIS.

- More details on rivers eligible for Wild and Scenic status have been included

- The proposed Marys Peak Scenic-Botanical Area was officially established by the Regional Forester

- As a result of public input and management concerns over protection of water and related soil and fishery resources, current management practices designed to protect and enhance water quality are highlighted more They are described briefly in the Forest-wide S&Gs concerning Best Management Practices (BMPs) in Forest Plan, Chapter IV and in greater detail in FEIS, Appendix J. This appendix has been included as mitigation common to all alternatives, and as a response to input to the DEIS.

- MRs were included in the DEIS for mink (mature riparian habitat), mountain quail (grass-forb habitat), and sharp-shinned hawk (representing a guild of species dependent on mature deciduous-mix habitat). Subsequently, a Regional process was established to screen the selection of species which appeared to be susceptible to extinction due to small numbers and limited geographic distribution It was determined that population viability of the above species was not a concern during the plan period or the next 50 years because the species were not as strongly associated with the specific habitats as previously thought Therefore, MRs for mink, quail and sharp-shinned hawk are not included in the FEIS. Additional information regarding the screening process is available in Region 6 document "A Process for Screening Viability Concerns, July 18, 1986", and in planning records at the Forest Supervisor's Office, Corvallis, Oregon.

- The above species were dropped as management indicator species because of their use of a broader range of habitats than appropriate for such designation.

- Two potential RNAs in the Oregon Dunes NRA have been withdrawn from consideration at this time.

- The emphasis of Management Area 2 has been changed from providing old growth for wildlife habitat to preserving amenity values and old-growth ecosystems

Changes in Technical Analysis for All Alternatives

The following are revisions and changes made in the analysis process for all alternatives:

- Yield tables used to estimate timber outputs from existing timber stands were updated to reflect growth through the midpoint of the first planning period, 1994.

- Stand ages for all timber stands modeled in the planning model, FORPLAN, were updated to 1990, the projected year for implementation of the Plan. The model data base was also revised to reflect harvest activity since the last update in 1985 through 1989

- The conversion factor used to calculate board feet of timber output from the cubic feet modeled in FORPLAN was found to be in error and was corrected The average Forest-wide factor increased from 4.7 to about 5 4 BF per CF

- Errors in the percentage of hardwood volume in existing timber stands and timber yield reduction due to wildlife tree management were corrected. A number of other changes were made in managed timber yield tables relative to commercial thinning activities, fertilization, genetic gains, reductions (from root rot and defect and breakage), standing inventory, and timber revenues

- The Fish Habitat Index Model was modified to limit influence of upland areas on large woody debris levels and to increase the following: existing smolt habitat capability, reliance on habitat quality as determined by large woody debris levels, effectiveness of headwall leave areas in preventing landslides, efficiency of leaving streamside buffers, and length of the recovery period before large woody debris is again produced in riparian areas after logging.

- The practice of leaving vegetation areas on steep headwalls to protect watershed conditions is maintained, but average modeled size is reduced from 5 to 4 acres to more closely reflect actual implementation practices of the past 5 years This resulted in about 11,300 fewer acres assigned to leave areas

- Spotted owl habitat areas (SOHAs) were remapped to comply with S&Gs (on size and distribution of sites) selected in the Record of Decision for the Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide. Sites were increased from 1,000 to 2,000 acres.

- Mapping of mature conifer habitat to be managed for wildlife species, such as the pileated woodpecker and marten, was adjusted to account for overlap with new SOHA locations

- The model used to project elk habitat capability through time was revised to be consistent with the Westside elk model developed in the Region in 1988 The new model accounts for size and spacing of openings as a factor influencing habitat capability.

- A recovery plan for bald eagles was developed by the U S. Fish and Wildlife Service in 1986 Habitat requirements identified in the recovery plan were incorporated into the FEIS. Number of sites decreased, but size increased Total acreage of habitat changed slightly

Changes to Alternative E (Preferred Alternative)

- More emphasis has been placed on protection and enhancement of anadromous fish habitat and on water quality in municipal watersheds. The percentage of the riparian zone protected by streamside buffers has been increased from 50% to 75%. Yearly amounts of fish habitat enhancement projects have been increased substantially. The amount of land that can be harvested in a municipal watershed each decade is reduced from 20% to 15%.

- The alternative has been redesigned to include an integrated recreation strategy consisting of provision of high quality destination sites in a coastal setting, "day-use" facilities that link coastal and inland areas, and opportunities for recreation in a forested setting close to urban areas in the Willamette Valley.

- As a result of public comments, more emphasis was given to maintaining current timber harvest levels to benefit local communities. The percent of suitable timber acres managed intensively on 60 to 80-year rotations, rather than 100-year rotations, was increased from 26% to 74% Other tradeoffs were made to wildlife habitats and undeveloped recreation areas to keep the timber harvest levels close to current.

- Management emphasis on cavity excavator habitat was reduced. The PA provides for maintaining 40% of biological potential by subbasin rather than 50%

- Habitat to be managed for pileated woodpecker, an indicator species for mature conifer habitat, was increased from 400-acre to 500-acre cores to reflect findings of recent research conducted in the Coast Range The former is too small to supply enough nesting and feeding habitat to support a pair of pileated woodpeckers

- Long-rotation management of deciduous-mix stands was felt to be unnecessary to maintain sufficient habitat for the guild of species that uses it New management objectives are to maintain diversity by keeping about 5% of the Forest in deciduous-mix habitat that is well distributed by age and location No special timber management is used to provide this condition for the next 10 years.

- Emphasis on providing permanent meadows for elk was reduced. Acres of new meadows created over a 50-year period were reduced from 2,000 to 1,000 acres

- One thousand acres of old-growth groves outside of areas unsuitable for timber production (Wildernesses, SOHAs, etc) are maintained for amenity values.

- Two additional RNAs have been recommended for possible designation.

ALTERNATIVE DEVELOPMENT PROCESS

Introduction to Alternatives

Alternatives display different ways of managing lands and resources of the Forest Each alternative is a unique combination of land uses, management guidance and practices, and activity schedules for different parts of the Forest As a result, each alternative would generate a different mix of goods and services for the public, and a different combination of resource outputs and environmental effects

A set of alternatives covering a broad range of possible actions was formulated by the IDT In formulating these alternatives the IDT was guided by several considerations:

- Alternatives must explore a variety of ways to respond to the public issues, management concerns, and resource use and development opportunities identified throughout the planning process

- Planning regulations 36 CFR 219.12 (e) and (f) require use of an analytical process to determine minimum and maximum resource production levels and economic consequences In addition, alternatives must respond to management concerns, and include alternatives which reflect current Forest and national programs, such as that for the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA).

In some alternatives the Forest would manage for production of commodities such as timber and salmon, whereas other alternatives would emphasize amenities, such as dispersed recreation and nongame wildlife habitat. One alternative (Alternative A, the "No-Action" Alternative) reflects current management direction, while another [Alternative B(Dep)] reflects objectives of the Forest Service RPA program In departure alternatives, timber harvesting schedules depart from a non-declining flow timber harvest schedule to meet specific needs. From this range of alternatives, the Regional Forester had a basis for recommending the one - Alternative E, the Preferred Alternative (PA) - which has the greatest Net Public Benefit (NPB).

"Benchmarks" are presented and discussed several times in this chapter. Benchmarks are analytic bases from which the alternatives were developed. One major purpose of benchmarks was to determine the maximum amount of various resource outputs the Forest can produce, subject to legal requirements. They were also used to provide information on the maximum biological potential of the Forest and economic implications of management. Character and use of benchmarks will be discussed later in this chapter.

The primary purpose of alternative development is to provide an adequate basis for identifying the alternative of most NPB [219 11 (f)]. Alternatives are based upon resource capabilities of the Forest Each alternative is designed to manage the Forest to achieve some goals and objectives. Some objectives, such as providing a sustained timber yield, are common to all alternatives Others, such as timber harvest levels and degree of fish habitat protection above MR levels, vary widely among alternatives

By managing the Forest resources in different ways, various objectives can be achieved to respond to the many issues and concerns on the Forest Management can vary by what is done, where it is done, and when it is done The result is a combination of management activities, management areas, and schedules which define a unique combination of resource outputs and environmental conditions for each alternative

NPB is the value to the nation of all benefits less all associated costs. NPB includes both priced and nonpriced benefits Priced benefits (i.e , those received from timber, commercial fishing, and developed recreation) can be given dollar values determined by either actual market transactions or by estimation methods that produce prices approximating market transactions Nonpriced benefits (i e., scenic views, threatened and endangered species, natural and scientific areas, historical and archeological sites, and clean air and water) are among those for which there are no available market transaction data and no reasonable way to estimate a dollar value similar to market values associated with priced benefits The Preferred Alternative is believed to provide the largest benefit above the cost of providing those priced and nonpriced benefits For a further discussion of NPB and priced and nonpriced benefits see Appendix B "Cost Efficiency and Net Public Benefit "

The alternative development process used here is outlined in 36 CFR 219 12 These regulations include the following goals for alternative formulation:

- Provide the basis for identifying the alternative that maximizes NPB;
- Distribute alternatives between minimum and maximum resource potentials and reflect a range of environmental resource uses and expenditure levels;
- Facilitate analysis of opportunity costs and tradeoffs,
- Evaluate effects on present net value, benefits, and costs;
- Provide different ways to respond to major public issues; and
- Meet objectives of the alternative in a cost efficient manner

To determine responsiveness of a proposed management alternative to ICOs, it is important to understand relationships between potential supply and projected demand for each forest resource Information on general trends in demand is included in "Timber", "Fish", "Wildlife", and "Recreation" in FEIS, Chapter III and can be compared with demand projections presented in the tables in "Development and Use of Benchmarks" in this chapter More information on supply and demand is also included in that section and in Forest Plan, Chapter II

Description of the Analysis Process

The first step in the analysis began with inventory of the Forest and construction of a data base which displays land and resource characteristics of the Forest. (This is the third of the steps listed in the Planning Process section of Chapter I.) This data base was updated between draft and final EIS to reflect timber harvest and growth and a revision of the spotted owl habitat network An area of the Forest with a relatively uniform set of characteristics was identified as a "capability area". About 30,000 such areas were identified In the next step, capability areas were aggregated into about 500 analysis areas Analysis areas are the basic units used in the analysis process and planning model and are not necessarily contiguous Analysis areas are distinguished from each other on the basis of differences in response to management practices, benefits, and costs.

In conjunction with creation of analysis areas, the IDT generated "management prescriptions" - sets of activities which represent a specific method of managing particular analysis areas. A group of these prescriptions covers the various ways that different analysis areas can be managed These prescriptions provide choices which can be made in managing the land An estimate of economic costs and resource yields associated with the prescriptions was generated for use in the forest planning model, FORPLAN. Costs were revised between draft and final EIS to reflect current operating procedures. (See Appendix B for details of the costs used in the analysis) FORPLAN, a linear programming model, was used to analyze many management objectives and how they interact In FORPLAN, objectives of alternatives were represented as constraints, and possible activities were represented as prescriptions. The FORPLAN model then found the most efficient set of prescriptions which met some overlying objective, subject to constraints of the alternative. The overlying objective of alternatives discussed in this FEIS, except Alternative NC, is to maximize present net value (PNV). Alternative NC was not developed using FORPLAN.

Once a FORPLAN solution was derived for an alternative, the Forest was divided into management areas (MAs). These are areas of the Forest where a set of management activities and S&Gs apply (see discussion of MAs later in this chapter). Each MA consists of one or more prescriptions from the FORPLAN solution. The 15 MAs are identified on the maps which accompany the EIS, and their acreages for each alternative are shown in tables in "Comparison of Alternatives" later in this chapter.

PNV of timber prescriptions on a per-acre basis (Stage-II Analysis) was determined prior to development of alternatives in the DEIS, and then revised to reflect changes in timber inventory information between draft and final EIS. PNV ranged from $16,000 per acre for 200-year-old, high-site Douglas-fir to less than $100 per acre for 10-year-old, low-site red alder. See Appendix B "Financial Analysis of Lands Tentatively Suitable for Timber Production" for more information on Stage-II Analysis

The data base was updated between draft and final EIS to reflect timber harvest and growth to the midpoint of the 1st decade of the Plan The data base was also revised to reflect the spotted owl network developed to meet direction in the Spotted Owl Supplement to the R6 Regional Guide.

The analysis process used for Alternative NC was much different than that used for other alternatives The Timber Resource Plan (TRP) was developed between 1976 and 1979 and forms the basis for Alternative NC. The IDT used documentation in Forest files and the TRP EIS as sources for much of the information displayed about Alternative NC.

The FORPLAN analysis model which was used for other alternatives was not used for Alternative NC FORPLAN could not be used because of how original data for the TRP timber resource allocation model was organized and because of the way land was characterized in the TRP data base. As a result, several projections made for Alternatives A through H from results of the FORPLAN model could not be made for Alternative NC. Instead, the IDT made qualitative estimates of some environmental effects

The TRP was developed to determine a level of annual timber harvest given a specific set of assumptions Harvest levels were determined by selecting a certain level of timber management from a range of intensities without varying the land base to address other issues As a result, the TRP's Preferred Alternative does not represent the most efficient combination of practices to produce desired outputs

The TRP was amended in 1980 as a result of the RARE II process, and in 1984 for the Oregon Wilderness Act These amendments reduced the regulated commercial land from 557,250 acres to 542,120 acres Potential yield changed from 452 million board feet (MMBF) per year to 438 MMBF per year and harvest was actually scheduled on 508,034 acres after allowances for resource protection. In developing Alternative NC, values for resources affected by these changes, including timber, were changed from figures published in the 1979 TRP in proportion to reductions in acreage of land scheduled for harvest (See discussion under "Lands Suitable /Unsuitable for Timber Production" in this chapter) These changes approximate actual resource conditions under the amended TRP

FEIS, Appendix B describes the entire analysis process and all changes made between draft and final EIS, including models used in the process Refer to Appendix B for a more complete and technical discussion

Management Requirements

Many laws and regulations guide Forest Service activities One law in particular, the National Forest Management Act of 1976 (NFMA), and its implementing regulations, provides direction for the forest planning process Regulations for National Forest System Land and Resource Management Planning, in Section 36 of the Code of Federal Regulations, Part 219 [36 CFR 219] specify: 1) minimum specific Management Requirements (MRs) to be met for accomplishing goals and objectives of the National Forest system [36 CFR 219 27] and 2) minimum requirements for integrating individual Forest resource planning into the Forest Plan [36 CFR 219.14 through 219 26] These collectively constitute the MRs

MRs from NFMA and its implementing regulations are legal requirements that must be met during forest plan implementation. Specifications or standards for achievement of each MR are established at the national level or through analysis at the regional level for most MRs These are listed in the regulations or as S&Gs in the Regional guide

Minimum specific requirements defined in 36 CFR 219 27 can be categorized as either resource protection requirements or management prescription requirements which specify practices involving: 1) vegetative manipulation of tree cover for any purpose, 2) timber harvest and cultural treatment, or 3) even-aged silviculture At the Forest level, requirements are incorporated into the planning process through S&Gs developed to address the MRs and management practices selected to meet the standards.

While S&Gs are developed to ensure that all alternatives comply with legal requirements, they do not necessarily establish the final level of management for resource protection MRs specify the "floor" for different levels of management considered during alternative development Management practices that would not comply with MRs are not considered feasible All Plan alternatives, except Alternative NC, meet MRs at a minimum

There are several requirements the Forest must meet which did not require special analysis Examples are protection of air quality, cultural resources, diversity, and road design These requirements are addressed in S&Gs in the Forest Plan While significant in themselves, they do not have significant effects on the Forest-wide planning analysis

For some MRs, special management prescriptions are developed to contain specific practices, and specific constraints are applied to FORPLAN to simulate compliance with S&Gs. Discussion of MRs here focuses on those that require specific analysis for prescription development and those that impose significant interactions with other resources MRs that needed specific planning analysis are:

- Water Quality - "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 governmental bodies with respect to the provision of public water systems and the disposal of waste water." [36 CFR 219 23 (d)]

- Soil and Water Resources - "Conserve soil and water resources and not allow significant permanent impairment of the productivity of the land " [36 CFR 219 27 (a)(1)]

- Riparian Areas - "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)]

- Fish and Wildlife - "Provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species." [36 CFR 219.27 (a)(6)]

- Threatened and Endangered Species - Prevent the destruction or adverse modification of critical habitat for threatened and endangered species [36 CFR 219 27(a)(8)]

- Pest Organisms - Prevent or reduce serious long-lasting hazards and damage from pest organisms [36 CFR 219 27(a)(3)]

- Timber Harvests - When openings are created by even-aged silviculture, individual cuts shall conform to Regional Guide direction on the dispersion of openings and maximum size limits for areas to be cut in one harvest operation. [36 CFR 219 27(d)]

- Timber Sale Schedules - Timber sale requirements are also included in most alternatives These require that stands of timber shall generally have reached culmination of mean annual increment (CMAI) prior to final harvest, and that timber harvests shall be scheduled to sustain a nondeclining flow (NDF). [36 CFR 219 16] These requirements are described in more detail in FEIS, Chapter III "Timber" and Appendix B "Benchmark Formulation."

Most of these MRs were met through development of prescriptions and S&Gs that did not have signficant effects on other resources Most of the timber requirements, including pest management needs, were met through prescription design. Threatened and endangered (T&E) species habitat needs and harvest dispersion requirements were met through constraints on FORPLAN A discussion of prescription development and MR constraints used in FORPLAN is provided in Appendix B. S&Gs developed to meet MRs listed above are included in Appendix D.

Significant Effects on Other Resources - MRs with significant interactions with other resources are those for maintenance of water quality, riparian areas, mature conifer-dependent wildlife species, and viable populations of northern spotted owls Specific implementation methods for MRs were developed by the IDT and are designed to accomplish each objective with minimum opportunity costs to other resources.

Water Quality and Riparian Area Protection - The primary activities on the Forest which affect water quality are tree harvesting, brush burning, fertilization, and road construction Management practices selected to protect soil and water resources protect water quality as well as fish habitats in streams and riparian habitat adjacent to perennial streams to assure maintenance of viable populations of species dependent on these habitats.

The IDT evaluated various options for management of soil and water resources and associated implications for water quality and fish resources Options considered ranged from removal of high risk slopes and most of the riparian areas from logging activities to allowing harvests on some high risk slopes and partial harvests in riparian areas Factors considered in selecting the preferred methods included probability of increased landslides, sedimentation, expected damage to residual vegetation, and amount of shading available to streams for fish habitat protection Management practices selected to protect soil and water resources are:

1 Maintaining vegetation on slopes judged to have a high risk of increased landslides. An average 4-acre size was selected for modeling the areas that would be left undisturbed on low- and high-risk landtypes. In addition, all lands too interspersed with high risk slopes to allow harvests would be removed from timber production

2 Maintaining vegetation on streamsides to provide shade sufficient to maintain water temperatures within state standards The amount of land was estimated to be 37 5% of the riparian area

3. Avoiding harvesting more than 30% of National Forest System (NFS) land in any third- or fourth-order basin to limit amounts of sedimentation and loss of stream structure

Implementation methods and modeling assumptions selected to meet the MR are sufficient to provide physical conditions necessary to satisfy resource protection needs and have the least effect on PNV and timber sale volume Additionally, the methods represent current practices that have been developed through cooperation among state and federal land management agencies The total amount of land removed from timber production to meet the MR is about 85,700 acres after accounting for overlap with other lands unsuitable for timber management.

Maintenance of Habitat for Mature Conifer-Dependent Wildlife Species - Habitat requirements were defined for two indicator species of mature conifer pileated woodpecker and marten The requirements are based on guidelines in the following documents. "A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service" (June 1986), and "A Background Document on the Development and Review of Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northest Region, USDA Forest Service" (June 1986) The requirements were based on existing research and professional judgment, and defined a) habitats used, b) dispersal distance between habitats, and c) size of habitat areas needed for reproduction

To perpetuate these species over their present range, a network of suitable habitat areas was identified Each area would provide habitat for one pair of animals, and distances between habitats would be conducive to dispersal of young To minimize opportunity costs to the timber program, habitat areas were overlapped with other habitats and lands unsuitable for timber production wherever possible

The Forest chose to provide mature conifer habitat by managing timber stands on 100-year rotations, rather than dedicating areas for mature conifer habitat Total habitat required at all times is 32,220 acres, of which 13,680 acres is in areas not suitable for timber production. The selected method has the least effect on PNV and timber outputs.

Maintenance of Habitat for Northern Spotted Owls - Habitat requirements for spotted owls were described in the Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (1988a), which changed direction for the Forest from that originally in the Regional Guide New direction requires that SOHAs be 2,000 acres in size, rather than 1,000 acres Old direction required 40 SOHAs, while new direction focuses on standards for ensuring appropriate spacing and distribution of SOHAs.

Under the new criteria, 22 SOHAs were located outside reserved areas (Wildernesses, Cascade Head Scenic-Research Area and Cascade Head Experimental Forest) Prescriptions were examined that protected these areas with no programmed timber harvest or managed enough acres with long timber rotation to provide equivalent suitable habitat. For this planning period, the Forest chose to designate habitat areas This has the least effect on timber sale levels and is most economically efficient The 22 designated SOHAs require about 44,400 acres of tentatively suitable timber land.

Additional Information - A detailed discussion of the analysis supporting selection of MR methods is provided in Appendix H. Appendix H was prepared in response to decisions of the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding an appeal brought by the Northwest Forest Resource Council on September 18, 1986. The appeal centered on direction from the Regional Forester to incorporate MRs into Forest Plan alternatives Appellants requested that appropriateness of MRs be examined through the EIS process.

Appendix H presents an analysis of MRs for water quality, riparian areas, and maintenance of viable populations of species using mature and old-growth conifer habitat. Alternative methods for achieving MRs are described and opportunity costs in terms of timber and PNV are displayed for various options Rationale for the method selected and implications of other options are discussed

Development and Use of Benchmarks

Resource and economic potentials of the Forest were identified by a set of eight management scenarios called benchmarks, as required by 36 CFR 219 12 (e) (This is the fourth of the steps listed in Chapter I " Planning Process") These benchmarks (see USDA Forest Service 1985 and Appendix B "Benchmark Analysis Results") identified potentials under current management direction, as well as under present legal requirements (except MRs in the Current Direction Benchmark; see Appendix B "Development of Management Requirements" for tradeoffs involved in the process) and regulations on timber harvest relative to culmination of mean annual increment (CMAI) In turn, these defined the decision space in which the alternatives could be developed

The eight benchmarks are described in detail in Appendix B "Benchmark Formulation", and associated outputs and effects are displayed in the tables in "Outputs and Effects" later in this chapter. Objectives and constraints used to formulate the benchmarks are given in Table B-24 in Appendix B.

After the DEIS was released to the public, several technical changes were made in the yield predictions and economic values of timber, the ratio used to convert cubic feet to board feet, the fish habitat index model, some wildlife habitat capability models, and MRs Costs were also updated to reflect current practices. (Refer to Appendices B and H for discussions of technical changes between draft and final EIS) To determine the total effect of these changes, the PNV and Timber benchmarks were rerun with revised data and displayed in Table II-39B in "Outputs and Effects" in this chapter. The other five benchmarks in the table are identical to those displayed in the DEIS, so results of any technical changes are not known for them. (The Current Direction Benchmark is not included because it became Alternative A)

Net effect of the technical changes is a 3% reduction in 1st-decade allowable sale quantity (ASQ) in the PNV Benchmark and less than a 1% reduction in the Timber Benchmark PNV increased 3% for the former and declined 2% for the latter. The other benchmarks were not rerun because these effects on ASQ were so small. Had they been rerun, the changes in ASQ and PNV of the Timber Departure Benchmark would have resembled those of the Timber Benchmark. Relative changes in the others would have been similar to those of the PNV Benchmark. Most nontimber costs would be the same as the PNV and Timber benchmarks.

After the following summary of each benchmark, the benchmark decision space for four major indicators - ASQ, PNV, fish habitat, and spotted owls - is displayed in Figure II-1. Table II-1 outlines the decision space for all major indicators analyzed in the benchmark analysis, and shows existing condition and estimated demand for each of these Demand estimates are explained in the following section

Table II-1. Decision Space and Demand Projections for Issues Indicators

OUTPUT/EFFECT	Unit of Measure	Existing Condition	Demand Projection	Highest Level	Lowest Level (1)
TIMBER					
Long-Term Sustained Yield Capacity	MMCF/Yr	NA	NA	83 4	0
Allowable Sale Quantity	MMCF/Yr	62 (1979-88)			
1st Decade			80 (2)	95 9	0
5th Decade			Unknown	71 6	0
Land Suitable for Timber Production	MAcres	381	NA	404	0
EXISTING OLD GROWTH					
Existing Old Growth Retained	MAcres	34	NA		
1st Decade (3)				34	22
5th Decade				34	20
WATERSHEDS					
Sediment	M Cu Yd/Yr	64			
1st Decade			NA	101	17
5th Decade			NA	51	13
FISH HABITAT					
Coho Smolt HCI, 5th Decade	M Smolts	1,019	1,960	1,147	316
WILDLIFE HABITAT					
Spotted Owl Habitat					
Managed Habitat Areas	# of SOHAs	22	NA	39	22 (4)
Owl Habitat Capability	# of Pairs	59			
1st Decade			NA	62	49
5th Decade			NA	87	35
Elk Habitat Capability, 5th Decade	HCI (#)	9,960	10,400 (5)	12,840	7,100
Bald Eagle Habitat					
Managed Habitat Sites	# of sites				
1st Decade		23 (6)	NA	23	23
5th Decade		23	NA	23	23
RECREATION USE, 5th DECADE	MRVDs/Yr				
Rural and Roaded Natural Dispersed		1,473	730 5	1513 4*	(7)
Semiprimitive Motorized (SPM)		242	482 0	482 0	(7)
Semiprimitive Nonmotorized (SPNM) (8)		10	122 8	118 0	(7)
Total Recreational Use		1,725	1335 3	2,113 4	(7)
Developed Sites		780	1,224 0	1,835 9	(7)

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-1 Cont. Decision Space and Demand Projections for Issues Indicators

OUTPUT/EFFECT	Unit of Measure	Existing Condition	Demand Projection	Highest Level	Lowest Level (1)
SPECIAL INTEREST AREAS					
Amount Recommended	Acres	2,800	NA	7,420	0
VISUAL RESOURCES					
Protection of Scenic Viewsheds	% Fully Protected	44%	100% (9)	100%	0%
WILDERNESS					
Amount of Development	Trail Miles	11 5	NA	64 5	11 5
UNDEVELOPED AREAS					
Amount Maintained Outside ODNRA	MAcres	27	NA	36 (10)	0
RESEARCH NATURAL AREAS					
Potential RNAs recommended	# Areas	2	NA	3 (11)	0
LOCAL COMMUNITIES, 1st DECADE					
Employment	MJobs/Yr	7 8	NA	12 1	4 3
Payments to Counties	MM$/Yr	11 8 (1979-88)	NA	27	3 7
ECONOMICS					
Net Cash Flow	MM$/Yr	20			
1st Decade			NA	78	-9
5th Decade			NA	83	-5
Noncash Benefits	MM$/Yr	NA			
1st Decade			NA	26	10
5th Decade			NA	34	10
Present Net Value	MM$	NA	NA	2,362	100

(1) The "lowest level" does not, in all cases, meet the Management Requirement (MR)
(2) All species, Regional disaggregation of RPA Program
(3) Includes both old-growth stands and old-growth trees
(4) 20 SOHAs are needed to meet MRs
(5) Oregon Department of Fish & Wildlife recommendations
(6) The existing number of **active** bald eagle sites (sites with eagles) is seven
(7) Not Calculated
(8) This includes wilderness use
(9) The demand for the visual resouce is the recommendation of the Visual Management System
(10) The number of acres in an undeveloped condition is higher in Alternative H than in the Recreation Benchmark (the latter had 29,890 acres) This is because more undeveloped acres are now available than were originally analyzed in the AMS
(11) RNAs were not considered in the benchmarks

CF = cubic feet, CSHCI = Coho Smolt HCI, HCI = habitat capability index, M = thousand, MM = million, NA = not applicable, RVD = Recreation Visitor Day, SOHA = Spotted Owl Habitat Area

Current Direction - Estimates outputs and effects of maintaining management direction and policy found in existing unit plans This benchmark does not meet all wildlife MRs.

Minimum Level - Estimates minimum costs (with resultant outputs and effects) necessary to retain NFS lands in federal ownership, subject to constraints necessary for protection of life, health, and safety of incidental users

PNV - Estimates the highest PNV that might be attained through an objective of maximizing return from market and nonmarket values under NDF harvest policy. Its primary purpose is to serve as a basis for economic comparisons between benchmarks and alternatives, as well as a basis for determining effects of various constraints on outputs and costs.

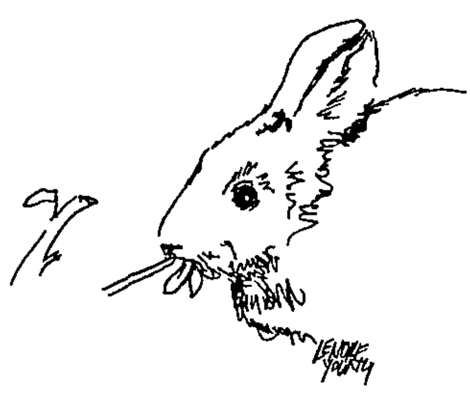
Timber - Estimates the highest sustainable amount of timber harvest on the Forest, subject to MRs and NDF of timber harvest.

Departure - Estimates the most efficient management for the Forest when timber harvest scheduling is not based on NDF.

Recreation - Estimates capability of the Forest to provide a mixture of recreational opportunities, including semiprimitive nonmotorized (SPNM), semiprimitive motorized (SPM), roaded natural, and developed. Unlike other benchmarks, it does not represent potential to produce the maximum of each individual type of opportunity, because the various types of recreation are mutually exclusive (e.g., SPNM and SPM) Instead, this benchmark provides a mixture of uses.

Nongame Wildlife - Estimates capability of the Forest to provide habitat for nongame species of wildlife Habitat is provided for these species at levels well above MRs, but not at each species' highest potential level. Like the recreation benchmark, it was designed to balance needs of all species

Fish - Estimates capability of the Forest to produce fish habitat



Allowable Sale Quantity
(MMCF/Year)

0	37.5	71.6	95.9
(Minimum Level)	(Fish)	(Timber)	(Departure)

Present Net Value
(MM$/Year)

107	1338	2050	2362
(Minimum Level)	(Fish)	(Timber)	(Departure)

Fish Habitat Capability Index (1)

767	1179	1307
(Minimum Level)	(Fish)	(Minimum Level)

Spotted Owl (Pairs)

30	36	39
(Current Direction – No MRs)	(Timber)	(Wildlife, Min Level)

(1) Outdated version of the index, so numbers are not comparable to those in alternatives and PNV and Timber Benchmarks

FIGURE II-1 BENCHMARK DECISION SPACE FOR RESOURCE INDICATORS (1st Decade)

Demand Analysis

Demand estimates in Table II-1 reflect future output/effect levels anticipated by several public agencies, including the Forest Service. These projections are discussed several places in the EIS, including Chapters III and IV, and are summarized below.

Timber - Demand for timber reflects the amount needed from the Forest in the future The RPA timber harvest objective of 80 MMCF/year was developed for the 1980 RPA program and distributed to the Forest in the Regional Guide (USDA Forest Service 1984a) This objective was based on existing management plans and direction and other available information used to develop the RPA program in the late 1970s. It reflects the Nation's resource management priorities as determined in 1980 by Congress and the administration, with extensive public participation

Demand projections were not made specifically for hardwoods. In general, demand for hardwood volume fluctuates with demand for lumber and wood products In 1980, annual hardwood production in Oregon was estimated to be 20 MMCF of which 50% was assumed to be for lumber and the rest for veneer logs, pulpwood, and firewood (Oregon Department of Forestry 1980) Statewide and nationally, it appears that there is an adequate supply of hardwood timber It is assumed that future demand for hardwoods on the Forest will steadily increase above past harvest levels of 6 to 18 MMBF/year as markets develop further.

Watershed - Demand was not projected specifically for water quality. However, it is assumed that demand will increase as more people move into areas adjacent to the Forest and as the amount of fishing increases.

Fish and Wildlife Habitat - Objectives developed by the Oregon Department of Fish and Wildlife reflect goals to maximize amounts of habitat available for fish and wildlife, especially game species. Objectives displayed in Table II-1 as well as objectives for nongame species are discussed in more detail in FEIS, Chapter IV "Consistency with Plans or Programs of Other Agencies".

Recreation - Future recreational use (including recreation associated with wildlife and fish habitat, and displayed in Table II-1) was estimated for most types of recreation based on growth rates developed for the statewide Outdoor Recreation Plan (Oregon Dept. of Transportation 1978) and amounts and mixes of recreational use on the Forest between 1979 and 1981 One exception was that projections for SPNM recreation are based on estimates in the Regional Guide (USDA Forest Service 1984a). In general, growth rates reflect anticipated population growth, changes in rates that people participate in different types of recreation, and characteristics of different recreational sites. These demand estimates were also used to project how well alternatives responded to issues concerning Special Interest Areas (SIAs), development in Wildernesses, and undeveloped areas

Visual Resouces - Demand for protection for scenery was based on an inventory of environmental characteristics of the Forest, as well as characteristics of people who use the Forest and adjacent travel corridors.

Research Natural Areas - Demand was not specifically projected for Research Natural Areas. However, it is assumed that demand will continue at current levels or increase as fewer areas are left in an undeveloped state

Range of Alternatives

After clarification of ICOs and planning criteria and collection of inventories and other data, alternatives were formulated with themes that reflected a variety of resource management objectives within the range defined by the benchmarks (See Appendix B for more details).

The major change made between draft and final EIS is that Alternative E(Dep) was dropped from consideration and Alternative NC added Thus, the number of alternatives remains at 10. The former was no longer useful in the range of alternatives, and the latter was intergrated into the FEIS from the Supplement to the DEIS

The range of alternatives possible and their development was limited by several constraints All alternatives except NC comply with the following:

- The Regional FEIS on Managing Competing and Unwanted Vegetation, which allows use of all management tools while reducing reliance on herbicides This constraint was added between draft and final EIS;
- S&Gs from the Regional Guide and SEIS, which at least meet the MR level and assure viability of the spotted owl, have been incorporated into all alternatives except NC This constraint was also added between draft and final EIS; and
- Other MRs (discussed previously).

All alternatives included the following:

- Clearcutting as the selected system for timber harvest (See Appendix G).
- All facets of mitigation, such as BMPs (See Appendix J), as a part of their formulation (40 CFR 1508 20) This aspect is discussed further in "Mitigation Common To All Alternatives" later in this chapter

Required Alternatives

Several alternatives are required by regulation or Forest Service regional or national direction These include:

No Action (Current Direction) - This is the "No-Action" Alternative required by NFMA [36 CFR 219.12 (f)(7)] and Council of Environmental Quality (CEQ) [40 CFR 1502.14 (d)] regulations This alternative continues management of the Forest as defined by approved management plans and existing policies, standards, and guidelines. This alternative does not always show the same outputs as current plans, however, because more recent inventories are used to predict results of implementation and because current plans do not meet all MRs required by NFMA Alternative A is the "No Action" Alternative in this EIS.

Emphasis on the Current RPA Program [36 CFR 219.12(f)(6)] - This alternative will determine how the 1980 RPA Program, distributed to the Forest through the Regional Guide, can best be achieved Alternative B Departure [referred to as B(Dep)] is the current RPA program alternative in this FEIS

Emphasis on Market Opportunities (Regional Direction, November 1983) - This alternative concentrates on outputs (timber, commercial fish, and developed recreational opportunities) with an established market price Management for other resources would be at levels compatible with the alternative emphasis Alternative D is the alternative which emphasizes market opportunities

Emphasis on Nonmarket Opportunities (Regional Direction, November 1983) - This alternative emphasizes water quality, fish, wildlife, dispersed recreation and other amenity values Market resources would be managed at levels compatible with the alternative emphasis Both Alternatives G and H emphasize nonmarket opportunities

Departure Alternative - The departure alternative, B(Dep), was designed to respond to different issues or concerns by departing from a NDF harvest schedule The purpose is to meet RPA timber harvest objectives Land assignments and resource management direction would be similar to that of Alternative B. Managing on a departure schedule usually would result in higher timber harvest levels in the 1st decade and lower levels in later decades

Other Alternatives - Additional alternatives [B, C, E(PA), F and H] were developed by the IDT to respond to ICOs on the Forest. Additionally, to assure compliance with NEPA and NFMA regulations [36 CFR 219 12(f)(1)] and to provide decisionmakers and the public with information needed to make a reasoned choice, the IDT developed a broad range of alternatives They designed the alternatives so that they were "distributed between the minimum resource potential and the maximum resource potential" to display the "full range" that the Forest could produce

Preferred Alternative - Alternative E(PA), the Preferred Alternative, was recommended after careful comparison of all alternatives on the basis of their resource outputs, environmental effects, implementation costs, and resource and economic tradeoffs between them Alternative E(PA) is the one which the Regional Forester feels maximizes long-term NPB It was recommended after the Forest Supervisor reviewed the IDT's evaluation, and after the Regional Forester and his staff reviewed the alternatives.

Three potential RNAs are included in Alternative E(PA) in the FEIS and Record of Decision (ROD). This action is a recommendation for study for designation as RNAs. Final suitability would be approved by the Chief of the Forest Service.

Alternatives Considered and Eliminated from Further Detailed Study

The alternative development process started almost on the 1st day of Forest planning Numerous interim decisions were made throughout the process, some expanded the space within which alternatives could be developed, while others limited that space These decisions ranged from determining inventory standards, such as the minimum size of a mapping cell, to establishing criteria needed to assure viability of a wildlife indicator species. Planning criteria [36 CFR 219.12(c)] provided the basis for such decisions. (Planning criteria for the Forest are contained in planning process records on file in the Forest Supervisor's Office.)

The space within which FEIS alternatives were developed is what remained after these planning criteria were applied. Any alternative with outputs outside the decision space were not fully developed In addition, some alternatives were not developed because they were not needed to resolve ICOs. A discussion of alternatives not fully developed follows

Additional Wilderness Designation - In the 1984 Oregon Wilderness Act, Congress determined that the Cummins Creek, Drift Creek, and Rock Creek areas were worthy of wilderness designation. An alternative could have been developed which would change designation for some or all these areas However, to do so would require a change in law.

The Act also stated that additional areas need not be considered for wilderness in the present planning process Since the issue of additional wilderness has not been raised since the Act, it is not being considered at this time Alternatives were developed that would maintain options to designate additional wilderness from all existing undeveloped areas.

Wild and Scenic (W&S) River Designation - Of rivers listed by the Nationwide Rivers Inventory (USDI National Park Service 1983), seven on the Forest--Drift Creek (Siletz), Wassen Creek, and the North Fork Smith, Umpqua, Alsea, Nestucca, and Siuslaw rivers--are eligible for further study as potential Wild, Scenic, and Recreational Rivers Although Lake Creek and the Lower Siuslaw, Siletz, and Smith rivers also are eligible, the small amount of NFS land which fronts on the rivers did not warrent further Forest Service study Three Rivers and the Little Nestucca River did not qualify for further study.

The Forest could have considered alternatives in which various combinations of these rivers were recommended for formal classification However, not enough is known about the rivers to do this Recommendations applied only to eligibility, not suitability. None of the alternatives considered will preclude classification of the rivers at some time in the future.

Sufficient Existing Management Plans - Shortly after land management plans for the Oregon Dunes National Recreation Area and Cascade Head Scenic-Research Area were completed (1976 and 1979, respectively), Forest planning was begun under NFMA These plans required EISs whose development was strongly influenced by public input

Existing management direction appears to be working well, and no new issues have been identified for either area through Forest planning Therefore, no alternatives to change management for these areas are included in this FEIS (see the discussion of issues in Appendix A)

NFMA Regulations Relative to MRs -The Forest Service identified practices that comply with laws and regulations governing land management activities These practices are Management Requirements (MRs) which must be met to accomplish goals and objectives of NFMA, as outlined in Title 36, Code of Federal Regulations, Part 219 (36 CFR 219). All viable Forest Plan alternatives must meet MRs to be legally implementable Alternative NC, the one alternative that does not meet MRs, is based on the 1979 TRP and included as directed by the Chief of the Forest Service following dismissal of an appeal by the Northwest Forest Resource Council

Because the TRP was developed prior to regulations for NFMA, the TRP did not incorporate MRs set forth by the Secretary of Agriculture to implement NFMA Alternative NC could not be used in future management of the Forest without Congress and the Secretary of Agriculture changing laws and regulations

All Undeveloped Areas Preserved and Intensified Commodity Production - An alternative was explored which would have preserved most of the undeveloped areas on the Forest while increasing commodity production elsewhere. Its purpose was to minimize adverse social and economic effects of preserving undeveloped areas by increasing investments on lands already developed. Since prescriptions on the Forest already contained a full range of intensive management practices, the only way to maintain output levels was to depart from NDF. In the future, however, harvest levels would have had to decline if long-term sustained yield capacities were to be reached This decline would cause adverse social and economic impacts. Inability of the alternative to fulfill its purpose indicated that it would not be useful to develop it fully It would not have contributed to resolving Forest ICOs

ORV Closures - In all alternatives, the Forest is basically open to off-road vehicle (ORV) use, with limited areas specifically closed to ORVs Alternatives that would have basically closed the Forest to ORVs, with specific areas open, are not presented. Such alternatives were considered early in the planning process, but were dropped because so little of the Forest is attractive and useable for ORVs A slight amount of occasional use in general Forest areas did not appear likely to create problems for other resources

Timber Harvest Levels on the Mapleton Ranger District - Special alternatives that established specific timber harvest levels (including no harvest) for the Mapleton Ranger District could have been developed in response to the recent lawsuit (see Chapter I and Appendix A). However, the set of alternatives developed for the entire Forest already provides wide ranges of timber harvest levels, protection of unstable slopes and fish habitat, and other management activities easily distinguishable for the Mapleton District or types of land that occur on the District Since examination of Forest-wide outputs and effects allowed a thorough analysis of alternative responses to issues raised in the lawsuit, no detailed alternatives were developed specifically for the Mapleton District Effects of alternatives on the Mapleton District are described in Appendix E

Additional Departure Alternatives - Regional direction mandates consideration of alternatives that depart from a NDF schedule when a departure can be used to respond to a particular issue or concern. The Forest evaluated two such alternatives fully in the DEIS and one in the FEIS. Others could have been developed and examined in detail, but none would have aided in resolving the issues and concerns

In the DEIS, a departure for Alternative E was included to provide a 1st-decade timber harvest for the Preferred Alternative that was closer to current levels. In the FEIS, the board-foot to-cubic-foot ratio was corrected, and Alternative E(PA) provides timber sale levels similar to past harvest levels, but with a NDF over time Alternative E (Dep) was no longer needed to address the issue about maintaining historic harvest levels Of over 6,400 public comments relating to DEIS alternatives, Alternative E (Dep) received the fewest (10). Because they provide higher ASQs than Alternative E

(Dep), other alternatives such as B and B(Dep) are more responsive to the issue of bridging the gap in harvest levels on private land.

Benchmarks - Benchmarks (summarized in Chapter II "Alternative Development Process" and described in detail in Appendix B "Analysis Prior to the Development of Alternatives") resemble alternatives in many ways For example, they evaluate integrated, multi-resource objectives and are the basis for predictions about environmental consequences However, they were not intended to be implementable, but rather to show resource and economic potentials of the Forest.

Eight of the benchmarks met CMAI and legal requirements (except MRs in one case) Of these eight, several were developed into alternatives after slight modification, others required more major changes to be implementable, and still others were not needed to resolve issues:

- The PNV Benchmark formed the basis for alternatives emphasizing market opportunities, including B, C, and D.
- The Departure Benchmark was modified to become Alternative B(Dep).
- The Current Direction Benchmark was modified by the addition of wildlife MR requirements to become Alternative A.
- The Recreation Benchmark formed the basis for Alternative F.
- The Nongame Benchmark formed the basis for Alternative E(PA)
- The Fish Benchmark lead to formulation of Alternatives G and H
- The Minimum Level Benchmark also weighed heavily in the formulation of Alternative H.

Alternatives With More Detailed Implementation - Additional ways of implementing the alternatives, such as individual timber sales, wildlife improvement projects, and recreational developments at campgrounds, could have been developed. However, any slight improvement in the ultimate decision would not have justified the additional time and costs. Additional environmental analysis will be conducted as decisions, such as the sale of timber, are implemented If a site-specific environmental analysis identifies significantly adverse effects on the human environment, a site-specific EIS will be prepared. For these reasons, the Forest chose not to include highly detailed schedules of projects for most aspects of alternative decisions Limited schedules are included in the Forest Plan to help decisionmakers and readers determine extent, timing, and environmental impacts of activities

ALTERNATIVES CONSIDERED IN DETAIL

Ten alternatives were considered in detail to demonstrate different ways of managing the land and resources of the Forest Each is a combination of availability of acres for various land uses, management practices, and activity schedules which analytically result in a specific combination of resource outputs, time frames, costs, benefits, and environmental consequences. Each alternative would meet MRs, multiple use, and sustained yield requirements at some level of acceptability

First, there is a narrative description of mitigation measures common to all alternatives. Next, goals, purposes, and management emphases of each alternative are provided This includes a short narrative about each alternative, an "Alternative-at-a-Glance" table showing the most important information about the alternative, and a "Point-Counterpoint" display illustrating contrasting perspectives for each alternative.

A comparison of alternatives follows. More detailed discussion of how Forest resource programs are managed in each alternative is included, as are several comprehensive sets of tables in "Output and Effects" *That section also presents responses of alternatives to ICOs and shows amounts of land assigned* to different MAs for each alternative. All significant land uses, some environmental effects, and resource outputs are presented by alternative and by time period. Qquantitative and qualitative uses, effects, and outputs are also presented. Descriptions of alternatives as they pertain to the Mapleton District are presented in Appendix E. Finally, a discussion of economic and resource tradeoffs is provided

outputs and effects projected for the alternatives, such as employment and payments to counties, are based on available inventory data and assumptions Major assumptions are that: 1) the annual budget is adequate for all planned activities; 2) the ASQ for each year will be harvested (see the discussion of demand for timber in "Benchmark Analysis" of this chapter), and; 3) the price of timber will increase 1% per year The most meaningful comparison of ASQ with past conditions is with the amount of timber harvested on the Forest over the last 10 years

Mitigation Common to all Alternatives

Management activities can adversely affect the environment. Mitigation measures may be applied to avoid, minimize, rectify, reduce, eliminate, or compensate for these adverse effects (40 CFR 1508 20) Many of the S&Gs for implementing the Preferred Alternative, outlined in Forest Plan, Chapter IV, serve to mitigate effects of changes in existing conditions In addition, much mitigation is already included or "built into" alternatives; this is discussed for each alternative in more detail in Chapter II "Management of Forest Resource Programs" These measures are briefly summarized below The most comprehensive discussion of mitigation measures is in FEIS, Chapter IV along with a complete discussion of effects of the alternatives on the environment

Management activities in all alternatives would be governed by S&Gs, including BMPs BMPs are specifically designed to protect water quality, as required by Section 208 of the Clean Water Act General BMPs will be selected and tailored for site-specific conditions to arrive at project level BMPs for the protection of water quality See FEIS, Appendix J for a discussion of the process and practices involved

Mitigation measures for Alternatives A through H do not necessarily apply to Alternative NC Since the purpose of the TRP is to calculate potential yield of wood, mitigation measures were not well described Measures to mitigate adverse environmental consequences were identified in the Unit Plans, not in the TRP

Municipal Watersheds Mitigation

The same measures used to protect fish habitat, discussed below, serve to minimize adverse effects on municipal water supplies.

With the exception of some restrictions on public access in the Corvallis watershed (Alternative A), activities in municipal watersheds would be generally managed uniformly across the Forest in all alternatives except NC and H Risk of damage would be minimized in Alternative H, in which all municipal watersheds would be closed to timber harvesting (except when necessary to provide wildlife habitat) and recreational activities Measures used to protect fish habitat everywhere, including maintenance of vegetation along streams and on steep slopes, will usually maintain water quality in municipal watersheds at acceptable levels In addition, maximum harvest rate (percent harvested in any decade) is lower in municipal watersheds than in other watersheds Where these measures are inadequate to maintain water quality at acceptable levels, additional measures including more limitations on harvest location or rate may be employed. State of Oregon water quality standards would be met in all alternatives except NC.

Fish Habitat Mitigation

Degradation of fish habitat is mitigated with several protective measures, applied at various levels, in the alternatives These levels are outlined in more detail in "Fish Habitat" later in this chapter. Measures which minimize effects include limitations on timber harvesting near perennial and intermittent streams, on landtypes (see glossary) with a high risk of landslides, and on unstable slopes which are likely to slide following harvest. Limitations on the percentage of a watershed that can be harvested in any 10-year period serve to reduce adverse effects over time. Fish habitat projects compensate for a relatively small amount of the impacts by improving or restoring habitat conditions.

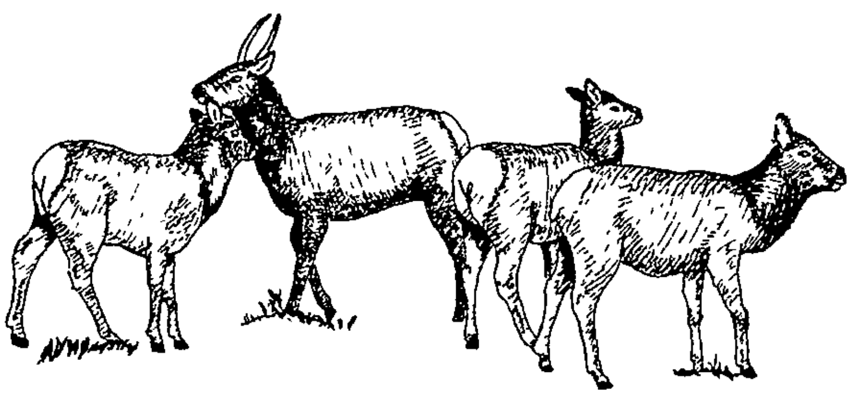
Wildlife Habitat Mitigation

Many adverse effects on wildlife habitat are minimized by specialized management of various types of habitat This management entails long timber rotations on some areas to benefit species dependent on mature conifer habitats; protecting some old-growth areas from timber harvest to benefit wildlife species such as spotted owls and bald eagles; clearcut harvesting to create meadows for elk; and leaving of dead and defective trees for still other species Effects are further minimized by providing more and larger habitat areas.

Other adverse effects are rectified by habitat improvement projects (i.e., forage seeding and creation of permanent meadows for elk) and transplanting of elk (coordinated with the State of Oregon)

Mitigation for Other Resources

For a discussion of mitigation for other resources, see FEIS and Forest Plan, Chapter IV.



Alternative Descriptions

Alternative No Change (NC) Description

Alternative NC would emphasize wood production. It was developed to represent the Timber Resource Plan (TRP) completed in 1979 and amended in 1984 to comply with legislation (P.L 98-328) that established Wildernesses on the Forest The purpose of the TRP is to determine the potential yield of harvestable timber on the Forest The TRP is neither an integrated management plan nor a land allocation plan, and consequently did not address all resource demands and uses.

If chosen, Alternative NC would have an average annual potential yield of about 92 MMCF (438 MMBF) during the 1st decade. This is 51% higher than the average annual harvest on the Forest during 1979-88 and 30% higher than during 1984-88 (Timber volumes and other outputs and effects are in tables in "Outputs and Effects" later in this chapter) The quantity of hardwoods available for sale would be 8.5 MMCF (39 MMBF) per year Attaining these yields would involve regeneration harvesting and commercial thinning of an average of 12,000 acres per year during the 1st decade This would increase to an average of 30,000 acres per year in the 2nd through 5th decades. Rotation age for subsequent managed stands would generally be 80 or 90 years

In Alternative NC, none of the Forest would be managed specifically to meet NFMA regulations, or management requirements (MRs), and timber would be harvested on some slopes that have a high risk of landslides. (See Chapter III "Watershed" for a discussion of what constitutes high-risk soils) Although S&Gs and implementation methods to meet MRs were developed as part of more recent Forest planning, the TRP would protect some resources by reducing or eliminating timber harvest on certain lands

Although timber harvest would be fully or partially restricted on about 19,000 acres of streamside vegetation (reducing timber yields on these acres by 82%), water quality meeting state standards, as well as viable populations of fish, would not be ensured. An average of almost 11,000 riparian acres would be harvested each decade. By the 5th decade, amounts of fish habitat would average 69% below present and would vary across the Forest (see Chapter IV for details). Municipal watersheds would not be given special protection measures beyond those described for riparian and unstable soil areas

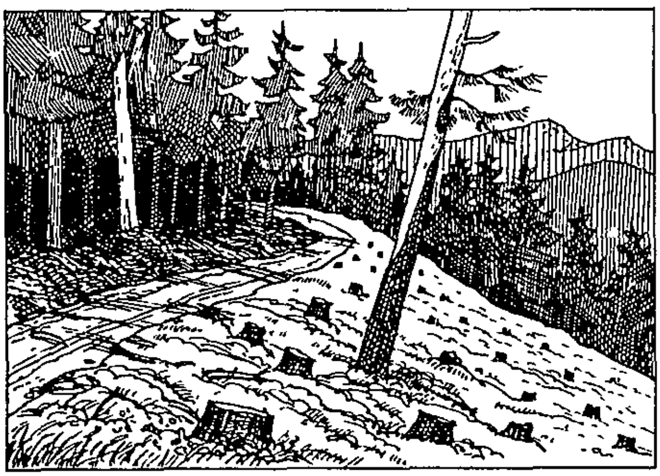
Unstable soils would be protected by not constructing roads on certain very steep areas Timber yields would be reduced 29% on the 84,000 acres in this category, primarily due to a restriction on construction of unstable midslope roads for commercial thinning Additional soil protection would come from not harvesting on all slopes in high-risk, unstable landtypes. Timber harvest would be eliminated on 22% of the 97,000 acres in this category.

Habitat for species dependent on riparian vegetation would be protected by withdrawal of about 6,000 acres from timber harvest, most of it in no-cut streamside buffers Deciduous-mix habitat would be protected on about 35,000 acres which largely overlap with other lands where timber harvest is excluded, such as soil leave areas and streamside buffers Timber yields would be reduced on about 5,000 acres of deciduous-mix habitat managed on 150-year rotations. Bald eagle habitat on 7,920 acres would be distributed among 198 40-acre patches that would be managed on 300-year rotations and expected to produce 63% of potential timber volumes An additional 13,000 acres of old-growth habitat would remain undisturbed on an interim basis to protect spotted owl populations. Although these lands were set aside in the TRP, pending allocation through the forest planning process, full timber yields from them were included in the potential yield calculations. The TRP does not establish elk population goals, deferring that decision to the forest planning process. In the interim the Forest would attempt to provide habitat to maintain the elk population at the 1979 level of about 2,500 animals. In reality, harvest patterns would create habitat capability for more than 2,500 elk.

There would be no undeveloped areas outside the Oregon Dunes National Recreation Area (NRA) and the three Wildernesses established by Congress in 1984. Opportunities for SPNM recreation would be provided in the Wildernesses and in two undeveloped areas in the Oregon Dunes NRA. Areas around Cape Perpetua and Marys Peak, totaling over 1,500 acres, would be managed as SIAs Other special recreation management areas would include the Heceta Head and Grand Ronde-Nestucca Trail historic sites (50 acres). Visual resource management would be provided by a 39% reduction in timber yield on 49,170 acres adjacent to selected travel routes. Two Research Natural Areas (RNAs) would continue to exist (1,356 acres) and one area, Reneke Creek, would be proposed for future designation as an RNA (600 acres).

If the estimated potential yield of 438 MMBF per year were harvested, Forest Service receipts and payments to counties would increase twofold in the 1st decade Employment opportunities would also increase, most noticeably in nearby communities whose economies rely on lumber and wood products.

Alternative NC would transform the Forest into a highly managed forest area which would, in time, resemble industrial timberland In the future, visitors would see many stands of young trees. Evidence of recent logging activity would be widespread. There would be about one-third of the old-growth and mature trees that exist today National Forest scenery along the most visually important highways would have a natural appearance. In addition, recreational use at developed sites would be heavy. An expanded road system would give easier access to much of the Forest. Wildlife such as elk which benefit from disturbance of vegetation would be more conspicuous.



Alternative NC at a Glance

DESCRIPTION	VALUE
Potential yield in the 1st decade (million cubic feet) (1)	92
Potential yield in the 1st decade (million board feet) (1)	438
Acres suitable for timber production	508,000
Percent of suitable acres managed on rotations of 80 years or less	78
Coho smolt habitat capability index in the 5th decade (2)	316
Number of spotted owl habitat areas (3)	0
Spotted owl habitat capability expected in the 5th decade	8
Elk habitat capability expected in the 5th decade	NA
Percent of SPNM demand expected to be met in the 5th decade (4)	23
Viewshed acres managed to protect scenery (5)	49,170
Acres of undeveloped areas outside the Oregon Dunes NRA	0
Employment dependent on the Forest (% change-1st decade) (6)	+40
Present net value (PNV) of the Forest (billions of dollars)	Unavailable (7)

(1) Potential yield is not directly comparable to ASQ See discussions later in this chapter
(2) This index is a relative estimate of the number of smolts (in thousands of fish) that could be supported by the stream ecosystem
(3) The TRP did not specify the number, size or location of habitat sites 13,000 acres were set aside in an interim policy See Chapter IV
(4) SPNM recreation was not addressed in the TRP This figure assumes the same management of the Oregon Dunes NRA roadless areas and the same level of trail development in Wildernesses and Oregon Dunes NRA as in Alternative A.
(5) This figure from the TRP is not directly comparable to viewshed figures for other alternatives because it includes some acreage of the modification Visual Quality Objective (VQO) in foregrounds, and does not meet the partial retention VQO in middleground
(6) Not provided in the TRP This estimate is based on the timber harvest level in Alternative NC and other resource levels in Alternative B
(7) PNV figures in the TRP are for a period of five decades and include only the timber program For Alternatives A through H, PNV figures are for a period of 15 decades and include all resource programs Comparable PNV for Alternative NC has not been calculated, it would probably be higher than Alternative B(Dep) because its harvest level is higher Alternative B(Dep) PNV is estimated at $2 3 billion for 150 years at 4 %

Point/Counterpoint Comparison - Alternative NC

POINT	ISSUE	COUNTERPOINT
Annual potential yield (92 5 million cubic feet/year) would be 51% higher than average annual harvest during 1979-1988	1 Timber	Annual potential yield would exceed demand as estimated by the RPA goal
Old growth would be provided in 93 bald eagle nest areas, 27 in reserved areas and 66 on 300-year rotations	2 Old Growth	The 66 managed bald eagle sites would be 40 acres each There would be no old growth for aesthetic, research, recreational or wildlife use outside of Wildernesses (10,000 acres) and bald eagle sites
Buffer strips would be left on 19,000 acres along Class-I and -II and unstable Class-III streams Leave areas would be left on 21,500 acres of unstable soils.	3 Water	Because the TRP soil inventory underestimated high risk soils and riparian acreage, many sensitive sites including unstable soils and stream adjacent slopes would be harvested Water quality would often not meet state standards
About 22% of the riparian zone would be protected from harvest disturbance	4 Fish	Viability of fish would be threatened in some streams
Bald eagle habitat would be provided Spotted owl habitat would be provided into the 5th decade Species dependent on conifer stands less than 90 years old would likely increase	5 Wildlife	Not all wildlife species would be provided habitat needed to maintain viability Populations of spotted owls and species dependent on mature conifer probably would not maintain viability past the 5th decade
Cape Perpetua and Marys Peak are established as SIAs for recreation	7 Special Interest Areas	Mt Hebo and Kentucky Falls would not be proposed as SIAs and would not receive scenic protection
Modified management on about 49,000 acres would provide some protection on the most visually important roadsides	9 Visual	Scenery would not be protected on the remaining acreage along visually important roads Visual quality objectives would not be fully met on about 80% of the 49,000 acres
Four undeveloped areas in the Oregon Dunes NRA Area would be maintained	11 Undevel-oped Areas	No other undeveloped areas would be maintained Projected demand for SPNM recreation would exceed capacity in the 1st decade
Reneke Creek would be proposed as an RNA.	12 Research	Sand Lake and Cummins/Gwynn Creek would not be proposed as RNAs
Job opportunities related to timber resources would increase Opportunities for some personal uses of the Forest (i e , elk hunting, firewood gathering, and roaded recreation) would increase	13 Commu-nities	People who want the Forest used for resources which are inconsistent with timber harvest would be less satisfied as levels of old growth, some wildlife species, water quality, undeveloped areas, and visual quality were reduced
Present net value (PNV) and cash flow in the 1st decade would probably be the highest of all the alternatives Receipts from the timber program alone would be high, as would payments to counties	14 Eco-nomics	PNV would be less than it could be because emphasis would be on growing as much wood as possible and not on economic efficiency

Alternative A (No Action) Description

Alternative A would continue the current course of action under approved unit management plans and other resource plans modified to meet MRs. The approved plans emphasize wood production and distribute harvests to each Ranger District based on its long-term sustained yield capacity (LTSYC) The plans also emphasize habitat for bald eagles and elk. There is little emphasis on maintaining old-growth stands (either as habitat in addition to MRs for spotted owls, or for other reasons), undeveloped areas, and trail development in Wildernesses. Scenery along part of the visually important roads would be protected.

This is the "no action" alternative, meaning no change from current management goals and activities. Existing plans were used to guide management of different parts of the Forest. Since some inventories completed more recently than the plans were used to predict results of implementation, this no action alternative does not always show the same outputs as current plans. Improvements have been made in soil inventories, riparian inventories, growth and yield predictions from managed timber stands, and estimates of numbers of animals living in various habitats Measures would be taken in this alternative to protect riparian areas and provide habitat for bald eagles and wildlife species dependent on dead and defective trees

If Alternative A were chosen, ASQ during the 1st decade would be 65 9 MMCF (351 MMBF), which is 21% higher than the average harvested on the Forest during 1979-1988 and 5% higher than during 1984-1988. (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter). The quantity of hardwoods available for sale would be 8.5 MMCF (31 MMBF) per year. Thirty percent of the land suitable for timber production would be managed on timber rotations of 90 years or more Timber would be harvested on some land with old-growth stands and land with relatively high risk of landslides (See Chapter III "Watershed" for a discussion of what constitutes high-risk soils)

MRs would maintain water quality that meets state standards, as well as viable populations of fish. An average of over 2700 riparian acres would be harvested each decade By the 5th decade, amounts of fish habitat would average 16% below present and would vary across the Forest (see Chapter IV for details) Complete protection would be provided to riparian areas in the Corvallis Municipal Watershed, and riparian areas in other municipal watersheds would be partially protected

MRs would maintain viable populations of wildlife Enough old-growth habitat would be maintained so that the spotted owl would continue to exist as a species on the Forest (at a habitat capability 63% of present levels) Habitat for bald eagles and other threatened and endangered (T&E) species would remain the same or increase Elk habitat capability would be 81% of present levels in the 5th decade

There would be no undeveloped areas outside the Oregon Dunes NRA and opportunities for SPNM recreation would be limited to Wildernesses and two undeveloped areas in the NRA SPNM opportunities would drop below demand during the 1st decade, and meet 23% of the demand in the 5th decade Scenery along most visually important roads would be fully or partially protected, although scenery along about one-third of them would be unprotected Flynn Creek and Neskowin Crest would continue as RNAs, and Reneke Creek would be proposed for future designation as an RNA

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 49% over the 1979-1988 average by the 1st decade Employment opportunities should also increase, most noticeably in nearby communities whose economies rely on lumber and wood products. Costs to operate the Forest would increase 19%. PNV of the Forest would be $2 1 billion.

Alternative A would continue transformation of the Forest into a managed forest area which, from a vista point, would have a patchwork appearance. A visitor in the year 2000 would see many stands of young trees, and an intensive program of improving stands for timber yields. Small to moderately-sized stands of old growth and mature trees would remain scattered at relatively regular intervals throughout the Forest. There would be many signs of logging and recreational uses at developed sites. An expanded road system would give easier access to much of the Forest. There should be more habitat for some wildlife than now, and there should be more wildlife to view.

Alternative A at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	65 9
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	351
Acres suitable for timber production	381,000
Percent of above managed on rotations of 80 years or less	70
Coho salmon habitat capability index in the 1st decade	858
Spotted owl habitat capability expected in the 5th decade	22
Pairs of spotted owls expected in the 5th decade	37
Elk habitat capability expected in the 5th decade	8,020
Percent of SPNM demand expected to be met in the 5th decade	23
Viewshed acres managed to protect scenery	35,937
Acres of undeveloped areas outside the Oregon Dunes NRA	0
Employment dependent on the Forest (% change-1st decade)	+20
Present net value of the Forest (billions of dollars)	2 1

Point/Counterpoint Comparison - Alternative A

POINT	ISSUE	COUNTERPOINT
Allowable timber sale quantity (65 9 million cubic feet/year) would be 21% higher than the average harvested on the Forest over the last 10 years	1 Timber	ASQ would be 29% lower than proposed in present plans and about 17% lower than RPA expectations Amounts of hardwoods available for sale should exceed demand
Old-growth stands with high economic value would be available for harvest	2 Old growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
Riparian zones would be completely protected in the Corvallis Watershed and moderately protected in other municipal watersheds, water from all watersheds would meet state water quality standards	3 Water	Unstable slopes outside of the riparian zone in all watersheds would be protected at MR levels
Most of the riparian zone would be protected from harvest disturbance	4 Fish	Levels of fish habitat would decline
All wildlife species should be provided habitat needed to maintain viability, except for bald eagles, habitat would exceed that provided in previous plans Species most likely to increase would be those dependent on conifer stands less than 80 years old	5 Wildlife	Species could be lost if adequacy of MRs were overestimated, margin for error would be narrow when managing at MR levels of habitat Elk habitat would decrease from present levels
Cape Perpetua and Marys Peak are established as SIAs for recreation	7 Special Interest Areas	Mt Hebo and Kentucky Falls would not be proposed as SIAs and would be available for timber harvest
Scenery would be fully or partially protected along about two-thirds of the visually important roads	9 Visual	Scenery would not be protected along the remaining one-third of visually important roads
Four undeveloped areas in the Oregon Dunes NRA would be maintained	11 Undeveloped Areas	No other potential undeveloped areas would be maintained Projected demand for SPNM recreation would exceed capacity in the 1st decade
Reneke Creek would be proposed as a potential RNA.	12 Research	Sand Lake and Cummins/Gwynn Creek would not be proposed as potential RNAs
Job opportunities related to Forest resources should increase Opportunities for some personal uses of the Forest (i e , firewood gathering and roaded recreation) would increase	13 Communities	People who want the Forest used for resources which are inconsistent with timber harvest would be less satisfied as levels of old growth, some wildlife species, water quality, undeveloped areas, and visual quality were reduced
PNV would be $2 1 billion Receipts would be high ($70 million/year), as would payments to counties	14 Economics	The emphasis on maximizing wood production reduces PNV Costs to operate ($32 million/year) would exceed current budgets by $5 million

Alternative B Description

Alternative B would emphasize efficient production of wood products Soil, water, fish, and wildlife resources would be managed at levels that meet MRs

If this alternative were chosen, ASQ during the 1st decade would be 69.1 MMCF (381 MMBF), which would be 31% higher than the average harvested on the Forest during 1979-1988 and 13% higher than harvested during 1984-1988. (For timber and other outputs, see tables in "Output and Effects" later in this chapter). Eighty-nine percent of land suitable for timber production would be managed on rotations of 80 years or less, with the remainder 90 years or more The quantity of hardwoods available for sale would be 5.8 MMCF (21 MMBF) per year.
MRs would maintain water quality that meets state standards, as well as viable populations of fish. Timber would be harvested on an average of 4,100 acres of the riparian zone (along 168 miles of stream) each decade, and on some slopes prone to landslides By the 5th decade, amounts of fish habitat would average 27% below present (see Chapter IV for variability across the Forest).

MRs would maintain viable populations of wildlife By the 5th decade, 59% of existing habitat capability for spotted owls would remain. Habitat capability for bald eagles would still be adequate for recovery of the species Elk habitat capability would drop 29% by the 5th decade.

Opportunities for SPNM recreation would drop below demand during the 1st decade and meet 30% of demand in the 5th decade, although there would be some development of trails in existing Wildernesses No undeveloped areas would be reserved outside the Oregon Dunes NRA. There would be no protection of scenery along visually important roads. Flynn Creek and Neskowin Crest would continue as RNAs

Assuming that all the ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 70% by the 1st decade Costs to operate the Forest would increase by 18%. Employment opportunities should also increase, most noticeably in nearby communities dependent on lumber and wood products PNV of the Forest would be $2.2 billion.

Alternative B would accelerate transformation of the Forest into a managed forest area which, from a vista point, would have a patchwork appearance. A visitor in the year 2000 would see many stands of young trees, and an intensive program of improving stands for timber yields. There would be fewer old-growth and mature trees than exist today There would be many signs of logging and recreational uses at well-maintained developed sites. Scenery along all visually important roads, including Highway 101, would be altered. An expanded road system would give easier access to much of the Forest. Wildlife such as elk that benefit from ecological disturbance would be more conspicuous.

Alternative B at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	69 1
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	381
Acres suitable for timber production	403,000
Percent of above managed on rotations of 80 years or less	89
Coho salmon habitat capability index in the 5th decade	748
Number of spotted owl habitat areas	22
Spotted owl habitat capability expected in the 5th decade	35
Elk habitat capability expected in the 5th decade	7,100
Percent of SPNM demand expected to be met in the 5th decade	30
Viewshed acres managed to protect scenery	0
Acres of undeveloped areas outside the Oregon Dunes NRA	0
Employment dependent on the Forest (% change-1st decade)	+30
Present net value of the Forest (billions of dollars)	2 2

Point/Counterpoint Comparison - Alternative B

POINT	ISSUE	COUNTERPOINT
ASQ (69 1 MMCF/year) would be 31% higher than the average harvested on the Forest over the last 10 years Amounts of hardwood available should meet demand Short timber rotations would favor timber production	1 Timber	ASQ would be 25% lower than proposed in present plans and about 13% lower than RPA expectations. Intensive timber management could eliminate some future management options
Old-growth stands with high economic value would be available for harvest.	2 Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
Water from all watersheds would meet state water quality standards.	3 Water	Municipal watersheds and unstable slopes would be protected at MR levels
Viable populations of fish would be maintained.	4 Fish	Fish habitat would be protected at MR levels, mitigation would be costly
All wildlife species should be provided habitat needed to maintain viability, except for bald eagles, habitat would exceed that provided in previous plans Species most likely to increase would be those dependent on conifer stands less than 80 years old Elk habitat capability would remain good	5 Wildlife	Species could be lost if adequacy of MRs were overestimated, margin for error would be narrow when managing at MR levels of habitat. Elk habitat capability would decrease
Cape Perpetua and Marys Peak are established and Mt Hebo would be proposed as SIAs for recreation	7 Special Interest Areas	Kentucky Falls would not be proposed as an SIA and would be available for timber harvest
Reforested clearcut units would provide some scenery	9 Visual	Scenery would not be protected along visually important roads on the Forest
Four undeveloped areas in the Oregon Dunes NRA would be maintained	11 Undeveloped Areas	No other potential undeveloped areas would be maintained Projected demand for SPNM recreation would exceed capacity in the 1st decade
Areas proposed as potential RNAs in other alternatives would initially be available for research on natural systems	12 Research	No additional areas would be proposed as potential RNAs, so there would be fewer opportunities for research on natural systems in the future
Job opportunities related to Forest resources should increase Opportunities for some personal uses of the Forest (i e , elk hunting, firewood gathering, and roaded recreation) would increase	13 Communities	People who want the Forest used for resources which are inconsistent with timber harvest would be less satisfied as levels of old growth, some wildlife species, water quality, undeveloped areas, and visual quality were reduced
PNV would be $2 2 billion Receipts would be high ($80 million/year) as would payments to counties	14 Economics	This alternative would not rank high in nonpriced benefits Costs to operate ($32 million/year) would exceed current budgets by $5 million

Alternative B Departure (RPA) Description

Alternative B(Dep) would attempt to implement the current RPA Program distributed to the Forest through the Regional Guide, attempt to meet timber objectives of the Oregon Department of Forestry, and would emphasize economic efficiency. It would produce large amounts of wood in the 1st decade by departing from a NDF harvest schedule and still produce at least minimum levels of dispersed recreation, fish, and wildlife.

This is the RPA alternative. This alternative would meet RPA timber goals for the 1st decade, and could meet some other RPA goals Its objectives are the same as for Alternative B, except that a departure schedule for timber is added Only aspects of Alternative B(Dep) that vary from Alternative B are discussed here

If this alternative were chosen, ASQ during the 1st decade would be 79 8 MMCF (439 MMBF), which is 51% higher than the average harvested on the Forest during 1979-1988 and 31% higher than during 1984-1988. (For timber and other outputs, see tables in "Output and Effects" later in this chapter) Eighty-nine percent of land suitable for timber production would be managed on rotations of 80 years or less. Timber objectives for RPA would be met during the 1st decade. This alternative emphasizes cost efficiency, and also includes 6 5 MMCF (23 MMBF) of hardwoods available for sale annually.

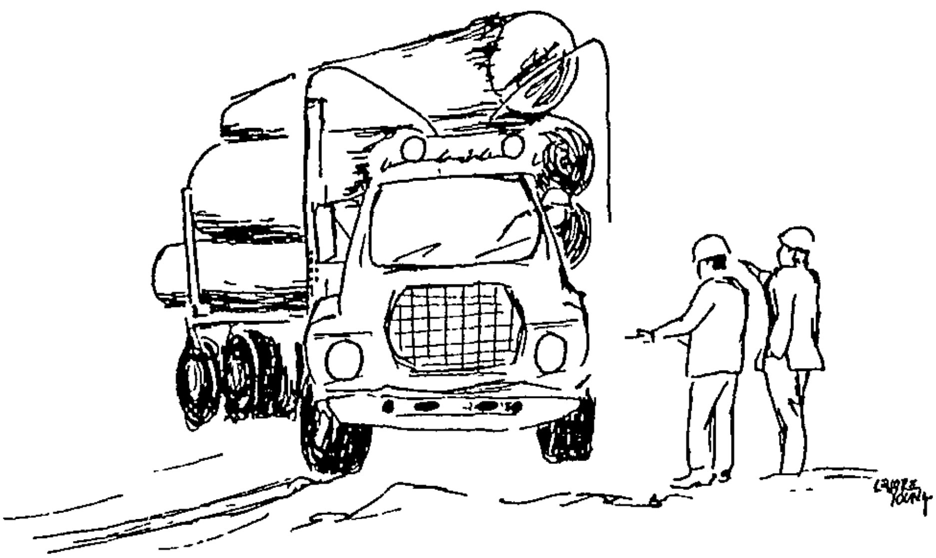
MRs would maintain water quality that meets state standards, as well as viable populations of fish Timber would be harvested on an average of about 6,400 acres of the riparian zone during each decade. By the 5th decade, amounts of fish habitat would average 37% below present levels (see Chapter IV for variability across the Forest) Because departure scheduling produces so much of the total forage during the 1st decade, elk habitat capability would decrease 20% by the 5th decade.

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would nearly double by the 1st decade Employment opportunities should also increase, most noticeably in nearby communities whose economies rely on lumber and wood products. These opportunities would drop commensurate with the fall in timber harvest after the 1st decade. Costs to operate the Forest would increase 22% over the 1979-1988 average. Gain in cost efficiency during the 1st decade would be somewhat offset by losses in later decades, and PNV would be $2.3 billion.

Alternative B(Dep) would noticeably transform the Forest into a managed forest area which, from a vista point, would have an extensive patchwork appearance. In the year 2000, the Forest would be dominated by signs of logging during the previous decade There would also be signs of recreational uses at well-maintained developed sites. Streams would be noticeably affected by logging activities.

Alternative B(Dep) at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	79 8
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	439
Acres suitable for timber production	403,000
Percent of above managed on rotations of 80 years or less	81
Coho salmon habitat capability index in the 5th decade	640
Number of spotted owl habitat areas	22
Spotted owl habitat capability expected in the 5th decade	35
Elk habitat capability expected in the 5th decade	7,070
Percent of SPNM demand expected to be met in the 5th decade	30
Viewshed acres managed to protect scenery	0
Acres of undeveloped areas outside the Oregon Dunes NRA	0
Employment dependent on the Forest (% change-1st decade)	+44
Present net value of the Forest (billions of dollars)	2 3



Point/Counterpoint Comparison - Alternative B (Dep)

POINT	ISSUE	COUNTERPOINT
ASQ during the 1st decade (79 8 MMCF/year) would meet RPA targets. Hardwoods available would meet demand Short timber rotations would favor timber production	1 Timber	ASQ would exceed the average harvest on the Forest over the last 10 years by 51% ASQ must drop in the 2nd to 5th decades to compensate for greater volumes sold in the 1st decade Intensive timber management could eliminate some future management options
Old-growth stands with high economic value would be available for harvest	2 Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
Water from all watersheds would meet state water quality standards	3 Water	Municipal watersheds and unstable slopes would be protected at MR levels
Viable populations of fish would be maintained	4 Fish	Fish habitat would be protected at MR levels, mitigation would be costly
All wildlife species should be provided habitat needed to maintain viability, except for bald eagles, habitat would exceed that provided in previous plans Species most likely to increase would be those dependent on conifer stands less than 80 years old Elk habitat would increase	5 Wildlife	Species could be lost if adequacy of MRs were overestimated, margin for error would be narrow when managing at MR levels of habitat
Cape Perpetua and Marys Peak are established and Mt Hebo would be proposed as SIAs for recreation	7 Special Interest Areas	Kentucky Falls would not be proposed as an SIA and would be available for timber harvest
Reforested clearcut units would provide some scenery	9 Visual	Scenery would not be protected along visually important roads on the Forest
Four undeveloped areas in the Oregon Dunes NRA would be maintained	11 Undeveloped Areas	No other potential undeveloped areas would be maintained Projected demand for SPNM recreation would exceed capacity in the 1st decade
Areas proposed as potential RNAs in other alternatives would initially be available for research on natural systems	12 Research	No additional areas would be proposed as potential RNAs, so there would be fewer opportunities for research on natural systems in the future
Job opportunities related to Forest resources would increase in the 1st decade Opportunities for some personal uses of the Forest (i e , firewood gathering and roaded recreation) would increase	13 Communities	People who want the Forest used for resources which are inconsistent with timber harvest would be less satisfied as levels of old growth, some wildlife species, undeveloped areas, and visual quality were reduced Job opportunities would decline in the 2nd decade
PNV would be $2 3 billion Receipts for the 1st decade would be high (93 million/year), as would payments to counties	14 Economics	PNV would be only slightly enhanced by departure from NDF harvest schedules Costs to operate ($33 million/year) would exceed current budgets by $6 million

Alternative C Description

Alternative C would emphasize production of wood while providing for a variety of recreational opportunities and production of big game This alternative attempts to attain a compromise between non-complementary resource objectives by assigning some lands to timber and elk management while others would be protected from timber harvest to enhance dispersed recreation and visual resources. Thus, the alternative would produce few high outputs except for elk Timber harvest would be distributed across the Forest and through time to provide a steady supply of forage for big game in clearcut units. This would be supplemented by forage in newly created meadows.

If this alternative were chosen, ASQ during the 1st decade would be 66.5 MMCF (365 MMBF), which is 26% higher than the average harvested on the Forest during 1979-1988 and 9% higher than the average harvested during 1984-1988. (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter). Eighty-one percent of land suitable for timber production would be managed on rotations of 80 years or less. The quantity of hardwoods available for sale would be 5 3 MMCF (19 MMBF) per year.

MRs would maintain water quality that meets state standards, as well as viable populations of fish. Timber would be harvested on an average of over 3,900 acres of riparian zone during each decade, much of it to provide forage for elk. Some slopes prone to landslides would be logged By the 5th decade, amounts of fish habitat would average 23% below present levels (see Chapter IV for variability across the Forest).

MRs would maintain viable populations of wildlife Old-growth habitat would be provided at the MR level and spotted owl habitat capability would be maintained at 61% of present levels Habitat capability for bald eagles would be adequate for recovery of the species. Elk habitat capability would increase more than 29% by the 5th decade

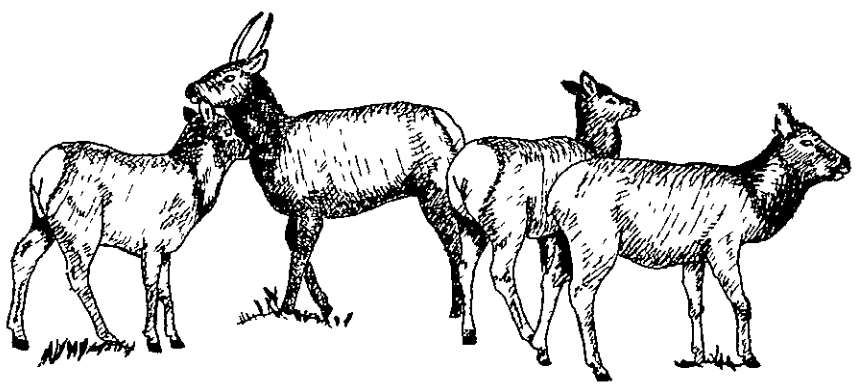
There would be some development of trails in existing Wildernesses Opportunities for SPNM recreation would keep pace with demand until the 2nd decade and meet 46% of demand in the 5th decade. Two undeveloped areas outside the Oregon Dunes NRA would be maintained (18% more acres than included in present plans) Scenery along more than one-third of the visually important roads would be partially or fully protected, although 35% fewer acres would be protected Flynn Creek and Neskowin Crest would continue as RNAs

Assuming that all the ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 65% over the 1979-1988 average by the 1st decade. Employment opportunities over the eight-county area should increase. Costs to operate the Forest would increase 20% This alternative would produce a PNV of $2 2 billion.

Alternative C would continue transformation of the Forest into a managed forest area which, from a vista point, would have a patchwork appearance. A visitor in the year 2000 would see many stands of young trees, and an intensive program of improving stands for timber yields These would contrast with a few large blocks of natural forest in undeveloped areas and Wildernesses and small to moderately-sized stands of old growth and mature trees scattered throughout the Forest for fish and wildlife There would be many signs of logging and recreational uses at well-maintained developed sites and in dispersed settings. Scenery along Highways 101 and 38 would appear natural, while scenery along about one-third of the rest of the visually important roads on the Forest would be partially protected An expanded road system would give easier access to much of the Forest. Wildlife such as elk that benefit from ecological disturbance would be conspicuous

Alternative C at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	66 5
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	365
Acres suitable for timber production	388,000
Percent of above managed on rotations of 80 years or less	81
Coho salmon habitat capability index in the 5th decade	787
Number of spotted owl habitat areas	22
Spotted owl habitat capability expected in the 5th decade	36
Elk habitat capability expected in the 5th decade	12,840
Percent of SPNM demand expected to be met in the 5th decade	46
Viewshed acres managed to protect scenery	24,756
Acres of undeveloped areas outside the Oregon Dunes NRA	7,400
Employment dependent on the Forest (% change-1st decade)	+26
Present net value of the Forest (billions of dollars)	2 2



Point/Counterpoint Comparison - Alternative C

POINT	ISSUE	COUNTERPOINT
ASQ during the first decade (66 5 MMCF/year) would be 26% higher than the average harvested on the Forest over the last 10 years Hardwood volumes available should meet demand	1. Timber	ASQ would be 28% lower than proposed in present plans and about 17% lower than RPA expectations
Old-growth stands with high economic value would be available for harvest	2 Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use.
Water from all watersheds would meet state water quality standards	3 Water	Municipal watersheds would be protected in the same manner as the rest of the Forest, unstable slopes would be protected at MR levels
Viable populations of fish would be maintained	4 Fish	Fish habitat would be protected at MR levels, mitigation would be costly
All wildlife species should be provided habitat needed to maintain viability; habitat would exceed that provided in previous plans Species most likely to increase would be those dependent on conifer stands less than 80 years old. Elk habitat would be the greatest of any alternative	5 Wildlife	Species could be lost if adequacy of MRs were overestimated; margin for error would be narrow when managing at MR levels of habitat Habitat for other wildlife dependent on mature conifer and old growth would be at MR levels
All areas would be established or proposed as SIAs for recreation	7 Special Interest Areas	Kentucky Falls SIA would be smaller than in some alternatives
Scenery would be fully or partially protected along more than one-third of the visually important roads on the Forest	9 Visual	Scenery would not be protected along about two-thirds of the visually important roads on the Forest
Wassen Creek and Drift Creek Adjacent would be maintained as undeveloped areas (along with areas in the Oregon Dunes RNA)	11 Undeveloped Areas	Undeveloped areas in Hebo-Nestucca and N Fk Smith River would be eliminated, projected demand for SPNM recreation would not be met after the 2nd decade
Areas proposed as potential RNAs in other alternatives would initially be available for research on natural systems	12 Research	No additional areas would be proposed as potential RNAs, so there would be fewer opportunities for research on natural systems in the future
Job opportunities related to Forest resources should increase Opportunities for some personal uses of the Forest (i e, elk hunting, firewood gathering, and roaded recreation) would increase	13 Communities	People who want the Forest used for resources which are inconsistent with timber harvest would be less satisfied as levels of old growth, some wildlife species, water quality, undeveloped areas, and visual quality were reduced
PNV would be $2 2 billion Receipts would be high ($78 million/year), as would payments to counties	14 Economics	Not every acre would be managed for its most efficient use Costs to operate ($32 million/year) would be $5 million higher than current budgets

Alternative D Description

The goal of Alternative D is to emphasize production of major commodities with market value (wood products, commercial fish - particularly salmon - and developed recreational activities for which a fee is paid) The Forest would be managed in a cost efficient manner, but not necessarily in an effort to produce highest dollar return Management direction to benefit wildlife would be that needed to meet MRs

This is the "market" alternative. This alternative includes often noncomplementary resource objectives, particularly production of timber and salmon There would be no harvest in riparian areas along perennial streams. Prime habitat for salmon was considered to be the southcentral part of the Forest containing the Alsea and North Fork Siuslaw rivers, as well as some streams flowing into the large coastal lakes. In these prime salmon areas, moderate and highly unstable slopes, and areas along intermittent streams would be extensively protected as well The rest of the land suitable for timber production would be harvested.

Measures would be taken in this alternative to enhance fish habitat, and limit amounts of timber harvesting in individual watersheds Measures also would provide habitat for bald eagles

ASQ during the 1st decade would be 60 6 MMCF (332 MMBF),which is 15% higher than the average harvested on the Forest during 1979-1988 and 1% below the average harvested during 1984-1988. (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter). Eighty-four percent of land suitable for timber production would be managed on rotations of 80 years or less. This would include some lands not considered prime salmon-producing areas where risk of landslides is relatively great (See Chapter III "Watershed"). The quantity of hardwoods available for sale would be 4 8 MMCF (18 MMBF) per year

MRs would maintain water quality that meets state standards None of the riparian zone would be harvested, and fish habitat in regions of the Forest that produce large numbers of salmon would be well protected Other parts of the Forest would be protected to a lesser degree, and after the 5th decade, amounts of fish habitat averaged over the entire Forest would be the same as at present (see Chapter IV for variability across the Forest)

MRs would maintain viable populations of wildlife By the 5th decade, 64% of the present habitat capability for spotted owls would remain Habitat capability for bald eagles would still be adequate to allow recovery of the species Elk habitat capability would drop 21% below present levels by the 5th decade

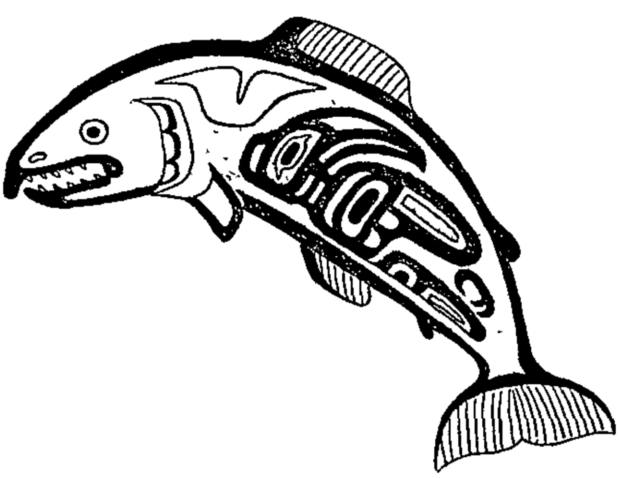
No undeveloped areas would be provided outside the Oregon Dunes NRA and there would be little development of trails. Opportunities for SPNM recreation would drop below demand during the 1st decade and meet 23% of demand in the 5th decade Scenery along Highway 101 (5% of the existing acres protected) would be protected Flynn Creek and Neskowin Crest would continue as RNAs, and Sand Lake would be proposed for future designation as an RNA.

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 49% over the 1979-1988 average by the 1st decade. Employment opportunities should increase with slight gains in industries associated with tourism, commercial fishing, and Forest Service activities Costs to operate the Forest would increase 12% This alternative would produce a PNV of $2 0 billion

Alternative D would continue transformation of the Forest into a managed forest area which, from a vista point, would have a patchwork appearance A visitor in the year 2000 would see many stands of young trees, and an intensive program of improving stands for timber yields. These would contrast with large blocks of natural forest in Wildernesses and salmon management areas and small to moderately-sized stands of old-growth and mature trees scattered throughout the Forest for fish and wildlife. There would be many signs of logging and recreational uses at well-maintained developed sites and more people fishing for salmon. Scenery would be heavily altered except along Highway 101. An expanded road system would give easier access to more of the Forest. Wildlife such as elk that benefit from ecological disturbance would be conspicuous

Alternative D at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	60 6
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	332
Acres suitable for timber production	341,000
Percent of above managed on rotations of 80 years or less	84
Coho salmon habitat capability index in the 5th decade	1,023
Number of spotted owl habitat areas	22
Spotted owl habitat capability expected in the 5th decade	38
Elk habitat capability expected in the 5th decade	7,900
Percent of SPNM demand expected to be met in the 5th decade	23
Viewshed acres managed to protect scenery	4,286
Acres of undeveloped areas outside the Oregon Dunes NRA	0
Employment dependent on the Forest (% change-1st decade)	+17
Present net value of the Forest (billions of dollars)	2 0



Point/Counterpoint Comparison - Alternative D

POINT	ISSUE	COUNTERPOINT
ASQ for the 1st decade (60 6 MMCF/year) would be 14% higher than the average harvested on the Forest over the last 10 years Hardwoods available for harvest should meet demand	1 Timber	ASQ would be 34% lower than present plans and about 24% lower than RPA expectations
Old-growth stands with high economic value would be available for harvest	2 Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
A balance of the Forest's two primary market resources (i e , timber and commercial fish) would be provided Fish habitat in Landtype Associations A, B, C, and D, where the streams with the highest value for salmon are located, would be well protected	4 Fish	Since commercial fish and timber management are not complementary, the balance would be attained by lowering potential outputs of both Unstable slopes would be protected at MR levels on other landtype associations
All wildlife species should be provided habitat needed to maintain viability	5 Wildlife	Species could be lost if adequacy of MRs were overestimated, margin for error would be narrow when managing at MR levels of habitat Elk habitat would decrease
Marys Peak and Cape Perpetua are established as SIAs for recreation	7 Special Interest Areas	Kentucky Falls and Mt Hebo would not be proposed as SIAs and would be available for timber harvest
Scenery along the coastal portion of Hwy 101 would be fully protected	9 Visual	Scenery along other visually important roads would not be protected
Four undeveloped areas in the Oregon Dunes NRA would be maintained	11 Undeveloped Areas	No other potential undeveloped areas would be maintained Projected demand for SPNM recreation would exceed capacity in the 1st decade
Sand Lake would be proposed as a potential RNA.	12 Research	Reneke Creek and Cummins/Gwynn Creek would not be proposed as potential RNAs
Opportunities for some personal uses of the forest (i e , salmon fishing, firewood gathering, and roaded recreation) would increase	13 Communities	People who want Forest used for nonmarket resources would be less satisfied as levels of old growth, visual quality, and undeveloped areas were reduced
PNV would be $2 0 billion Receipts ($70 million/year) and payments to counties would increase	14 Economics	Not every acre would be managed for its most efficient use Costs to operate (31 million/year) would exceed current budgets by $4 million.

Alternative E(PA) Description

The goal of Alternative E(PA), the alternative preferred by the Forest Service, is to provide a variety of recreational uses and fish and wildlife habitats, and to emphasize wood production. To produce the desired wildlife habitat, 26% of the 357,000 acres suitable for timber production would be managed on rotations of 90 years or more with additional intermediate thinning of tree stands Management direction to enhance nonmotorized recreation and nongame wildlife habitat would also benefit fish resources.

More emphasis has been placed on the following: protection of riparian areas and enhancement programs for anadromous fish habitat; riparian buffers and limits on timber harvest to maintain water quality in municipal watersheds; maintaining current levels of timber harvest and associated jobs and payments to counties; preservation of smaller old-growth groves for amenity values; and providing habitat for additional verified spotted owl pairs and additional distributional habitat using SEIS guidelines. Alternative E (PA) also has been redesigned to include an integrated recreation strategy consisting of provision of high quality destination sites in a coastal setting, "day-use" facilities that link coastal and inland areas, and opportunities for recreation in a forested setting close to urban areas in the Willamette Valley. The number of acres managed specifically for undeveloped recreation and certain species of wildlife has been reduced Two RNAs not included in the original alternative are now recommended for designation.

This alternative includes often noncomplementary resource objectives. Some lands would be protected for SPNM recreation and nongame wildlife while others would be managed for elk and wood Thus, outputs of most resources would be moderate Timber harvest would be distributed and scheduled to provide a steady supply of forage for big game in clearcut units. This would be augmented by forage produced in newly created meadows Measures would be taken in this alternative to protect riparian areas and provide habitat for spotted owls and species of wildlife dependent on mature conifer and snag habitat.

If this alternative were chosen, ASQ during the 1st decade would be 61.2 MMCF (332 MMBF), which is 15% higher than the average harvested on the Forest during 1979-1988 and 1% below the annual average harvested during 1984-1988 (for timber and other outputs, see tables in "Outputs and Effects" later in this chapter). A total of 264,000 of 357,000 acres suitable for timber production would be managed on rotations of 80 years or less The quantity of hardwood available for sale would be 5.2 MMCF (19 MMBF) per year.

An average of 1350 acres of the riparian zone would be harvested each decade, and most slopes prone to landslides would be protected. By the 5th decade, fish habitat would average 8% below present levels (see Chapter IV for variability across the Forest)

MRs would maintain viable populations of wildlife. By the 5th decade, 71% of present habitat capability for spotted owls would remain. Distribution of spotted owls on the northern portion of the Forest would be enhanced by providing SOHAS that link with habitat on BLM land Habitat capability for bald eagles would be adequate to allow recovery of the species Elk habitat capability during the 5th decade would be 7% below present levels

There would be moderate development of trails in existing Wildernesses and elsewhere Opportunities for SPNM recreation would drop below demand in the 1st decade and meet 40% of demand in the 5th decade. Two undeveloped areas outside the Oregon Dunes NRA (27% of the existing acres) and all SIAs for recreation would be designated. Scenery along over one-half of the visually important roads would be partially or fully protected (11% more acres than now). Flynn Creek and Neskowin Crest would continue as RNAs, and Sand Lake, Reneke Creek, and Cummins/Gwynn Creek would be proposed for future designation as RNAs. One thousand acres of old-growth groves and ecosystems would be maintained for amenity values and uses.

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 48% over the 1979-1988 average by the 1st decade Employment should increase with some gains in industries associated with tourism, commercial fishing, and Forest Service activities. Costs to operate the Forest would increase 17%. This alternative would produce a PNV of $2.0 billion.

Alternative E(PA) would continue transformation of the Forest into a managed forest area which, from a vista point, would have a patchwork appearance To a visitor in the year 2000, however, some of the Forest would appear to be natural. There would be fewer stands of young trees. Signs of logging of clearcuts would be less obvious A program of thinning to improve timber yields would be intense but these impacts would not be readily visible Natural forest in undeveloped areas and Wildernesses and scattered stands of old-growth and mature trees for fish and wildlife would blend more with the rest of the Forest Fishing and hunting should become more widespread. There should be more opportunities for nonmotorized recreation such as viewing wildlife. Scenery along many visually important roads would not be altered

Alternative E(PA) at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	61 2
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	332
Acres suitable for timber production	357,000
Percent of above managed on rotations of 80 years or less	74
Coho salmon habitat capability index in the 5th decade	936
Number of spotted owl habitat areas	29
Spotted owl habitat capability expected in the 5th decade	42
Elk habitat capability expected in the 5th decade	9,220
Percent of SPNM demand expected to be met in the 5th decade	40
Viewshed acres managed to protect scenery	39,402
Acres of undeveloped areas outside the Oregon Dunes NRA	7,300
Employment dependent on the Forest (% change-1st decade)	+20
Present net value of the Forest (billions of dollars)	2 0

Point/Counterpoint Comparison - Alternative E(PA)

POINT	ISSUE	COUNTERPOINT
ASQ during the 1st decade (61 2 MMCF/year) would be 14% greater than the average harvested on the Forest over the last 10 years, amounts of hardwoods available for sale should meet demand	1 Timber	ASQ would be 33% lower than proposed in present plans and about 23% lower than RPA expectations
Old-growth stands with high economic value would be available for harvest.	2 Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
Protection of most of the riparian zone would benefit fish habitat and watershed conditions	4 Fish	Unstable slopes outside the riparian zone would be protected at MR levels
More spotted owl habitat areas would be provided than in any other alternative except H	5 Wildlife	No single species or group of species would be emphasized Elk habitat would decrease
All areas would be established or proposed as SIAs for recreation	7 Special Interest Areas	The Kentucky Falls SIA would be smaller than in some alternatives
Scenery would be fully or partially protected along over one-half of the visually important roads	9 Visual	Scenery would not be protected along about one-half of the visually important roads on the Forest
Wassen Creek and Drift Creek Adjacent would be maintained as undeveloped areas (along with areas in the Oregon Dunes NRA).	11 Undeveloped Areas	Hebo-Nestucca and N Fk Smith River would not be maintained as undeveloped areas, SPNM demand would exceed capacity in the 1st decade.
All identified areas would be proposed as potential RNAs	12 Research	Remote and brushy terrain would limit opportunities for research on natural systems in forested areas
Opportunities for some personal uses of the Forest (i e , firewood gathering, viewing scenery, and roaded recreation) would increase	13 Communities	Some people who want the Forest used for certain amenities or commodities would be less satisfied as levels were reduced
PNV would be $2 0 billion Receipts ($70 million/year) and payments to counties would increase	14 Economics	All acres would not be managed for their most efficient uses Costs to operate ($32 million/year) would exceed current budgets by $5 million

Alternative F Description

Alternative F provides a range of recreational uses and opportunities while emphasizing production of habitat for fish and nongame wildlife, protection of scenic resources, and production of a moderate amount of timber

This alternative includes generally complementary resource objectives All Special Interest Areas and most undeveloped areas would be maintained for recreational purposes Management of most other land would benefit fish and nongame wildlife Timber would be harvested on short rotations on land where these other resources are not emphasized

Measures would be taken in this alternative to protect unstable slopes and riparian areas, enhance fish habitat, and constrain scheduling of timber harvest Other measures would provide habitat for spotted owls and species of wildlife dependent on mature conifer and dead and defective tree habitat.

If this alternative were chosen, ASQ during the 1st decade would be 52.6 MMCF (288 MMBF), which is 1% lower than the average harvested on the Forest during 1979-1988 and 14% lower than during 1984-1988. (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter). The quantity of hardwoods available for sale would be 5 5 MMCF (20 MMBF) per year Thirty-four percent of land suitable for timber production would be managed on rotations of 90 years or more.

None of the riparian zone would be harvested Also, slopes prone to landslides would be well protected, resulting in fish habitat 2% above present levels in the 1st decade (see Chapter IV for variability across the Forest)

MRs should maintain viable populations of wildlife By the 5th decade, 75% of present habitat capability for spotted owls would remain A moderate amount of deciduous-mix habitat would be available to wildlife associated with this type of habitat Habitat capability for bald eagles would be adequate to allow recovery of the species Elk habitat capability during the 5th decade would be 18% below existing levels

Three undeveloped areas outside the Oregon Dunes NRA (39% more acres than in present plans) would be provided and there would be considerable development of trails in existing Wildernesses and elsewhere. Opportunities for SPNM recreation would exceed demand until the 3rd decade and meet 65% of demand in the 5th decade Three SIAs for recreation would exist Scenery along about 80% of the visually important roads would be partially or fully protected A total of 50% more acres would be protected than at present Flynn Creek and Neskowin Crest would continue as RNAs, and Reneke Creek would be proposed for future designation as an RNA

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would increase 25% by the 1st decade Employment opportunities would increase somewhat Costs to operate the Forest would increase 7%. This alternative would produce a PNV of $1.8 billion

Alternative F would moderate transformation of the Forest landscape into a patchwork appearance To a visitor in the year 2000, the Forest would appear more natural than today There would be fewer stands of young trees Signs of logging would be less obvious There would be many signs of recreational uses of developed sites and SIAs Natural forest in undeveloped areas and Wildernesses, and scattered stands of old-growth and mature trees for fish and wildlife would blend with the rest of the Forest Tourism and fishing should become more widespread There should be more opportunities to view fish and wildlife Scenery along many visually important highways would appear natural

Alternative F at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	52 6
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	288
Acres suitable for timber production	314,000
Percent of above managed on rotations of 80 years or less	66
Coho salmon habitat capability index in the 5st decade	1,041
Number of spotted owl habitat areas	25
Pairs of spotted owls expected in the 5th decade	44
Elk habitat capability expected in the 5th decade	8,200
Percent of SPNM demand expected to be met in the 5th decade	65
Viewshed acres managed to protect scenery	53,237
Acres of undeveloped areas outside the Oregon Dunes NRA	16,200
Employment dependent on the Forest (% change-1st decade)	+7
Present net value of the Forest (billions of dollars)	1 8

Point/Counterpoint Comparison - Alternative F

POINT	ISSUE	COUNTERPOINT
ASQ during the 1st decade (52.6 MMCF/year) would be 1% lower than the average harvested on the Forest over the last 10 years	1. Timber	ASQ would be 43% lower than proposed in current plans and about 34% lower than RPA expectations. Amounts of land removed from the suitable timber base would be doubled, without proportionally decreasing levels of risk to other resources
Old-growth stands with high economic value would be available for harvest	2. Old Growth	Harvest of old-growth stands would reduce availability of a limited resource for aesthetic, recreational, scientific, and wildlife use
Levels of fish habitat would increase, unstable slopes would receive much more protection than recommended in current plans	4. Fish	Levels of fish habitat would be below potential
Levels of habitat for nongame wildlife would be high, including 25 spotted owl habitat areas	5. Wildlife	No single species or group of species would be emphasized. Elk habitat would decrease
All areas would be established or proposed as SIAs for recreation	7. Special Interest Areas	Opportunities for some types of recreation would be limited in these areas
Scenery along about 80% of the visually important roads would be fully or partially protected	9. Visual	Scenery along about 20% of visually important roads would not be protected
Wassen Creek, Hebo-Nestucca, and Drift Creek Adjacent would be maintained as undeveloped areas (along with the areas in the Oregon Dunes NRA)	11. Undeveloped Areas	N. Fk. Smith River would not be added as an undeveloped area, projected SPNM demand would exceed capacity in the 3rd decade
Reneke Creek would be proposed as a potential RNA.	12. Research	Sand Lake and Cummins/Gwynn Creek would not be proposed as potential RNAs
Opportunities for some personal uses of the Forest (i.e., fishing, firewood gathering, viewing scenery, and roaded recreation) would be maintained or increase	13. Communities	Job opportunities should remain about the same as now. People who want the Forest used for resources such as elk and old growth would be less satisfied.
PNV would be $1.8 million Receipts ($59 million/year) and payments to counties would increase	14. Economics	Nonpriced benefits would increase Costs to operate ($29 million/year) would exceed current budgets by $2 million

Alternative G Description

The goal of Alternative G is to enhance resources such as water quality, game fish and wildlife, dispersed recreation, scenery, and other amenities that do not have a direct market value.

This alternative includes complementary resource objectives, and would provide the highest simultaneous levels of recreational opportunities, fish and wildlife habitat, and protection for scenery, soil and water. All old growth would be protected. Timber harvest on short rotations would be scheduled to provide a steady supply of forage for big game in clearcut units. This would be augmented by forage produced in new meadows.

Measures would be taken in this alternative to protect unstable slopes and areas along both perennial and intermittent streams, and to limit timber harvesting in individual watersheds. These and other measures would enhance habitat for fish, spotted owls, bald eagles, and species of wildlife dependent on deciduous mix, mature conifer, and dead and defective tree habitat.

If this alternative were chosen, ASQ during the 1st decade would be 28.2 MMCF (151 MMBF), which is 48% lower than the average harvested on the Forest during 1979-1988 and 55% lower than during 1984-1988. (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter). The quantity of hardwood available for sale would be 3.3 MMCF (12 MMBF) per year Fifty-eight percent of land suitable for timber production would be managed on rotations of 90 years or more

None of the riparian zone would be harvested Slopes prone to landslides would be well protected, resulting in fish habitat 7% above present levels by the 5th decade (see Chapter IV for variability across the Forest).

Habitat capability for spotted owls would be maintained at 93% of present levels Large amounts of deciduous-mix habitat would be available to wildlife associated with this type of habitat Habitat capability for bald eagles would be adequate to allow recovery Elk habitat capability during the 5th decade would be slightly above present levels. This alternative would produce high levels of nongame wildlife and moderate levels of big game.

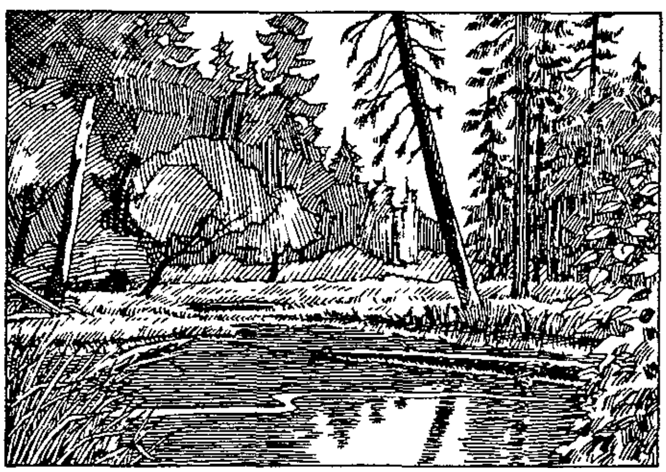
Opportunities for SPNM recreation would exceed demand until the 4th decade and meet 76% of demand during the 5th decade. Trails in existing Wildernesses and elsewhere would be developed to their fullest extent. Three undeveloped areas outside the Oregon Dunes NRA (76% of existing acres) and all Special Interest Areas for recreation would be included Scenery along all visually important roads would be partially or fully protected. There would be 66% more acres protected than at present Flynn Creek and Neskowin Crest would continue as RNAs, and Reneke Creek and Sand Lake would be proposed for future designation as RNAs

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would decrease 34% over the 1979-1988 average by the 1st decade. Employment opportunities would also decrease, primarily in industries relying on timber and Forest Service expenditures. Loss of jobs would be slightly offset by increases in industries associated with tourism and commercial fishing Costs to operate the Forest would decrease 12% This alternative would produce a PNV of $1 1 billion

Alternative G would reverse transformation of the Forest landscape into a patchwork appearance. To a visitor in the year 2000, large areas of the Forest would appear natural There would be relatively few stands of young trees Signs of logging would be less obvious than today There would be many signs of recreational uses of developed sites and signs of nonmotorized recreation in SIAs. Natural forest in undeveloped areas and Wildernesses, and large stands of old-growth and mature trees for fish and wildlife would dominate the Forest. Tourism, fishing, and hunting should become more widespread There should be more opportunities to view fish and wildlife. Scenery along most visually important roads would appear natural.

Alternative G at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	28 2
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	151
Acres suitable for timber production	183,000
Percent of above managed on rotations of 80 years or less	42
Coho salmon habitat capability index in the 5th decade	1,094
Number of spotted owl habitat areas	27
Spotted owl habitat capability expected in the 5th decade	55
Elk habitat capability expected in the 5th decade	10,200
Percent of SPNM demand expected to be met in the 5th decade	76
Viewshed acres managed to protect scenery	59,990
Acres of undeveloped areas outside the Oregon Dunes NRA	20,600
Employment dependent on the Forest (% change-1st decade)	-25
Present net value of the Forest (billions of dollars)	1 1



Point/Counterpoint Comparison - Alternative G

POINT	ISSUE	COUNTERPOINT
Large amounts of timber and site productivity would be preserved for future generations	1 Timber	ASQ during the 1st decade (28 2 MMCF/year) would be 70% lower than the average harvested on the Forest over the last 10 years, and about 65% lower than RPA expectations
Long timber rotations would provide a wider margin of error and maintain future management options		Timber yields are reduced by harvesting beyond CMAI
All stands of old growth would be protected, providing opportunities for aesthetic, recreational, scientific, and wildlife use of this type of forest.	2 Old Growth	The future of old-growth stands would be uncertain, lack of vegetation management could result in succession to some other type of habitat, old-growth stands with high economic value would not be available for harvest
Levels of fish habitat would increase, unstable slopes would be fully protected because no timber harvest would be permitted on high risk soils	4 Fish	Areas adjacent to intermittent streams would not be protected from harvest disturbance.
Habitat above MRs for both game and nongame wildlife and 27 SOHAs would be provided Elk habitat would increase from present levels	5 Wildlife	Every species of wildlife or group of species would be managed below its potential Elk habitat would be greater in some alternatives
All areas would be established or proposed as SIAs, including the most acreage of any alternative	7 Special Interest Areas	Opportunities for some types of recreation would be limited in these areas
Scenery along all visually important roads would be fully or partially protected and meet VMS goals	9 Visual	Scenery along about three-fourths of the visually important roads would be only partially protected
Capacity for SPNM recreation would exceed demand for 3 decades, Wassen Creek, Hebo-Nestucca, and Drift Creek Adjacent would be maintained as undeveloped areas (along with ODNRA areas)	11 Undeveloped Areas	N Fk Smith River would not be added as an undeveloped area, demand for SPNM recreation would exceed capacity in the 4th decade
Reneke Creek and Sand Lake would be proposed as potential RNAs	12 Research	Cummins/Gwynn Creek would not be proposed as a potential RNA
Opportunities for some personal uses of the Forest (i e , fishing, hunting, viewing scenery, and recreation associated with undeveloped areas and wildlife habitat) would increase People who were concerned with preservation of natural systems would be more satisfied because levels of old growth and undeveloped areas would be maintained or increase An intermediate level of all nonmarket resources would be provided	13 Communities	Job opportunities should decrease, especially in lumber and wood products, trade, and service industries All nonmarket resources would be managed below their potential
PNV would be $1 1 billion Receipts ($31 million/year) and payments to counties would decline	14 Economics	Nonpriced benefits would increase Costs to operate ($24 million/year) would be $3 million less than current budgets

Alternative H Description

The goal of Alternative H is to preserve natural systems in large areas of the Forest and to protect habitats of nongame wildlife and fish. There would be particular emphasis on maintaining all old-growth stands and protecting soil and water resources.

Resource objectives in this alternative are complementary. Large areas that are prone to landslides or adjacent to streams would be preserved to protect fish habitat. These assignments often would augment large undeveloped areas Usually, timber would be harvested in a way to benefit wildlife habitat Undeveloped recreational facilities would be provided where they would not conflict with natural conditions and with the habitat of nongame wildlife and fish.

Measures would be taken in this alternative to protect unstable slopes, municipal watersheds, and areas along both perennial and intermittent streams to enhance fish habitat, and constrain scheduling of timber harvest. These and other measures would also provide habitat for spotted owls, bald eagles, *and species of wildlife dependent on deciduous mix, mature conifer, and dead and defective tree habitat*

If this alternative were chosen, ASQ during the 1st decade would be 13 5 MMCF (72 MMBF), which is 75% lower than the average harvested on the Forest during 1979-1988 and 79% lower than during 1984-1988 (For timber and other outputs, see tables in "Outputs and Effects" later in this chapter) The quantity of hardwoods available for sale would be 1 7 MMCF (6 MMBF) per year. Land suitable for timber production would be managed on rotations of 90 years or more. Most acres suitable for timber production would be managed to benefit wildlife and visual resources Most plantations would be managed for a mixture of deciduous and coniferous trees

None of the riparian zone would be harvested All slopes prone to landslides would be fully protected, resulting in average fish habitat 10% above present levels by the 5th decade (see Chapter IV for variability across the Forest) All watersheds used for municipal water supply would be closed to timber harvest and public access, except when needed to meet wildlife objectives

Slightly more habitat capability would be provided for spotted owls than at present. Large amounts of deciduous-mix would be available to wildlife associated with this type of habitat Management areas for bald eagles would be exceptionally large and habitat capability for the species would be adequate to allow recovery Elk habitat capability during the 5th decade would be 18% lower than present levels

Four undeveloped areas outside the Oregon Dunes NRA would be reserved (all exixting acres plus 10,000 acres of land that would revert to an undeveloped condition) and potential for SPNM recreation would be as great as possible Due to limited trail development in Wildernesses, SPNM opportunities would drop below demand during the 3rd decade and meet 65% of demand in the 5th decade Scientific and research opportunities relating to natural systems would be enhanced. Flynn Creek and Neskowin Crest would continue as RNAs, and Reneke Creek, Sand Lake, and Cummins/Gwynn Creek would be proposed for future designation as RNAs

Scenery along the 10 most visually important roads would be preserved; all others would be partially protected Total acres protected would be 66% greater than at present Altering of vegetation could not be used to provide vistas in protected areas.

Assuming that all ASQ would be harvested and the price of timber would increase 1%/year, Forest Service receipts and payments to counties would decrease 69% over the 1979-1988 average by the 1st decade Employment opportunities should also decrease, especially in industries relying on timber, Forest Service expenditures, and elk hunting. Loss of some jobs would be offset in industries associated with tourism and commercial fishing. Costs to operate the Forest would decrease 31% This alternative would produce a PNV of $0.8 billion

Alternative H would reverse present transformation of the Forest landscape into a patchwork appearance. To a visitor in the year 2000, large portions of the Forest would appear natural. Compared with now, there would be relatively few stands of young trees. Signs of logging would be inconspicuous, although clearcuts might stand out because of their scarcity. Natural forest in undeveloped areas and Wildernesses, and large stands of old-growth and mature trees for fish and wildlife, would dominate the Forest. There should be more opportunities to view nongame wildlife. Scenery along all visually important roads would appear natural.

Alternative H at a Glance

DESCRIPTION	VALUE
Allowable sale quantity (ASQ) in the 1st decade (million cubic feet)	13 5
Allowable sale quantity (ASQ) in the 1st decade (million board feet)	72
Acres suitable for timber production	133,000
Percent of above managed on rotations of 80 years or less	0
Coho salmon habitat capability index in the 5th decade	1,120
Number of spotted owl habitat areas	37
Spotted owl habitat capability expected in the 5th decade	60
Elk habitat capability expected in the 5th decade	8,120
Percent of SPNM demand expected to be met in the 5th decade	65
Acres managed to protect scenery in viewsheds	59,990
Acres of undeveloped areas outside the Oregon Dunes NRA	37,000
Employment dependent on the Forest (% change-1st decade)	-46
Present net value of the Forest (billions of dollars)	0 8

Point/Counterpoint - Alternative H

POINT	ISSUE	COUNTERPOINT
Long timber rotations (over 90 years) would benefit many resources Such conservative management would provide a wider margin for error and maintain future options Large amounts of timber and site productivity would be preserved for future generations	1 Timber	ASQ during the 1st decade (13 5 MMCF/year) would be 75% lower than the average harvested on the Forest over the last 10 years; large amounts of land would be removed from the productive timber base Timber volume offered for sale would be reduced
All stands of old growth would be protected, providing opportunities for aesthetic, recreational, scientific, and wildlife use of this type of forest	2 Old Growth	The future of old-growth stands would be uncertain, succession to another type of habitat is possible, old-growth stands with high economic value would not be available for harvest
There would be little risk of contamination of water from municipal watersheds	3 Water	Less vegetation management could increase risk of damage to watersheds from wildfire
Levels of fish habitat would increase Environmental damage to streams would be uncommon	4 Fish	Access for enhancement projects would be limited Some damage might occur if small inclusions of unstable land exist where timber is harvested
2,000 acres of habitat would be provided in each of 37 SOHAs	5 Wildlife	Every species or group of species would be managed below its potential Elk habitat would decrease
Cape Perpetua and Marys Peak are established and Mt Hebo proposed as SIAs for recreation	7 Special Interest Areas	Kentucky Falls would not be proposed as an SIA , but would be included in an undeveloped area
Scenery along all visually important roads would be either preserved or partially protected	9 Visual	Alteration of vegetation could not be used to maintain or create scenic views in preserved areas In partially protected areas, scenery except that in the foreground could be heavily altered by other activities
Potential for SPNM recreation would be at maximum, Wassen Creek, Hebo-Nestucca, N Fk Smith River, and Drift Creek Adjacent would be maintained as undeveloped areas	11 Undeveloped Areas	SPNM use would be limited because of lack of trail development, projected SPNM demand would exceed capacity in the 3rd decade
All identified areas would be proposed as potential RNAs A full range of natural systems would be provided	12 Research	Remote and brushy terrain would limit research on natural systems in forested areas Much of the Forest has low natural diversity
Opportunities for some personal uses of the Forest (i e , fishing, viewing scenery, and recreation associated with wildlife) would be maintained or increase People who were concerned with preservation of natural systems would be more satisfied as old growth and undeveloped areas were maintained	13 Communities	Job opportunities would decrease, especially in timber and wood products, trade, and services industries Opportunities for some personal uses of the Forest (i e , hunting and firewood gathering) would decrease
PNV would be 0.8 billion Receipts ($15 million/year) and payments to counties would be low	14 Economics	Nonpriced benefits would be high Costs to operate ($19 million/year) would be $8 million less than current budgets

COMPARISON OF ALTERNATIVES

This section presents the alternatives in a way that they can be easily compared. Aspects presented for comparison include

- Responsiveness to issues and concerns,
- Assignment of land to management areas,
- Management of Forest resource programs,
- Resource outputs,
- Environmental effects, and
- Costs and benefits

In addition to tables, narrative sections describe differences between alternatives.

No mathematical formula can define the preferred alternative Indeed, there are differences of opinion about particular effects of alternatives Therefore, major effects of each alternative must be the basis for review, judgment, and eventual selection.

The following pages summarize outputs and effects that differ significantly among alternatives (Outputs and effects projected for each alternative are based on the assumption that ASQ for each year will be harvested) Comparison of the alternatives in terms of those issues pertinent to the Mapleton lawsuit is presented in Appendix E.

Response to Issues and Concerns

How alternatives respond to Issues, Concerns, and Opportunities (ICOs) is portrayed in Table II-2 *For each alternative, information in the table describes how each ICO is specifically resolved* In Table II-2, "existing" represents conditions attained during the last 10 years through management based on some older direction, and clearly differs from projections for the next 10 years under Alternative A using present direction, including MRs Responses in more quantitative and qualitative terms, such as lifestyles of local communities, are discussed in "Outputs and Effects" later in this chapter.

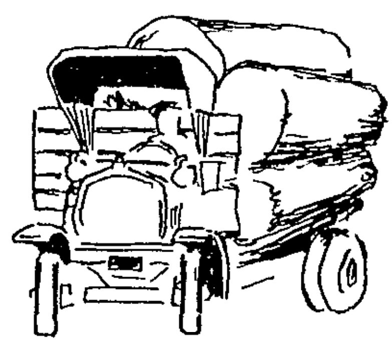


Table II-2. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
1. TIMBER						
Land Suitable for Timber Production (MAcres)	381	508 (1)	381	403	403	388
Allowable Sale Quantity 1st Decade (MMCF/Yr) 5th Decade (MMCF/Yr) 1st Decade (MMBF/Yr)	 62 4/57 6 (2) 338/312 (2)	 92 5 104 7 438	 65 9 65 9 351	 69.1 69 1 381	 79 8 57 5 439	 66 5 66 5 365
Long Term Sustained Yield Capacity (MMCF Per Year)	NA	109.3	69 4	80 4	80.9	77 2
Percent of Suitable Acres Managed on Rotations of· 60-80 Years 90-100 Years 110+ Years	 70 17 13	 78 19 3	 70 17 13	 89 8 3	 81 13 6	 81 13 6
Hardwood Volume in ASQ 1st Decade (MMCF/Yr) 1st Decade (MMBF/Yr)	 Approx 4 9-5 4 Approx 18-20	 8 5 39	 8 5 31	 5 8 22	 6 5 23	 5 3 19
2. OLD GROWTH						
Retained Acres (MAcres) 1st Decade 5th Decade Rate of Harvest (MAcres)· 1st Decade	 34 	 24 10 (3) 10	 27 21 7	 22 20 12	 22 21 12	 23 21 11
3. WATERSHEDS						
Protection of Unstable Slopes (Vegetation leave in MAcres)	Vegetation left on all slopes with a high risk of landslides, regardless of landtype (68 3)	Vegetation left only in high-risk landtypes	Same as existing condition	Same as existing condition	Same as existing condition	Same as existing condition
Estimated Number of Landslides Per Year Associated with Harvesting 1st Decade	79	141 (4)	92	88	106	86

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
1. TIMBER					
Land Suitable for Timber Production (MAcres)	341	357	314	183	133
Allowable Sale Quantity					
1st Decade (MMCF/Yr)	60 6	61 2	52 6	28 2	13 5
5th Decade (MMCF/Yr)	60 6	61 2	52 6	28 2	17 0
1st Decade (MMBF/Yr)	332	332	288	151	72
Long-Term Sustained Yield Capacity (MMCF Per Year)	68 6	72 5	59 6	30 2	18 4
Percent of Suitable Acres Managed on Rotations of					
60-80 Years	84	74	66	42	0
90-100 Years	7	13	21	47	55
110+ Years	9	13	13	11	45
Hardwood Volume in ASQ					
1st Decade (MMCF/Yr)	4 8	5 2	5 5	3 3	1 7
1st Decade (MMBF/Yr)	18	19	20	12	6
2. OLD GROWTH					
Retained Acres (MAcres)					
1st Decade	23	31	26	34	34
5th Decade	21	23	24	34	34
Rate of Harvest (MAcres)					
1st Decade	11	3	8	0	0
3. WATERSHEDS					
Protection of Unstable Slopes (Vegetation leave in MAcres)	Same as existing condition, plus additional protection for slopes in prime salmon areas (106 2)	Same as existing condition	Vegetation left on all slopes with high or moderate risk of landslide (112 9)	Same as H	Same as F, plus vegetation left on all other land in high-risk landtypes (277 3)
Estimated Number of Landslides Per Year Associated with Harvesting					
1st Decade	75	79	70	30	13

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
Estimated Sediment Produced Per Year (M Cubic Yards) 1st Decade 5th Decade	 64	 101 (5) 48	 76 44	 71 50	 86 44	 71 51
Percent Watershed Harvestable per Decade	30	30	30	30	30	20
Protection Afforded Municipal Watersheds (MWS)	No harvest near perennial streams in MWS, public access restricted in Corvallis WS	Restricted access in Corvallis WS	Same as existing condition	No protection measures beyond those provided streams in other areas of the Forest	Same as B	Same as B
4. FISH HABITAT Protection of Riparian Areas in Lands Managed for Timber - Average Buffer Width by Stream Class	 65-70% of riparian areas, Class I & II - 90' buffer, Class III - 50' buffer.	 22% of riparian areas, Some buffers along 70% of Class I and II streams, and 50% of class III streams	 75% of riparian areas, Class I & II - 100' buffer, Class III - 60' buffer	 37% of riparian areas, 50' buffer along three sides of all perennial streams	 Same as B	 Same as B
Coho Smolt HCI (M Smolts) 1st Decade 5th Decade	1019	 830 (6) 316 (6)	 926 858	 951 748	 951 640	 950 787
Percent Change in Habitat Capability, Present to 5th Decade		-69	-16	-27	-37	-23

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
Estimated Sediment Produced Per Year (M Cubic Yards) 1st Decade 5th Decade	 66 46	 67 55	 60 42	 32 19	 17 13
Percent Watershed Harvestable per Decade	15	20	20	10	5
Protection Afforded Municipal Watersheds (MWS)	Same as existing conditions with additional restrictions on harvest and use of herbicides	Same as existing plus 15% limit on area harvested in MWS each decade	Same as B	Same as B	No timber harvest or public access in any MWS
4. FISH HABITAT Protection of Riparian Areas - Average Buffer Width by Stream Class	100% or riparian areas, 100' buffer along all perennial streams plus buffers along intermittent streams in prime salmon areas	Same as A	100% of riparian areas, 100' buffer along all perennial streams	100% of riparian areas, 100' buffer along all perennial streams plus buffers along all intermittent streams	100% of riparian areas, 100' buffer along all perennial streams plus buffers along all intermittent streams and in areas upslope from riparian areas.
Coho Smolt HCI (M Smolts) 1st Decade 5th Decade	 985 1,023	 982 936	 993 1,041	 1,018 1,094	 1,032 1,120
Percent Change in Habitat Capability, Present to 5th Decade	0	-8	+2	+7	+10

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
5. WILDLIFE HABITAT						
Spotted Owl Habitat Areas (SOHAs)	22	(7)	22	22	22	22
Mature Conifer Habitat 1st Decade (MAcres) 5th Decade (MAcres)	221	176 18	191 110	182 103	174 102	183 106
Dead and Defective Tree Habitat (Percent Biological Potential), 1st Decade	75	40	69	68	68	67
Elk Habitat Capability (HCI) 1st Decade 5th Decade	9,960 NA	NA NA	10,290 8,020	8,990 7,100	9,460 7,070	12,330 12,840
Acres of Permanent Meadow Created by 5th Decade	Harvest is distributed to provide continuous forage	0	0	0	0	8,700
Upland Deciduous-Mix Habitat 1st Decade (M acres) 5th Decade (M acres)	58	34 28	34 25	54 24	51 25	51 25
Riparian Area (M acres)	77	77	77	77	77	77
Bald Eagles Nest Sites Size of Sites (Acres)	23 125	93 (8) 40	23 125	23 125	23 125	23 125
Habitat Improvements 1st Decade (Acres)	290	(9)	2,890	3,590	250	6,750

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
5. WILDLIFE HABITAT					
Spotted Owl Habitat Areas (SOHAs)	22	29	25	27	37
Mature Conifer Habitat					
1st Decade (MAcres)	186	174	192	202	211
5th Decade (MAcres)	116	120	143	196	227
Dead and Defective Tree Habitat (Biological Potential), 1st Decade	70	68	71	77	82
Elk Habitat Capability (HCI)					
1st Decade	9,180	10,170	8,920	9,120	7,730
5th Decade	7,900	9,220	8,200	10,200	8,120
Acres of Permanent Meadow Created by 5th Decade	0	1,000	0	3,900	0
Upland Deciduous-Mix Habitat					
1st Decade (MAcres)	52	56	49	51	56
5th Decade (MAcres)	26	28	32	41	43
Riparian Habitat (M acres)	77	77	77	77	77
Bald Eagles					
Nest Territories	23	23	23	23	23
Size of Territories (Acres)	125	125	125	325	625
Habitat Improvements					
1st Decade (Acres)	200	4,110	2,510	4,310	80

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
6. RECREATION						
ROS Classes provided (MAcres)		Not addressed in TRP				
SPNM	57		27	27	27	34
SPM	10		10	10	10	10
Roaded Natural	51		47	46	46	48
Rural	513		548	549	549	539
Total	631		631	631	631	631
Percent of Demand for SPNM Met	Demand for SPNM recreation is presently met					
1st Decade		56	56	72	72	100
5th Decade		23 (10)	23	30	30	46
SPNM Opportunities Outside Oregon Dunes NRA and Wildernesses	No areas designated, 26,900 acres provide SPNM opportunities					
Areas		0	0	0	0	2
Acres		0	0	0	0	7,400
7. SPECIAL INTEREST AREAS						
Number of Areas	Cape Perpetua, Marys Peak 2,900 acres	2	2	3	3	3
Total Size (Acres)		1,500 (11)	2,880	2,770	2,770	5,770
8. SUTTON & SAND LAKE						
Sutton:	Some ORV use, little development or environmental protection 2700 acres total use	Not addressed in TRP				
Acres Open to ORVs			215	330	330	215
Acres Closed to ORVs			2485	2370	2370	2485
Rec Developments			2 trails	2 trails	2 trails	2 trails
Sand Lake						
Size of Recreation Area (Acres)	1,120	1,120	1,120	720	720	720

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
6. RECREATION					
ROS Classes provided (MAcres)					
SPNM	27	34	44	48	64
SPM	10	10	10	10	10
Roaded Natural	45	52	49	49	46
R	549	534	529	524	511
Total	631	631	631	631	631
Percent of Demand for SPNM Met					
1st Decade	56	97	100	100	100
5th Decade	23	40	65	76	65
SPNM Opportunities *Outside* Oregon Dunes NRA and Wildernesses					
Areas	0	2	3	3	4
Acres	0	7,300	16,200	20,400	36,200
7. SPECIAL INTEREST AREAS					
Number of Areas	2	4	4	4	3
Total Size (Acres)	1,090	7,070	7,340	7,340	4,570
8. SUTTON & SAND LAKE					
Sutton:					
Acres Open to ORVs	330	215	0	0	0
Acres Closed to ORVs	2370	2485	2700	2700	2700
Rec Developments	2 trails	2 trails	2 trails	2 trails	
Sand Lake					
Size of Recreation Area (Acres)	620	990	1,120	990	990

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
9. VISUAL RESOURCE MANAGEMENT						
Visual Quality Objectives for Sensitive Viewsheds						
Highway 101	Full (12) along Highway 101 and 3 major corridors, partial (13) or none on other 5, full on half of others, none on remainder	(14)	Same as existing condition	No scenic protection on any corridors	No scenic protection on any corridors	Full
8 Major Corridors						Full on 1, partial on others
23 Other Corridors						Full on 3,none on others
10. WILDERNESS						
Trail Management 5th Decade (Miles)						
Drift Creek	8 5	8 5 (15)	8 5	17	17	8 5
Cummins Creek	3	12	12	12	12	26
Rock Creek	0	0	0	0	0	0
11. UNDEVELOPED AREAS						
Number of Unroaded Areas Maintained	Seven areas exist, none designated, 57,000 acres	4	4	4	4	6
Undeveloped Condition Maintained (MAcres)		20,000	20,000	20,000	20,000	27,400
12. RESEARCH NATURAL AREAS (RNAs)						
Areas Recommended for RNA Designation	Neskowin Crest and Flynn Creek designated	Reneke Creek recommended	Reneke Creek	None	None	None
13. MINERALS AND ENERGY						
Area Accessible to Leasing with Few Restrictions (MAcres)	488 0	504 4	488 0	516 5	516 5	493 2

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS.

Table II-2 Cont. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
9. VISUAL RESOURCE MANAGEMENT					
Visual Quality Objectives for Sensitive Viewsheds					
Highway 101	Full (Coastal portion)	Full	Full	Full	Full
8 Major Corridors	None	Full on 4, partial on others	Full on 7, partial on one	Full	Full
23 Other Corridors	None	Full on 8, partial on others	Full on 16, none on others	Full	Partial
10. WILDERNESS					
Trail Management 5th Decade (Miles)					
Drift Creek	8 5	15 5	23	23	8 5
Cummins Creek	12	12	26	26	3
Rock Creek	0	0	0	15 5	0
11. UNDEVELOPED AREAS					
Number of Unroaded Areas Maintained	4	6	7	7	8
Undeveloped Condition Maintained (MAcres)	20,000	27,300	36,200	40,600	57,000
12. RESEARCH NATURAL AREAS (RNAs)					
Areas Recommended for RNA Designation	Sand Lake	Reneke Creek, Sand Lake, Cummins/ Gwynn Creek	Reneke Creek	Reneke Creek, Sand Lake	Reneke Creek, Sand Lake, Cummins/ Gwynn Creek
13. MINERALS AND ENERGY					
Area Accessible to Leasing with Few Restrictions (MAcres)	510 0	467 3	456 9	431 6	400 3

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-2 Cont. Comparison of Issue and Concern Response

		ALTERNATIVE				
ISSUE/Outputs/Effects	**Existing**	**NC**	**A**	**B**	**B(DEP)**	**C**
14. LOCAL COMMUNITIES (1979-88 average)						
Employment Opportunities (M Jobs)	7.8 (5% of economy)	(16)	9 4	10 2	11 2	9 9
Local Income (MM$)	153	(16)	187	206	230	199
Payments to Counties, Average Annual 1st Decade (MM$)	11 8	(16)	17 5	20 0	23 2	19 5
15. ECONOMIC VALUES						
Total Cash Flow, Average 1st Decade (MM$)	19 9	(17)	37 6	47 8	59 4	45 2
5th Decade (MM$)			68 0	69 5	52 4	65 1
Present Net Value ($ Billion)	Not presently calculated	(18)	2 1	2 2	2 3	2 2

Table II-2. Footnotes

(1) The Timber Resource Plan (TRP) displayed regulated commercial forest land (542,120 acres) as suitable acres Timber harvest activities were scheduled on only 508,034

(2) The first number is the chargeable volume sold in 1979 through 1988
Average cut 53 5 MMCF (290 MMBF) per year
Average sold 62 4 MMCF (338 MMBF) per year
The second number is the chargeable volume sold in 1984 through 1988
Average cut 66 1 MMCF (358 MMBF) per year
Average sold 57 6 MMCF (312 MMBF) per year

(3) This figure does not include 13,000 acres which the TRP set aside on an interim basis for spotted owls

(4) This figure is derived using current calculation methods and inventories. In the TRP, the estimated number is 104 However, the TRP underestimates the number of landslides for three reasons 1) the effectiveness of leave areas for preventing accelerated landslides was assumed to be 70% rather than 52% as used in the FEIS, 2) the inventory of high-risk landtypes used was 126,000 acres, but the current is 220,957 acres, and 3) slopes with a "high" risk of landslides in low-risk landtypes were not considered

(5) These figures are derived using current methods and inventories TRP estimates were 64 MCuYd/Yr in the 1st decade, and 59 MCuYd/Yr in the 5th The TRP underestimated sedimentation in four ways See footnote 4 for the first three ways, the fourth is that sediment from dry ravel following controlled burns was not estimated

(6) The CSHCI was not used in the TRP This estimate was derived by using the CSHCI model with the timber harvest schedule contained in the TRP and making a series of assumptions about location and timing of timber harvest in landtype associations

(7) 13,000 acres would remain undisturbed, on an interim basis, awaiting land allocation through land management planning Those acres would be harvested in the 5th decade to meet the potential yield predicted in the TRP

(8) Habitat sites would be managed on a 300-year rotation

(9) The TRP did not address habitat improvement activities

(10) This assumes the same management of the Oregon Dunes National Recreation Area (NRA) roadless areas and the same level of trail development in the Wildernesses and Oregon Dunes NRA roadless areas as in Alternative A.

(11) The TRP designated 1,500 acres of commercial forest land in the Marys Peak area This is not the full size of this area since some of the acres were included in general nonforest or meadow categories in the TRP

Table II-2 Cont. Comparison of Issue and Concern Response

	ALTERNATIVE				
ISSUE/Outputs/Effects	**D**	**E(PA)**	**F**	**G**	**H**
14. LOCAL COMMUNITIES					
Employment Opportunities	9 2	9 3	8 4	5 6	4 3
Local Income (MM$)	183	188	166	110	75
Payments to Counties, Average Annual 1st Decade (MM$)	17 6	17 5	14 8	7 8	3 7
15. ECONOMIC VALUES					
Total Cash Flow, Average					
1st Decade (MM$)	39 8	38 1	29 9	7 3	-4 2
5th Decade (MM$)	62 9	61 3	49 6	24 0	12 4
Present Net Value ($ Billion)	2 0	2 0	1 8	1 1	0 8

Table II-2. Footnotes

(12) Full protection = protected to level recommended in Forest Service's Visual Management System
(13) Partial protection = protected to a level below the Visual Management System
(14) The TRP provided for some visual protection on about 82,300 acres of land with special visual sensitivity However, information about specific areas which would have been protected is unavailable
(15) Wilderness management was not adressed in the TRP, presumably it would be the same as Alternative A.
(16) If estimated with the same assumptions as Alternative A to H, NC would be similar to B(Dep) in the 1st decade
(17) Based on TRP timber receipts and program costs, net timber receipts would be $53 million
(18) PNV is not available

ASQ = Allowable Sale Quantity, BF = board feet, CF = cubic feet, M = thousand, MM = million; ORV = off road vehicle, SPM = Semiprimitive Motorized, SPNM = Semiprimitive Nonmotorized

Management Areas

A management area (MA) is a part of the Forest (not necessarily contiguous) for which a combination of goals, desired conditions, and standards and guidelines is unique Two key qualities of a MA are that its boundaries must be easily recognizable on the ground and easily illustrated on a map. Every acre on the Forest is assigned to one of 15 MAs Numbers of acres in the various MAs (Table II-3) depend on the emphasis of each alternative For each alternative, the sum of acreages for the MAs equals total size of the Forest.

Table II-3. Management Area Acres

MANAGEMENT AREA	ALTERNATIVE				
	NC (1)	A	B	B(DEP)	C
1 Silverspot Butterfly	0	1,926	1,926	1,926	1,926
2 Existing Old-Growth Groves	0	0	0	0	0
3 Spotted Owls	0 (2)	42,951	44,389	37,645	37,645
4. Bald Eagle	7,920 (3)	2,527	2,650	2,566	2,566
5 Special Interest Areas	1,500 (4)	2,884	1,088	4,084	4,084
6 Cascade Head Scenic-Research Area	3,932 (5)	4,787	4,787	4,787	4,787
7 Cascade Head Experimental Forest	7,958	7,210	7,210	7,210	7,210
8 Sand Lake	1,150 (6)	1,122	720	720	720
9 Sutton	2,707 (6)	2,707	2,707	2,707	2,707
10 Oregon Dunes NRA	23,693 (5)	26,513	26,513	26,513	26,513
11 Undeveloped Areas	0	0	0	7,432	7,432
12 Wilderness	21,782 (7)	22,186	22,186	22,186	22,186
13 Research Natural Areas	1,270	1,168	688	688	688
14 Scenic Viewsheds	49,165 (8)	27,418	0	0	19,671
15 Timber, Wildlife, Water, Fish	504,352	487,962	516,497	493,226	493,226
TOTAL	625,434	631,361	631,361	631,361	631,361

(1) Alternative NC did not define MAs Figures in this column represent areas identified in the Timber Resource Plan (TRP) for special management which are generally comparable to MAs in Alternatives A through H

(2) The Wildlife Appendix to the TRP said that, on an interim basis, 13,000 acres of "prime older forest where populations of spotted owls now exist will remain undisturbed, awaiting land allocations through land management planning" However, these acres were not removed from the regulated commercial forest land base when potential yields were calculated

(3) Only one-third of this acreage (about 2,640 acres) would be suitable for bald eagle nest sites at any one time because these areas were to be managed on a 300-year rotation None of the acreage shown in other alternatives would be harvested

Table II-3. Management Area Acres

MANAGEMENT AREA	ALTERNATIVE				
	D	E(PA)	F	G	H
1 Silverspot Butterfly	1,926	1,926	1,926	1,926	1,926
2. Existing Old-Growth Groves	0	1,000	0	16,551	11,739
3 Spotted Owls	43,971	46,512	40,771	37,958	55,621
4 Bald Eagle	2,650	2,502	2,487	6,466	12,435
5 Special Interest Areas	1,088	5,384	5,653	5,653	2,884
6 Cascade Head Scenic-Research Area	4,787	4,787	4,787	4,787	4,787
7 Cascade Head Experimental Forest	7,210	7,210	7,210	7,210	7,210
8 Sand Lake	620	991	1,122	991	991
9 Sutton	2,707	2,707	2,707	2,707	2,707
10 Oregon Dunes NRA	26,513	26,513	26,513	26,513	26,513
11 Undeveloped Areas	0	7,298	16,159	20,375	36,205
12 Wilderness	22,186	22,186	22,186	22,186	22,186
13 Research Natural Areas	928	1,408	1,168	1,408	1,408
14 Scenic Viewsheds	6,765	33,666	41,730	45,071	44,414
15 Timber, Wildlife, Water, Fish	510,010	467,271	456,942	431,559	400,335
TOTAL	631,361	631,361	631,361	631,361	631,361

(4) This is not the full acreage in the Marys Peak SIA since the TRP included some of that area in the general nonforest or meadow categories rather than here

(5) Difference in acreage is due to land aquisition since the TRP was written

(6) *This area was not identified as a special management area in the TRP For purposes of comparison, the same size as* Alternative A is displayed

(7) The TRP was amended for Wildernesses in Amendment 2, 8/6/84 Difference in acreage since then is due to improved mapping

(8) This figure from the TRP is not directly comparable to other viewshed figures This is because it includes some acreage of the modification Visual Quality Objective (VQO) in foregrounds, which the other alternatives do not, and it does not include acreage of the modification VQO in middleground, which the other alternatives do There is no way to develop a directly comparable figure

MAs 14 and 15 include both lands suitable and unsuitable for timber production. (Suitable land is a technical term; suitable land may or may not actually grow timber; see the glossary) No other MAs include suitable lands In MAs other than 2, 12 and 13, some trees may be cut and removed from the unsuitable land if this activity either enhances habitat conditions or does not interfere with meeting other objectives for the area. MAs are described in detail in Forest Plan, Chapter IV Brief descriptions of the 15 areas follow.

MA 1 Oregon Silverspot Butterfly Emphasis - The primary goal is to maintain quality of silverspot butterfly habitat, and enhance habitats to contribute to removal of threatened species classification from state and federal lists. Management activities in the area must be compatible with habitat goals and recovery of the species In some alternatives, additional goals for portions of the area are to provide visual quality, maintain undeveloped characteristics, and protect the outstanding scenic and botanic features of a potential Special Interest Area.

MA 2 Existing Old-Growth Groves and Ecosystems - The primary goal is to protect old-growth groves for aesthetic, recreational, and scientific purposes Some of these groves will meet the Regional Guide definition of old-growth ecosystems and some will not. Management activities must not harm the groves, which are scattered unevenly across the Forest While they provide habitat for some wildlife, the groves are too small to provide suitable habitat for the spotted owl. (Some old-growth stands are included in other MAs, such as Wildernesses and spotted owl habitat. This MA includes some existing old-growth groves that are not within these other MAs. For a complete explanation of how and where old growth is managed in alternatives, see "Management of Existing Old Growth " later in this chapter.)

MA 3 Spotted Owl Habitat Emphasis - The primary goal of this MA is to provide enough old-growth conifer habitat for nesting and foraging of spotted owls to assure continued existence of spotted owls on the Forest Because the spotted owl is an indicator species, an additional goal is to maintain habitat for other species that prefer old growth Much of the habitat occurs in other MAs such as Wildernesses and undeveloped areas

MA 4 Bald Eagle Habitat Emphasis - The primary goal is to provide enough nesting habitat for bald eagles to assist with recovery of the species. Like MA 3, it does not include all bald eagle habitat; some is included in Wildernesses, undeveloped areas, spotted owl habitat areas, and other MAs.

MA 5 Special Interest Area Emphasis - The primary goal is to protect the unusual natural characteristics of existing and potential SIAs, and where appropriate, foster public use and enjoyment of these areas. In some alternatives, additional goals for some portions of the MA are to protect visual quality, protect values in a potential RNA, and provide habitat for some wildlife.

MA 6 Cascade Head Scenic-Research Area - The primary goal, as stated in Public Law 93-535, is "to provide present and future generations with the use and enjoyment of certain ocean headlands, rivers, streams, estuaries, and forested areas; to ensure the protection and encourage the study of significant areas for research and scientific purposes; and to promote a more sensitive relationship between humans and their environment". The MA also provides habitat for wildlife

MA 7 Cascade Head Experimental Forest - The primary goal is to further research in the coastal spruce-hemlock forest and to serve as a demonstration area for promising techniques and principles of forest management. The MA also provides habitat for a variety of wildlife.

MA 8 Sand Lake Recreation Area - The primary goal is to provide a mix of recreational opportunities (emphasizing off-road vehicle use, sightseeing, camping, and picnicking) and to protect ecological values of the beach and estuarine environments Habitat for bald eagles is also provided in a portion of the MA.

MA 9 Sutton Recreation Area - Like MA 8 (Sand Lake), the primary goal is to provide a mix of recreational opportunities (including off-road vehicle use, hiking, sightseeing, camping, horseback *riding and picnicking) and to protect wildlife and sensitive plant habitat In all alternatives, habitat* for bald eagles is also provided

MA 10 Oregon Dunes National Recreation Area - The primary goal is to encourage enjoyment of ocean shorelines, dunes, forested areas, lakes, and recreational facilities, and to conserve scenic, scientific, historic, and wildlife values which contribute to enjoyment of the area

MA 11 Undeveloped Area Emphasis - The primary goal is to maintain or allow reversion to undeveloped conditions This will provide SPNM recreation opportunities, and will help increase habitat for fish and wildlife.

MA 12 Wildernesses - The primary goal is to preserve wilderness character and natural conditions in each Wilderness This MA also provides opportunities for SPNM recreation, habitat for wildlife, and opportunities for research. It is managed in accordance with the Wilderness Act of 1964.

MA 13 Research Natural Areas - The primary goal is to preserve ecosystems for study of natural systems and processes RNAs will serve as a baseline for comparison to ecosystems that have been altered through human activity They also preserve irreplaceable genetic variation and thereby assist in maintaining sensitive and threatened and endangered species

MA 14 Scenic Viewshed Emphasis - The primary goal is to provide attractive scenery The MA also has the same goals as MA 15. These include timber production, maintenance of wildlife habitats, protection of watersheds and fish habitat, and encouraging dispersed recreation. The MA contains some lands that are suitable for timber production and others that are not

MA 15 Timber, Wildlife, Watershed, Fish, Dispersed Recreation Emphasis - Lands managed for these resources are so intermingled that they are included in one MA The primary goals are to produce timber, provide habitat for wildlife dependent upon mature conifer and meadow habitat, supply woody debris for fish habitat, reduce risk of accelerated landslides and surface soil erosion, and provide a variety of dispersed recreational opportunities The MA contains some lands that are suitable for timber production and others that are not

Management of Forest Resource Programs

In the following section, the management program for each resource is described for each alternative, as well as the way the Forest plans to manage the resource Forestwide and in each MA.

Goals and objectives for a given resource program are included in the discussion of MAs in Forest Plan, Chapter IV For example, objectives for managing timber are in that chapter in MAs 14 and 15 These are MAs that include lands suitable for timber production which provide the ASQ. The "Timber" section that follows discusses these lands

For a discussion of environmental consequences of managing resources in each alternative, see FEIS, Chapter IV

Management of Timber

TIMBER TERMINOLOGY

Allowable sale quantity (ASQ) - Quantity of timber that may be sold from lands suitable for timber production during a specific time period

Biological potential - From the 1979 Timber Resource Plan - the maximum amount of sustainable wood fiber obtainable by application of intensive timber management practices to all acres classified as commercial forest land Needs of other forest resources on commercial forest land are not included in determination of this potential

Long-term sustained yield capacity (LTSYC) - The highest timber yield that may be sold on a continuing basis consistent with multiple-use objectives

Non-declining flow (NDF) - A timber harvest scheduling policy that requires that volume of timber planned for harvest in a decade must not be less than that planned for harvest in the previous decade.

Potential yield (PY) - From the 1979 Timber Resource Plan - the sustainable output of wood fiber available after some needs of other forest uses have been deducted from biological potential

Programmed harvest - From the 1979 Timber Resource Plan - the part of potential yield scheduled for harvest in a specific year The level of programmed harvest is based on current demand, funding, silvicultural practices and multiple use considerations

Silvicultural practices - Methods used to tend, harvest, and replace a forest of distinctive form

Management of the timber resource would differ by alternative. On lands suitable for timber production, the ASQ, mix of species sold, and rotation lengths all would vary by alternative Amount of land suitable for timber production also would vary substantially by alternative (Figure II-2), as would amount of land unsuitable for timber production

Lands suitable for timber production are the base from which ASQ is calculated While trees can be cut and removed from some lands unsuitable for timber production, the amount does not contribute to ASQ. Harvest from lands suitable for timber production plus harvest from unsuitable lands makes up the total timber sale program for the Forest

Timber outputs are calculated in cubic feet (CF) and converted to board feet (BF) using factors derived from the last Forest timber inventory Cubic measure is used for harvest scheduling and control for Forest Plan implementation because it more accurately represents wood volume than the traditional BF measure CF represents the total wood fiber in a tree stem from stump height to a specified top diameter BF measure estimates the number of BF that can be milled from a tree, and is more subjective Methods used to measure BF were developed for large logs, and as average sizes of trees decrease over the next several decades, BF will not give an accurate measure of growth or harvest volumes The Forest Service will begin to sell and account for timber sales based on cubic measure within the next few years, and to allow for this transition period, ASQ and historical sell and harvest volumes are displayed in both CF and BF

Timber resource inventory and management data are presented in Table II-4 This table is followed by discussions of land suitability for timber production, ASQ, and LTSYC. The amount of land suitable for timber production has the greatest influence on timber outputs

Table II-4. Timber Resource Management Information

	BENCH-MARK		ALTERNATIVE									
	Timber	PNV	NC (1)	B	B(Dep)	A	C	E(PA)	D	F	G	H
Suitable Lands (2)												
(MAcres)	404	404	508	403	403	381	388	357	341	314	183	133
Inventory (3)												
Begin MMCF	2,634	2,658	UA	2,640	2,630	2,503	2,590	2,349	2,277	2,070	1,225	1,000
Begin MCF/acre	6 5	6 6	UA	6 5	6 5	6 6	6 7	6 6	6 7	6 6	6 6	7 5
End MMCF	2,311	2,285	UA	2,253	2,360	2,249	2,252	2,292	2,005	1,971	1,207	1,280
1st Decade ASQ (4)												
MMCF	71 7	68 2	92 5	69 1	79 8	65 9	66 5	61 2	60 6	52 6	28 2	13 5
% of Begin	2 7	2 6	UA	2 6	3 0	2 6	2 6	2 6	2 7	2 5	2 3	1 4
MMBF	377	383	438	381	439	351	365	332	332	288	151	72
LTSYC (5)												
MMCF	83 4	80 3	109 3	80 4	80 9	69 4	77 2	72 5	68 6	59 6	30 2	18 4
% of End MMCF	3 6	351	UA	3 6	3 4	3 1	3 4	3 2	3 4	3 0	2 5	1 4
Decade Met	11	10	UA	10	14	13	11	11	11	11	10	14
Net Growth (6)												
Present CF/Acre	98	96	UA	96	93	100	96	100	100	102	102	87
2030 CF/Acre	194	167	UA	176	195	203	173	180	182	176	176	14
2030 MMCF	78 3	67 2	UA	71 1	78 3	76 6	68 7	64 3	62 0	55 3	33 0	19 3
Yield Level (7)												
Full MAcre	368	354	405	365	364	324	324	289	287	208	80	60
% of Suitable	91	88	80	91	90	85	83	81	84	66	44	45
50-99% MAcre	36	50	103	38	38	57	64	68	54	106	103	73
% of Suitable	9	12	20	9	10	15	17	19	16	34	56	55
1st Decade Harvest (8)												
Clearcut MAcre	76	50	92	57	67	63	58	52	52	46	27	12
Shelterwood acre	0	0	0	0	0	0	0	0	0	0	0	0
Selection Macre	0	0	0	0	0	0	0	0	0	0	0	0
Total % Suitable	19	12	18	14	17	16	15	14	15	15	15	9

(1) In the TRP, as adjusted in 1984, potential yield was calculated for 542,000 acres, however, timber harvest was scheduled on only 508,000 acres UA means unavailable TRP potential yield is shown under the ASQ columns for Alternative NC

(2) Number of acres suitable for timber production

(3) Total inventory volume (level of growing stock) on acres suitable for timber production at the beginning and end of the planning horizon and average per acre inventory at the beginning of the planning horizon

(4) The cubic and board foot volume of average annual ASQ for the 1st decade Also, the relationship of average annual ASQ in the 1st decade to the beginning inventory

(5) Annual long-term sustained yield capacity (LTSYC), the relationship of the LTSYC to the ending inventory, and decade in which average annual ASQ equals or exceeds LTSYC

(6) Average annual net growth per acre on lands suitable for timber production at the beginning of the planning horizon and in the 5th decade Also, total growth on the suitable land base in the 5th decade

(7) Acres of suitable land in two yield categories based on management prescriptions for regenerated stands and the relationship of these lands to the suitable land base Full yield represents those selected prescriptions which do not reflect any reductions in projected timber growth and yields because of other resource objectives The 50-90% category for less than full yield represents those prescriptions which reflect reduced growth and yield due to other resource objectives or considerations such as extended rotations or special cutting practices There were no acres assigned to prescriptions resulting in less than 50% of full yield

(8) Acres to be harvested during the 1st decade displayed by cutting method and in total as a percent of the suitable land base

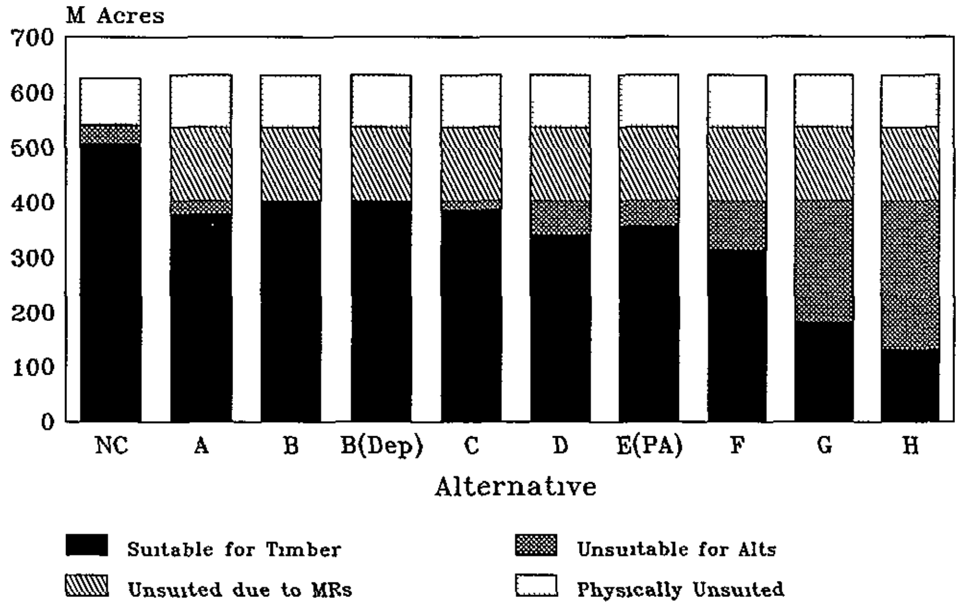


FIGURE II-2. SUITABILITY OF LANDS FOR TIMBER PRODUCTION BY ALTERNATIVE

Lands Suitable/Unsuitable for Timber Production - Amounts of land suitable for timber production are shown in Table II-5 and Figure II-2. Acres vary because of different resource objectives of alternatives. Also, the process used to determine the amount of land suitable for timber production for Alternative NC differed from other alternatives. Following is an explanation of criteria used to determine if land is suitable for timber production for Alternatives A through H and a short summary of the differences for Alternative NC

Lands suitable for timber production include lands with scheduled timber harvest where timber stands are managed to:

- Primarily produce wood products,
- Meet watershed, fish, and wildlife MRs, and
- Accomplish other objectives of the alternatives, such as scenic protection and providing wildlife habitat above MR levels.

Lands are determined to be unsuitable for timber production for several reasons, as outlined in 36 CFR 219.14 (a) and (b) The sum of categories 1 (never suitable, also referred to as physically unsuitable) and 2 (not appropriate), listed below, equals the total land unsuitable for timber production.

I. Lands never considered suitable for timber production are ("Physically Unsuitable" category in Figure II-2):

   A. Not forested [219.14 (a) (1)]

1 Water
2. Not stocked with 10% tree cover
3. Developed for purposes other than timber production

B. Inadequate response information (in accordance with FSM 2409 13, part 21 5). Information is insufficient to predict timber yields This land consists primarily of an insignificant number of acres of shore pine stands, which grow less than 20 cubic ft/acre/yr of timber with little or no commercial value.

C Areas where timber harvesting would cause irreversible resource damage [219 14 (a) (2)]

D. Areas where regenerating tree stands would be difficult [219.14 (a) (3)].

E. Withdrawn by Congress, Secretary of Agriculture, or Chief of the Forest Service [219 14 (a) (4)].

The remaining forested acres are considered tentatively suitable. See Table II-5 (lands suitable for timber production) for acres in each of the above categories

II Some lands are considered "not appropriate" for timber production [36 CFR 219 14 (c) (1-3)] if they are:

A Needed to meet multiple-use objectives of the alternatives [219 14 (c) (1)]. The number of acres included here varies by alternative; for some alternatives a given acre could be suitable *for timber production, and in another it could be unsuitable* (See the "Unsuitable for Alt " category on Figure II-2) For example, the Wassen Creek undeveloped area is included in Alternative C, and is thus unsuitable for timber production in that alternative Wassen Creek is not included in Alternative B, and the area is classified as suitable in that alternative)

B. Needed to meet Management Requirements [219.14 (c) (2)] These lands are not considered suitable for timber production in any of the alternatives (See "Unsuitable for MRs" category on Figure II-2)

C. Not cost-efficient in meeting resource objectives, including timber production [219 14 (c) (3)] The Forest does not have land in this category

Table II-5. Land Management Objectives by Alternatives

	ALTERNATIVE				
	NC	A	B	B(Dep)	C
1. Tentatively Suitable Forest Land	**542,120 (1)**	**537,746**	**537,746**	**537,746**	**537,746**
2. Not Appropriate for Timber Production					
A. Needed to meet MRs					
1 TE&S species	NA (2,3)	48,615	48,615	48,615	48,615
2 Water quality	NA	94,982	94,982	94,982	94,982
Subtotal		*143,597*	*143,597*	*143,597*	*143,597*
Subtotal after accounting for overlapping acres	**NA**	**134,077**	**134,077**	**134,077**	**134,077**
B. For other multiple-use objectives					
1 Additional wildlife habitat protection	0	0	0	0	8700
2 Additional watershed & fisheries protection	34,086	21,781	0	0	0
3 Recreation opportunities	NA (4)	3,849	1,831	1,831	11,476
4 RNAs outside reserved lands	NA (4)	480	0	0	0
5 Visual management	NA	4,791	0	0	4,366
Subtotal	*34,086*	*30,901*	*1,831*	*1,831*	*24,542*
Subtotal after accounting for overlapping acres	**NA**	**22,883**	**464**	**464**	**16,047**
C. Not cost-efficient for timber objectives	**0**	**0**	**0**	**0**	**0**
3. Lands Suitable for Timber Production (5)	**508,034**	**380,786**	**403,205**	**403,205**	**387,622**

(1) The tentatively suitable land base had not been defined when the 1979 TRP was developed This figure is the regulated commercial forest land base determined for the TRP. The TRP land classification is described in more detail in Appendix B

(2) MRs had not been developed at the time the TRP was completed

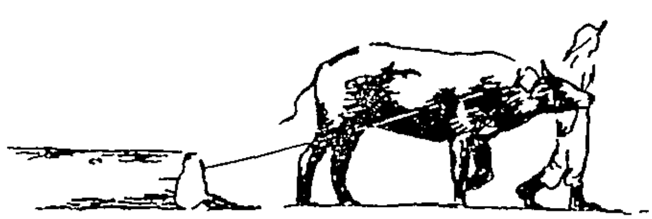
(3) Under the TRP all acres identified for eagle and spotted owl habitats were to be managed with long rotations and protected for an interim period, respectively, but not removed from suitable timberland

(4) The proposed Reneke Creek RNA (480 ac) and two Special Interest Areas (Cape Perpetua and Marys Peak, 1526 ac) were removed from regulated commercial forest land (#1)

(5) Calculated by deducting lands needed to meet MRs (2.A), lands for other multiple-use objectives (2 B) and lands not cost-efficient for timber objectives (2 C) from tentatively suitable forest land (1)

Table II-5 Cont. Land Management Objectives by Alternatives

	ALTERNATIVE				
	D	E(PA)	F	G	H
1. Tentatively Suitable Forest Land	**537,746**	**537,746**	**537,746**	**537,746**	**537,746**
2. Not Appropriate for Timber Production					
A. Needed to meet MRs					
1 TE&S species	48,615	48,615	48,615	48,615	48,615
2 Water quality	94,982	94,982	94,982	94,982	94,982
Subtotal	*143,597*	*143,597*	*143,597*	*143,597*	*143,597*
Subtotal after accounting for overlapping acres	**134,077**	**134,077**	**134,077**	**134,077**	**134,077**
B. For other multiple-use objectives					
1. Additional wildlife habitat protection	0	11,541	5,899	14,097	36,347
2 Additional watershed & fisheries protection	82,454	28,109	89,108	253,564	279,427
3 Recreation opportunities	1,482	13,826	22,879	57,669	71,060
4 RNAs outside reserved lands	146	626	480	626	626
5 Visual management	867	7,265	7,800	6,775	18,164
Subtotal	*84,949*	*61,367*	*126,166*	*332,731*	*405,624*
Subtotal after accounting for overlapping acres	**62,519**	**46,481**	**89,514**	**220,980**	**270,963**
C. Not cost-efficient for timber objectives	*0*	*0*	*0*	*0*	*0*
3. Lands Suitable for Timber Production	**341,150**	**357,188**	**314,155**	**182,689**	**132,706**



Alternative NC Differences - The timber resource classification system used to develop the 1979 TRP was different from the above NFMA suitability determination process Therefore, acres shown in Figure II-2 for Alternative NC are approximations of categories used in the timber land suitability process established by NFMA. Appendix B and Chapter III "Land Suitable for Timber Production" give more detailed comparisons of the two suitability processes

As for Alternatives A through H, all lands scheduled for harvest in the TRP are considered to be "lands suitable for timber production" under Alternative NC in Figure II-2. These are the acres used to determine the 1979 TRP potential yield

Lands not scheduled for harvest by the TRP are considered to be unsuitable under Alternative NC No acres are shown in "Unsuitable Due to Management Requirements" in Figure II-2 because there were no MRs developed for the Forest at the time the TRP was developed

Except for Alternative NC, Alternatives B and B(Dep) would have the most area suitable for timber production Alternatives A, C, and E(PA) would have fewer suitable acres because of additional wildlife, fisheries, and recreation objectives Alternatives D and F have even more acres managed for recreation and fish production, and consequently fewer acres for timber production Alternatives G and H would have the fewest acres suitable for timber production and the most acres managed for water quality, fisheries, wildlife, old growth, and amenities that do not have direct market value

Alternative NC has the most acres suitable for timber production for two reasons.

1 MRs established in response to NFMA regulations were not in effect at the time the TRP was developed, and

2 Information has become available after development of the TRP which shows that more land is required for protection of resources such as sensitive soils, water quality, and wildlife.

MRs and new data have been incorporated in Alternatives A through H, but not Alternative NC. Again, see Appendix B for more detail on differences in land suitability.

Allowable Sale Quantity (ASQ)

ASQ is the average amount of wood that is planned to be sold per year from the suitable land base over the next decade It comprises the primary Forest timber sale program and is calculated in cubic feet using the FORPLAN model. ASQ is primarily live, sound trees that meet required utilization standards These will be harvested through either regeneration, commercial thinning, or salvage harvests Trees from land suitable for timber production that die and are salvaged are also included in ASQ Table II-6 displays the contribution of these different harvest types to ASQ

Board foot volumes displayed are higher proportional to cubic foot volumes than those displayed in the DEIS. This is due to a correction made between draft and final EIS that increased the number of board feet calclulated for each cubic foot of timber output See Appendix B for a complete explanation of the correction. This correction has no effect on ASQ, because ASQ is calculated in cubic feet

In Alternatives B and B(Dep), all land suitable for timber production and not managed to meet MRs would be managed for commercial timber Consequently, ASQ for sale under these alternatives would be greatest of Alternatives A through H In Alternatives G and H, the Forest would manage suitable lands primarily for scenery, nongame wildlife, and undeveloped recreation; therefore, the ASQ would be the lowest for these. The amount of timber offered for sale in alternatives C through F would be intermediate. Alternative NC has the highest ASQ of all alternatives (see Figure II-3).

Table II-6 First Decade ASQ by Harvest Type

	ALTERNATIVE									
	NC	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
Regeneration Harvest										
Acres	9,030	6,140	5,150	6,590	5,680	5,110	5,060	4,506	2,610	1,170
MMCF	86 4	63 6	67 5	78 1	65 1	59 2	59 0	51 4	27 3	12 8
MMBF	417	341	373	430	357	325	323	282	147	69
Salvage Harvest										
Acres	170	140	130	150	120	110	110	100	60	30
MMCF	1 9	1 4	1 5	1 7	1 4	1 3	1 3	1 1	0 6	0 3
MMBF	9	7	8	9	8	7	7	6	3	2
Commercial Thinning										
Acres	2,900	618	36	6	14	65	600	72	205	282
MMCF	4 2	0 9	0 1	0 0	0 0	0 1	0 9	0 1	0 3	0 4
MMBF	12	3	0	0	0	0	2	0	1	1
Total ASQ										
MMCF	92 5	65 9	69 1	79 8	66 5	60 6	61 2	52 6	28 2	13 5
MMBF	438	351	381	439	365	332	332	288	151	72

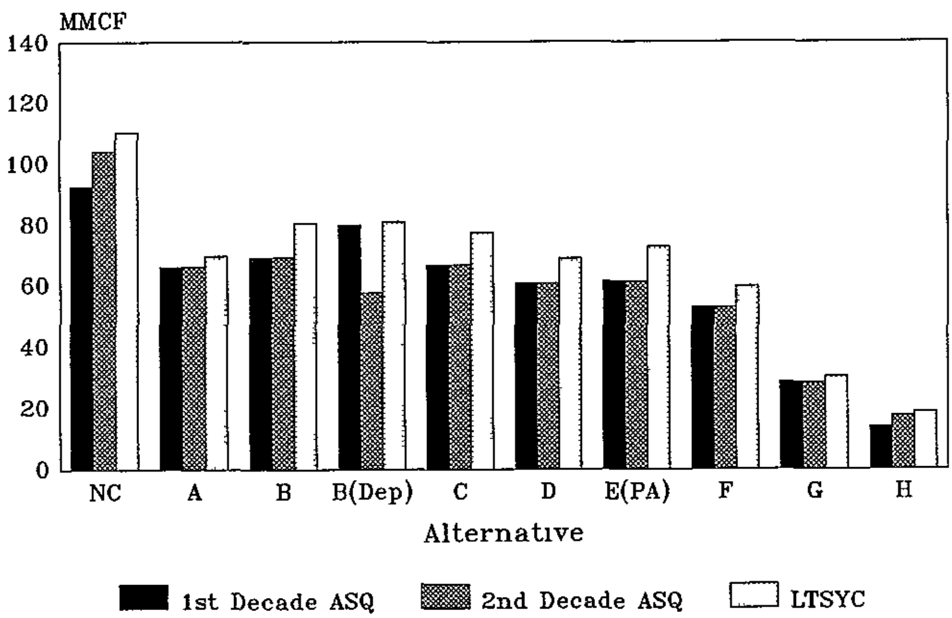


FIGURE II-3 ANNUAL ASQ AND LONG-TERM SUSTAINED YIELD CAPACITY (LTSYC)

The ASQ displayed for the NC Alternative is actually potential yield for the amended TRP. Alternative NC has a higher ASQ than other alternatives for two major reasons

1. **Acres Available for Timber Production** - The majority of the difference between potential yield in Alternative NC and ASQ in Alternatives A through H is due to more acres being available exclusively for timber production. New information about protection requirements of other resources has been acquired since development of the TRP. More accurate inventories of high-risk soils and riparian areas now exist. Protection requirements for these sensitive areas as well as for wildlife habitats are better understood. The TRP recognized that protection was needed for some species, such as elk, marten and spotted owls, but the decision about how much was explicitly deferred to the Forest land management planning process, when better information was expected to be available. A detailed discussion of these developments and their influence on the land base available for timber harvest is in Appendix B.

   The TRP prescribed interim deferral of timber harvest on 13,000 acres of identified spotted owl habitat However, acres available for harvest were not reduced for this deferral, so the potential yield was unaffected. If these acres had been considered permanently set aside for spotted owls and unavailable for timber harvest, potential yield of the TRP (ASQ of Alternative NC) would have been reduced.

2. **Timber Management Regimes** - The TRP prescribed five to eight commercial thinnings per rotation and yield estimates included trees as small as 7 5 inches DBH Commercial thinning in Alternative NC occurs every 10 years beginning at age 25, through the entire stand rotation. This maintains stands closer to optimum stocking for timber stand growth than the one or two thinnings in the other alternatives Modeling five to eight commercial thinnings predicted more wood production over stand rotation and made volume available for harvest earlier in the rotation. When the TRP was developed, such high intensity timber management was optimistically accepted as economically and physically feasible Under this program eventually around 45,000 acres, or almost 10% of the suitable land base would be commercially thinned each year It has been determined since the TRP that more than two commercial thinnings are uneconomical and it is recognized that five to eight commercial thinnings would cause excessive damage to soil and residual trees

   The optimistic commercial thinning program increased 1st-decade biological potential calculated by the TRP Resource Allocation Model (RAM) It predicted that most timber yield in the 6th to 8th decades would come from commercial thinnings Anticipated availability of this thinning volume allowed scheduling of harvest of all existing mature timber within the first 5 decades.

Long-Term Sustained Yield Capacity

Long-term sustained yield capacity (LTSYC) for each alternative is a prediction of the maximum timber volume that could be sustained annually from lands suitable for timber production on the Forest, consistent with multiple use objectives of the alternative Differences in LTSYC between alternatives reflect both 1) the number of acres suitable for timber management and 2) the kind of timber management prescribed for those acres

While all acres suitable for timber management could produce commercial timber products, objectives of the timber management program can be wildlife habitat and visual quality as well as timber products (Table II-7). Predicted yields from areas managed for wildlife habitat (timber stands harvested on longer rotations in MA 15) and visual quality (MA 14) are usually lower than predicted yields from areas managed primarily for wood products.

Table II-7. Long Term Sustained Yield Capacity (LTSYC) and Suitable Timber Acres

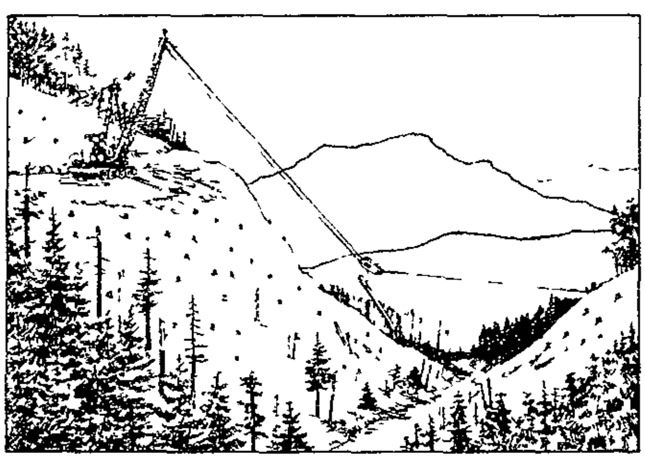
	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
LTSYC (MMCF)	109 3	69 4	80 4	80 9	77 2	68 6	72 5	59 6	30 2	18 4
Management Emphasis										
Visual Objectives	49	18	0	0	28	17	17	27	13	1
Wildlife Objectives	47	39	38	39	36	37	51	79	90	72
Timber Objectives	412	324	365	364	324	287	289	208	80	60
Total Suitable Acres	*508*	*381*	*403*	*403*	*388*	*341*	*357*	*314*	*183*	*133*

LTSYC of each alternative is influenced most by the number of acres suitable for timber production Alternatives NC, A, B, C, and E(PA) each have a higher LTSYC than other alternatives because more acres would be suitable for timber production and more of those acres would be managed intensively (on shorter rotations, Table II-7)

Table II-7 shows respective acres of land suitable for timber production that would be allocated for *timber, wildlife, or visual objectives* Visual acres are in MA 14 Timber and wildlife acres are in MA 15 and volume contributions to LTSYC vary depending on the number of acres with different rotation lengths and species mixes

As with ASQ, LTSYC for Alternative NC is much higher than for other alternatives because·

- Alternative NC has more acres available for timber management, and
- More intensive management of younger stands results in higher per-acre yields over a rotation in Alternative NC



Timber Sale Program Quantity (TSPQ)

TSPQ is total volume of timber projected for sale. It is ASQ with submerchantable and salvage volume and miscellaneous products added (Table II-8). ASQ is calculated based on amount of timber that can be produced on suitable lands as described above The amount of timber to be salvaged from suitable and unsuitable lands is estimated.

Table II-8. Timber Sale Program Quantity

MMCF Per Year	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Allowable Sale Quantity (1)	92 5	65 9	69 1	79 8	66 5	60.6	61 2	52 6	28 2	13 5
Submerchantable Volume (2)	1 8	1 2	1 3	1 5	1.3	1 2	1 2	1 0	0 6	0 3
Non-chargeable Green Volume (3)	0 0	0 0	0 0	0 0	1.1	0 0	0 1	0 0	0 5	0 0
Salvage Volume (4)	1 9	1 4	1 5	1 7	1 4	1 3	1 3	1 2	0 7	0 4
Miscellaneous Products (5)	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
Timber Sale Program (6)	95 4	68 2	71 5	82 4	70 0	62 9	63 6	54 7	30 4	14 9

(1) ASQ is chargeable volume, or amount that would be annually scheduled for sale It includes mortality salvage volume from suitable lands All other categories are nonchargeable volume and are estimates of what might be offered for sale For Alternative NC, the ASQ is represented by potential yield from the TRP

(2) Submerchantable volume refers to cull and small logs not meeting utilization standards and not included in growth and yield projections for ASQ This information was not included in the TRP For comparison purposes, Alternative NC assumes a figure which is proportionate to the value for Alternative B(Dep)

(3) Green volume from creation of wildlife meadows on lands unsuitable for timber production

(4) Salvage volume is an estimate of mortality salvage that might be sold from lands both suitable and unsuitable for timber production

(5) "Miscellaneous products" refers primarily to commercial and personal use firewood, posts, poles, and cedar bolts

(6) "Timber Sale Program" volume does not equal the sum of the columns because salvage volume from lands suitable for timber production is included in both ASQ volume and Salvage volume

Species Offered for Sale

The mixture of species offered for sale is determined by the primary objective of the alternative, which could be: 1) to produce as much wood fiber as possible (while meeting other resource objectives), or 2) to produce as high an economic value as possible (consistent with regulations and other objectives). About 11% of the ASQ in Alternative A would be hardwood, compared with about 8% for other alternatives (Table II-9) The management objective of Alternatives A and NC is wood fiber Other alternatives emphasize economic value and fewer hardwoods would be harvested early.

Large ASQs, as in Alternative B(Dep), would result in more hardwoods being offered for sale because conifers cannot be harvested without harvesting some hardwoods. Alternatives G and H, with an emphasis on riparian and soil protection, have the lowest proportion of hardwood to total ASQ

Table II-9 displays volumes of hardwoods and conifers harvested.

Table II-9. Annual Conifer and Hardwood Volume, 1st Decade

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Conifer Volume										
(MMCF)	84 0	57 4	63 3	73 3	61 9	55 8	56 0	47 1	25 2	11 8
(MMBF)	399	320	359	415	349	314	313	268	141	66
Hardwood Volume										
(MMCF)	8 5	8 5	5 8	6 5	5 7	4 8	5 2	5 5	3 5	1 7
(MMBF)	39	31	22	23	21	18	19	20	13	6
Total Volume (1)										
(MMCF)	92 5	65 9	69 1	79 8	67.6	60 6	61 2	52 6	28 7	13 5
(MMBF)	438	351	381	438	370	332	332	288	154	72

(1) Volumes from green sales for creation of wildlife meadows in lands unsuitable for timber production are added to the ASQ figures for alternatives C and G as well as the Preferred Alternative

Rotation Lengths

Rotation length is the time that elapses in one complete growing cycle (i e from regeneration harvest to regeneration harvest) Short rotations (60, 70 or 80 years) usually result in higher PNVs and ASQs over the planning horizon than long rotations (90, 100 years, or longer).

Long rotations are prescribed to meet wildlife habitat or visual management objectives All other areas must, as a minimum, reach 95% of Culmination of Mean Annual Volume Increment (CMAI) before harvest The only exceptions are areas with abnormal stand conditions, such as extremely low growth rates due to using seed from a different geographic area or infection with root rot

Overall, rotation lengths have been shortened between draft and final EIS This is, in part, a response to public comments that questioned prescribing longer rotations when not specific needed, as well as to reduction in levels of MRs that require longer rotations.

Alternative H would have the highest proportion of acres suitable for timber production managed on long rotations All stands suitable for timber would be managed on rotations longer than 90 years.

Alternatives A through G would have a combination of both short and long rotations In these alternatives, the proportion of suitable acres managed on rotations of 60, 70 or 80 years would range from 42% to 89%; the rest would be managed on rotations of 90 years or longer In Alternative E(PA), 26% of the stands would be managed on rotations longer than 90 years

Under Alternative NC, most future stands on suitable timber land would be managed with 80- or 90-year rotations About 4% of suitable timber land would be managed on longer rotations

Long rotations would usually reduce PNV and the ASQ in the 1st decade This is demonstrated by Alternative H, which would show the greatest relative difference between LTSYC (18.4 MMCF/YR) and the ASQ (13 5 MMCF/YR) of all alternatives (Figure II-4) This gap narrows as percentage of acres in long rotations decreases

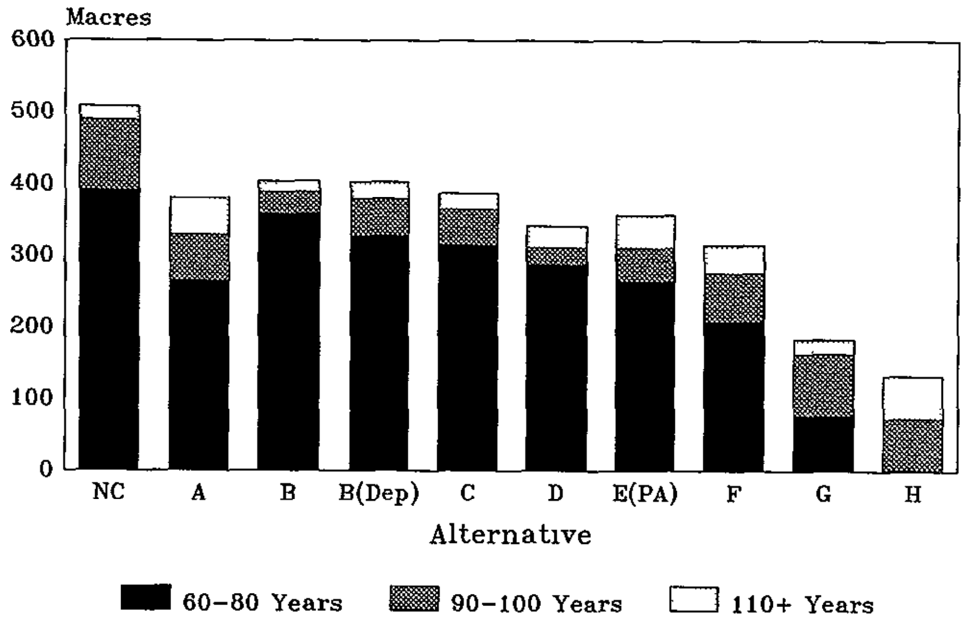


FIGURE II-4 ROTATION LENGTHS OF ACRES SUITABLE FOR TIMBER PRODUCTION

Silvicultural Practices

Table II-10 shows amounts of land expected to be treated with six different silvicultural practices in the 1st decade. Differences among alternatives would be primarily due to amounts of land harvested rather than the mix of treatments. The area expected to be treated with a regeneration harvest is related to timber harvest levels discussed previously. All suitable lands that are harvested will be reforested

Table II-10. Silvicultural Practices for 1st Decade

SILVICULTURAL PRACTICE	ALTERNATIVE									
Average Acres/Year	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Reforested	8,600	6,300	5,700	6,700	5,600	5,200	5,200	4,600	2,600	1,200
Released	5,700	4,700	4,500	4,900	4,500	4,100	4,200	3,700	2,100	1,300
Precommercial Thinning	2,400	2,400	2,400	2,400	2,400	2,200	2,300	2,000	1,200	900
Fertilized	0	2,500	2,500	2,500	2,500	2,300	2,400	2,200	1,200	1,000
Commercial Thinning (1)	2,900	600	40	10	20	70	600	70	200	300
Regeneration	9,000	6,300	5,700	6,700	5,600	5,200	5,200	4,600	2,600	1,200

(1) Acres of commercial thinning shown here were generated in the FORPLAN model for each alternative The model analyzes average conditions of immature stands that are available for commercial thinning Site specific analysis during Forest Plan implementation will determine whether or not commercial thinning is appropriate for individual stands

Regeneration Harvest - An appropriate regeneration method for each specific stand will be selected when planning projects at Ranger Districts To analyze effects and predict costs and yields in this FEIS, it was necessary to identify the regeneration method most likely to be used. Appendix G, "Selection of Silvicultural Systems for Forest Planning" lists criteria used.

Even-aged systems such as clearcut, seedtree and shelterwood are most appropriate for Oregon Coast Range forests Extensive operational experience and research demonstrate that clearcutting meets all criteria On this Forest, clearcutting usually is the most cost-effective method of assuring survival of desired species, it is most practical considering the Forest's wet soils, weather patterns, and topography; it offers best control over diseases on the Forest; and extensive use of clearcutting has demonstrated that reforestation is practical. Because it is environmentally sound and has been traditionally used, clearcutting is used for Forest Plan analysis Actual selection of harvest methods during Forest Plan implementation, will be made on a site-specific basis, and could include systems other than clearcutting.

Reforestation - Reforestation practices (site preparation, planting, animal damage control, and release) are used to establish trees on a site following a regeneration harvest. They allow: 1) control of species composition of the stand, 2) introduction of improved genetic stock, 3) control of density of the stand, 4) planting of resistant species in root rot areas, and 5) reduction of agents that jeopardize survival of the seedlings

Precommercial Thinning - Precommercial thinning controls density and species mix of a plantation Stands grow at optimum rates when species best adapted to the site are planted and when trees are spaced to provide the most utilizable timber from the fewest trees Proper spacing of trees increases amount of light and nutrients available, thus improving individual tree growth and stand health and vigor

Fertilization - Fertilization increases health, vigor and growth of conifer stands, primarily through increases of nitrogen Fertilizer was applied operationally on the Forest for the first time in 1989, and it has been used on other federal, state, and private timberlands, as well as in research trials on different soils on the Forest Fully-stocked plantations between 20 and 30 years of age would receive one application of 200 pounds of nitrogen fertilizer per acre

Commercial Thinning - Commercial thinning serves the same function as precommercial thinning, except that excess trees can be marketed It can improve net stand growth by harvesting trees that have died or are about to die It increases size of remaining trees, and thus amounts of utilizable wood, by concentrating production in fewer trees It is not commonly used on older natural stands because trees left standing are less likely to respond by increasing growth rates, and are often damaged during thinning

Intensity of commercial thinning is the greatest difference in silvicultural treatments between Alternative NC and Alternatives A through H In Alternatives A through H, timber prescriptions were available that allowed one or two, or no commercial thinnings The TRP specified that most acres were to be commercially thinned five to eight times during a rotation This was believed to be economically and physically feasible at the time It has since been determined that more than two commercial thinnings does not significantly improve wood fiber yield and is not economically feasible (Crim et al 1983)

Commercial thinning in Alternatives A through H is specified at stand age 40 and includes trees at least 10 inches in diameter breast height (DBH) Commercial thinning in Alternative NC starts at *stand age 25, and thus includes trees as small as 7 5 inches DBH Volume from trees of this size is* not considered merchantable by current standards Removing trees during commercial thinnings does some damage to remaining trees Conducting five to eight thinnings in a stand would cause much greater damage than one or two

Use of Herbicides - Concern about use of herbicides has been an issue for several years on the Forest. The Pacific Northwest Region has completed a Final Environmental Impact Statement on Managing Competing and Unwanted Vegetation All alternatives would comply with the Record of Decision issued by the Regional Forester in December 1988 for that FEIS. The decision made will guide all vegetation management activities, and established policy and guidance for subsequent site-specific analyses. The selected alternative was intended to protect human health and promote long-term health and productivity of the Forest.

Under the selected alternative, all vegetation management tools are permitted, and herbicide is to be used only when other methods are ineffective The overall emphasis is to reduce reliance on herbicides by stressing prevention of vegetation management problems and using low-risk methods whenever possible.

For all alternatives of this FEIS:

1. Selection of a treatment method would be made at the project level based on a site-specific analysis of relative effectiveness, environmental effects (including human health), and costs of feasible alternatives, and herbicides will be selected only if their use is essential to meet management objectives; and

2. Monitoring and enforcement plans to implement specific methods will be developed for site-specific projects and described in environmental analyses for these projects

Lands Suitable for Timber Production in MAs 14 and 15 (Alternatives A-H)

Two MAs include lands suitable for timber production. The management of these lands has been discussed in a general way in previous sections The following section summarizes specific management direction for timber.

MA 14 - Forest vegetation is managed to maintain or improve scenery Methods include spacing trees to accelerate rapid growth in diameter, managing for a mix of hardwoods and conifers, removing vegetation to provide scenic vistas and openings, and cutting units in sizes and shapes to minimize evidence of disturbance Rotation lengths exceeding 100 years and establishment of stands with a higher percentage of hardwoods are the main characteristics of the timber program in this management area (Harvest methods other than clearcutting are not commonly used.)

MA 15 - Timber is managed to meet two primary objectives in MA 15: 1) production of wood fiber, and 2) maintenance of habitats for wildlife. Management of timber primarily for wood fiber involves harvest every 60, 70, or 80 years, while management primarily for wildlife habitat involves longer rotations or creation of permanent meadows in Alternatives C and G and the Preferred Alternative. The latter are outlined more specifically in "Management of Wildlife" later in this chapter.

Lands Suitable for Timber Production in Alternative NC

MAs were not delineated for development of the TRP, so that information is not available for Alternative NC However, timber management practices were modified on some acres to benefit visual, soil, water, or wildlife resources as in Alternatives A through H

Visual - In Alternative NC, the most sensitive scenery would be managed on rotations of 150 to 200 years. Close spacing of trees in important visual areas was stressed in the TRP

Soil - There would be no thinning in areas where unstable soils prevent construction of new roads needed for commercial thinning Regeneration harvest would still take place in these areas.

Water - Partial-cut leave strips would be left along half the Class-I and -II stream mileage and 11% of the Class-III stream mileage

Wildlife - Timber prescriptions for wildlife include·

1 300-year rotations for bald eagle habitat

2 150-year rotations for deciduous-mix habitat in some streamside management units

Timber - Lands that receive an intensive timber emphasis are managed on 80- or 90-year rotations Most stands receive one precommercial thinning treatment and five to eight commercial thinnings

Lands Unsuitable for Timber Production -- All MAs (All Alternatives)

Most of the timber program involves management of suitable lands in MAs 14 and 15 However, some trees may be cut and removed from most unsuitable lands when necessary to achieve desired future conditions or meet management objectives of the area This is done for a variety of purposes, including·

1 Harvesting of trees or stands substantially damaged by fire, windthrow, or other catastrophies, or which are threatened by insects or disease, and

2 Cutting of trees or stands to conduct experiments, promote safety of Forest users, enhance wildlife habitat, improve scenery, obtain fuelwood or Christmas trees, or provide access.

Specific reasons that trees can be cut and removed are outlined in standards and guidelines for each MA in Forest Plan, Chapter IV

Comparison of Past, Present, and Projected Future Timber Outputs

The Forest has provided significantly increasing volumes of timber to local industry for the past 30 to 40 years Its importance in the present supply is a function of ages of timber found on the Forest and harvest practices on lands of other owners in the same supply area Depletion of mature timber on privately owned lands has increased demand for Forest timber as it began to reach maturity over the past 40 years

The 1965 Timber Resource Plan's maximum allowable annual harvest level was 382 MMBF, and the programmed sale level was 369 MMBF/yr Average annual timber sale in the years between implementation of the 1965 and 1979 TRPs was 348 MMBF

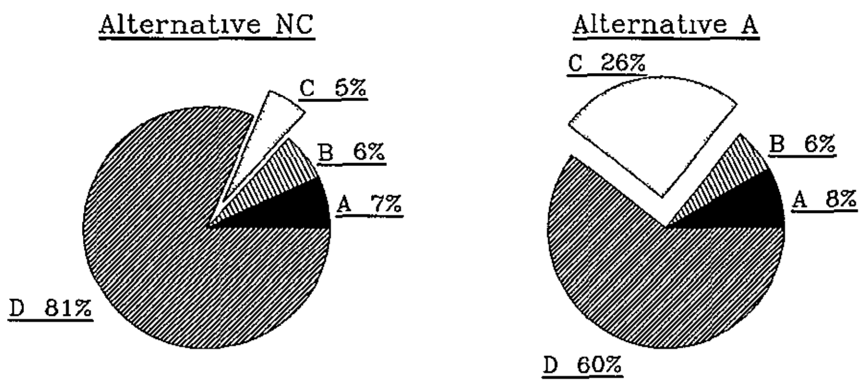
Calculations and assumptions used to develop the 1979 TRP resulted in an increase in potential yield to 459 MMBF/yr. Estimated annual programmed harvest was set at 427 MMBF/yr for the first 10 years of the Plan. The TRP was adjusted in 1984 for the Oregon Wilderness Act, which created three Wildernesses on the Forest This reduced acres suitable for timber production and subsequently potential yield to 438 MMBF, but programmed harvest remained at 427 MMBF/yr

Alternative A is representative of management direction in the 1979 TRP adjusted for NFMA requirements for resource protection. To meet changes in law and policy in addition to the Wilderness Act, Alternatives A through H allocate additional acres for MRs for the following reasons:

1 The 1979 TRP provided no protection for the spotted owl, compared with the current MR level of 2,000 acres of habitat for each of 22 pairs of owls.

2. The 1979 TRP did not protect water quality and fish habitat enough to meet MRs, because it underestimated amounts of land with high potential for landslides and number of riparian acres.

Figure II-5 illustrates the land base for the TRP and a 114,000-acre adjustment necessary to incorporate NFMA requirements for Alternative A.



Code	Description	Alternative NC	Alternative A
A.	Non-forest	43,895	51,861
B	Special Areas not Available for Timber Production	39,419	36,768
C	Area Needed for Resource Protection	34,086	161,946
D	Area Available for Timber Production	508,034	380,786
	Total	625,434	631,361

FIGURE II-5. COMPARISON OF ACRES IN ALTERNATIVES NC AND A

In addition to the changes in land assignments, differences between the 1979 TRP potential yield and the Forest Plan ASQ would result from differences in estimated yields from timber lands The 1979 TRP overestimated yields by relying on theoretical information. Growth and yield models used in the FEIS predict yields about 6% lower. These yields are based primarily on the DFSIM model (Curtis et al. 1981) which is based on measured plot data contributed by many organizations in the Pacific Northwest, including Weyerhaeuser Company, Crown Zellerbach Corporation, International Paper, and MacMillan-Bloedel Ltd

ASQ is frequently the focus for comparisons of timber output because it is linked to predicted economic *effects such as employment, income and county revenues from timber production. Potential yield from* the 1979 Timber Resource Plan is commonly compared to ASQ in public discussions While this is a convenient comparison to make, the two terms are not directly comparable

Potential yield represents maximum possible yield of timber assuming maximum use of very intensive silvicultural practices on all commercial forest land, including marginal lands The Forest did not expect to sell timber at the potential yield level, so the programmed harvest level was set at 427 MMBF in the TRP This programmed harvest level was based on expected budget limitations and the likelihood that full yield would not be attained on marginal lands Table II-11 compares programmed harvest to potential yield, as well as harvested and sold volumes for the last 5 and 10 years.

Table II-11. Past and Projected Future Timber Output (MMBF)

	ASQ	Other Sawtimber (1)	Other Timber	Total
1979 Timber Resource Plan				
Potential Yield	438	0	14 (2)	452
Programmed Harvest	427	0	14 (2)	440
Average Annual Sell				
1979-1988	338	0	12	350
1984-1988	312	0	13	325
Average Annual Harvest				
1979-1988	290	0	11	301
1984-1988	336	0	12	348
Alternative E(PA)	332	1	12	345

(1) Green volume from creation of wildlife meadows in lands unsuitable for timber production
(2) Not in the 1979 Timber Resource Plan, but estimated here to enable comparisons

Table II-12 compares average potential annual yield from the 1979 TRP, average annual sold and harvested volume from 1979-88 and 1984-88, and ASQ for FEIS alternatives During 1979-88, annual sold volume was 338 MMBF and volume harvested was 290 MMBF For 1984-88 these volumes are 312 MMBF and 336 MMBF

ASQs of Alternatives A through H reflect NFMA MRs and additional adjustments to harvest levels depending on the mix of multiple uses proposed in a given alternative Some marginal lands have been removed from those suitable for timber production and assumptions about intensive management practices have been updated. ASQ represents a ceiling on the amount of chargeable timber volume to be sold

Table II-12. Comparison of Past, Present, and Alternative Timber Outputs

	TIMBER OUTPUT COMPONENTS
I.	**ALLOWABLE SALE QUANTITY (ASQ)** ASQ is composed of those volumes resulting from the yield projections of FORPLAN. ASQ is obtained from lands designated as suitable for timber production under NFMA regulations, and meets utilization standards in the Regional Guide When sold, the volume is called "chargeable", and is used to determine achievement of planned ASQ goals (1)
II.	**SAWTIMBER FROM LANDS DESIGNATED UNSUITABLE FOR TIMBER PRODUCTION** This incidental volume is an estimate of timber that will be sold from lands not designated for timber production These sales are generally associated with management of vegetation for other resources Though meeting Regional Guide utilization standards, this volume is "nonchargeable" against planned ASQ goals (2)
	TOTAL NET MERCHANTABLE SAWTIMBER (I + II)
III.	**SUBMERCHANTABLE VOLUMES FROM ALL LANDS** Estimated timber volume that does not meet utilization standards in the Regional Guide, but which could be utilized for products other than sawtimber It is "nonchargeable" against planned ASQ goals
	TOTAL NONCHARGEABLE (II + III)
IV.	**TIMBER SALE PROGRAM QUANTITY (I + II + III)** Timber sale program quantity includes ASQ for the 1st decade and estimated additional volume planned for sale during the 1st decade, such as fuelwood

(1) Chargeable - wood that is attributed to Potential Yield (green and salvage) or ASQ ASQ includes salvage volume only when it is salvage of timber that otherwise would have been green ASQ volume Examples are windthrow, fire kill, and widespread mortality from insect and disease Incidental natural mortality is not included in ASQ and salvage of such volume is not chargeable

(2) Nonchargeable - all volume not included in growth and yield projections for the selected managment prescriptions used to arrive at ASQ or Potential Yield

(3) Alternative NC is based on yield of timber projected for 1980 to 1989, as calculated for the 1979 Timber Resource Plan, and amended in 1984 Potential yield is only that volume shown under Sawtimber (chargeable) and Salvage (chargeable) Yield predictions were based on the RAM harvest scheduling model, a method no longer used While potential yield represented a level that could be produced, ASQ represents a timber objective and program for achievement of planned levels However, both potential yield and ASQ do represent a ceiling on amount of chargeable timber volume that could be sold for a given decade In this context, the two terms are comparable

Table II-12 Comparison of Past, Present, and Alternative Timber Outputs

MMBF Per Year	ALTERNATIVE									
(Average Volume Sold 1979-88/1984-88)	NC (3)	A	B	B(Dep)	C	D	E(PA)	F	G	H
A. Green	429	344	373	430	357	325	325	282	148	70
B Salvage	9	7	8	9	8	7	7	6	3	2
Total Allowable Sale Quantity (338/312)	438	351	381	439	365	332	332	288	151	72
A. Green (4)	0	0	0	0	5	0	1	0	2	0
B Salvage (5)	0	0	0	0	0	0	0	0	0	0
Total Sawtimber Volume From Unsuitable Lands (0/0)	0	0	0	0	5	0	1	0	2	0
Merchantable Sawtimber (338/312)	438	351	381	439	370	332	333	288	153	72
A Fuelwood (4/4 (6))	4	4	4	4	4	4	4	4	4	4
B Other Including Cull (8/9)	10	8	9	10	9	8	8	7	5	3
Total Submerchantable Timber (12/13)	14	12	13	14	13	12	12	11	9	7
Total Nonchargeable (12/13)	14	12	13	14	18	12	13	11	11	7
Quantity (350/325 (7))	452	363	394	453	383	344	345	299	162	79

(4) Green volume from unsuitable lands is from the creation of wildlife meadows
(5) No volume is shown for mortality salvage from unsuitable lands, however, some incidental volume would be expected under each alternative
(6) Data from Fiscal Year 84 to Fiscal Year 88
(7) The annual volume actually harvested averaged 290 MMBF of sawtimber and 11 MMBF of submerchantable volume during FY 1979-88 and 336 MMBF of sawtimber and 12 MMBF of submerchantable volume during FY 1984-88

The last 10 years include a high and low harvest cycle that is common to the timber industry and is therefore a useful comparison Comparison to the last five years shows alternative ASQs relative to years with good lumber and plywood markets For either time period, it is more meaningful to compare proposed ASQ to actual harvest levels than to unrealized maximum production represented by potential yield Employment and timber receipts result from actual harvest levels, not from potential levels

Forest Cut and Sell History

Timber actually harvested and sold over the past decade differs from the programmed sell level predicted in the 1979 TRP. The average sell level of 350 MMBF/yr (including nonchargeable) is less than the programmed sell level of 426 MMBF/yr from the TRP However, amount of timber actually harvested during the last 10 years has been even less, with an average of 302 MMBF/yr. Industry did not cut all that was sold, primarily because demand for wood products was not as high in the early 1980s as in the 1970s This was due in part to high interest rates and a recession in the general economy. Figure II-6 shows the cut and sell history on the Forest over the last decade.

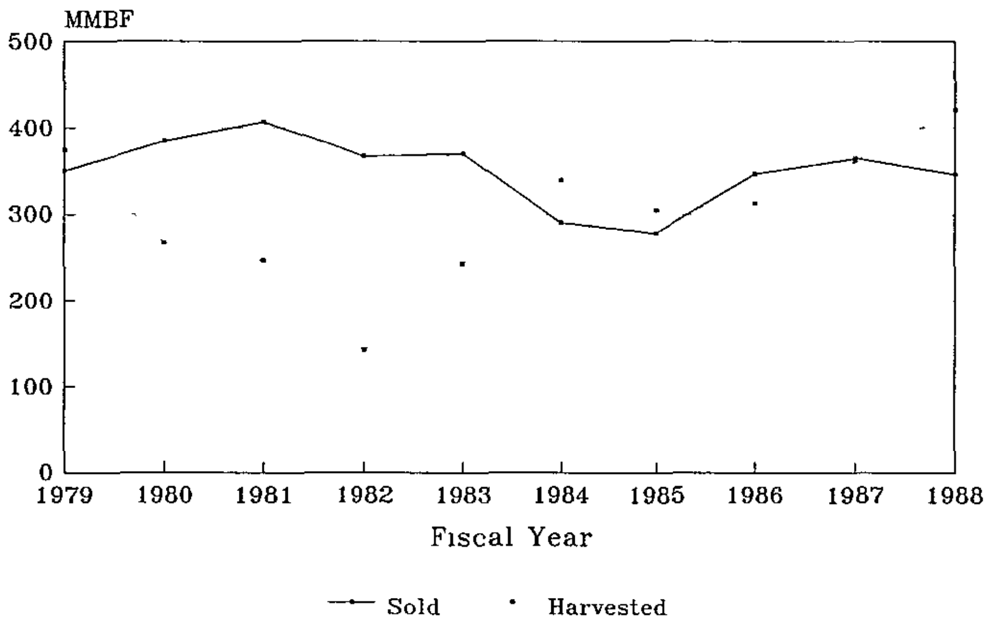


FIGURE II-6 TIMBER SOLD AND HARVESTED

Management of Existing Old Growth

In all alternatives, some existing old-growth stands would be maintained to meet a variety of resource objectives, including habitat for dependent species, undeveloped and research values, aesthetics, and recreational opportunities Because objectives for these resources vary by alternative, the amount of existing old growth expected in the 5th decade also varies

Existing old growth would be maintained in MAs 2 through 7, 11, 12 and 14, depending on the alternative Old growth would be maintained in old-growth groves, habitat for spotted owls and bald eagles, Special Interest Areas, Cascade Head Scenic-Research Area and Experimental Forest, undeveloped areas, wildernesses and scenic viewsheds. Some old growth would be maintained in vegetation leave areas in MA 15. There is no significant amount of existing old growth inventoried in MA 1, 8, 9, 10 and 13 (Silverspot Butterfly, Sand Lake, Sutton, Oregon Dunes NRA and Research Natural Areas) in any alternative Old growth would be harvested on suitable acres in MAs 14 and 15

Table II-13 displays acres of existing old growth that would be maintained in each alternative at the end of the 1st, 2nd, and 5th decades In addition, stands in the 130- to 190-year age group are shown These older stands could become old growth in about 80 years Table II-13 also shows which existing old-growth and mature conifer stands are in MAs that are not planned for timber harvest ("not suitable") under various alternatives

Table II-13 Older Age Groups by Suitability

	ALTERNATIVE									
	NC(1)	A	B	B(Dep)	C	D	E(PA)	F	G	H
1ST DECADE										
Wilderness, Not Suitable										
130-190 years	0	0	0	0	0	0	0	0	0	0
200+ years	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Nonwilderness, Not Suitable										
130-190 years	0	0	0	0	0	0	0	0	0	0
200+ years	8,600	18,800	18,400	18,400	18,900	19,300	21,300	21,300	31,800	31,800
Nonwilderness, Suitable										
130-190 years	0	0	0	0	0	0	0	0	0	0
200+ years	13,000	6,400	1,500	1,100	2,100	1,200	7,500	3,100	0	0
2ND DECADE										
Wilderness, Not Suitable										
130-190 years	100	100	100	100	100	100	100	100	100	100
200+ years	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Nonwilderness, Not Suitable										
130-190 years	(2)	5,600	5,400	5,400	5,500	8,800	5,500	7,900	15,900	17,900
200+ years	8,600	18,800	18,400	18,400	18,900	19,300	21,300	21,300	31,800	31,800
Nonwilderness, Suitable										
130-190 years	(2)	3,500	2,600	2,600	2,600	2,500	3,600	4,000	4,100	5,400
200+ years	13,000	5,200	1,500	1,100	1,600	1,200	1,000	3,100	0	0
5TH DECADE										
Wilderness, Not Suitable										
130-190 years	18,800	18,800	18,800	18,800	18,800	18,800	18,800	18,800	18,800	18,800
200+ years	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Nonwilderness, Not Suitable										
130-190 years	(2)	70,800	67,700	67,700	69,800	78,300	73,300	91,700	137,000	151,200
200+ years	7,800	18,800	18,400	18,400	18,900	19,300	21,300	21,300	31,800	31,800
Nonwilderness, Suitable										
130-190 years	0	3,200	400	100	3,000	2,600	2,000	14,000	14,000	17,300
200+ years	0	0	0	0	0	0	0	800	0	0

(1) Alternative NC is based on the 1979 Timber Resource Plan (TRP) The rate of harvest by age class was not detailed in the TRP The assumption in the FEIS is that high valued stands would be harvested early in the planning period, unless those stands were to be left for other resource values

(2) Data for the 130-190 year age class by suitable and non-suitable categories is not available for Alternative NC Estimated values are similar to Alternatives B and B(Dep)

Management of Municipal Watersheds

Fifty public systems withdraw water from streams draining National Forest land Of these, two municipalities--Corvallis and Toledo--have long-standing agreements with the Secretary of Agriculture which require special coordination regarding activities other than timber management and watershed protection

With the exception of some restrictions on public access in the Corvallis watershed (Alternative A), activities in municipal watersheds would be managed uniformly across the Forest in all alternatives except NC and H Measures used to protect fish habitat everywhere, including maintenance of vegetation along streams and on steep slopes, and special restrictions on use of herbicides would maintain water quality in municipal watersheds at acceptable levels. (See Forest-wide standards and guidelines (S&Gs) for soil, water, fish, and municipal watersheds in Forest Plan, Chapter IV) In addition, maximum timber harvest rate (percent harvested in any decade) would be lower in municipal watersheds than elsewhere. Where these measures might be inadequate to maintain water quality at acceptable levels, harvest location or rate could be limited further

Amount of protection afforded water quality varies by alternative, depending upon desired amounts of fish habitat, as outlined in "Fish Habitat and Water Quality Management" on the following pages In addition, timber harvesting and recreation would be excluded from municipal watersheds in Alternative H State of Oregon water quality standards would be met in all alternatives except NC. TRP inventories underestimated the extent of lands with large amounts of unstable landslide-prone soils, and overestimated effectiveness of vegetation leave areas in preventing landslides

As the resource maps illustrate, municipal watersheds overlap with other MAs. Thus, management of the watersheds is directed by S&Gs that are either Forest-wide or specific to MAs where overlap occurs

Management of Soil Productivity

Maintenence of soil productivity depends upon relative amounts of erosion or displacement of mineral and organic soil, compaction of soil surface, and soil nutrients lost to the atmosphere or ground and surface water. Management practices are designed to limit such erosional and nutrient losses, and include those listed in "Fish Habitat and Water Quality Management" plus the following:

1. Limit detrimental soil conditions such as surface erosion, compaction, puddling, displacemnt, and severely burned soil to less than 15% of the total project area This is accomplished by restricting ground based and cable harvest systems to specified locations, and by refraining from post-harvest burning on fragile soils on sites likely to suffer intense heating as a result of the burn.

2. Retain sufficient ground vegetation and organic matter to maintain long-term surface soil stability and site productivity This is accomplished by controlling destruction of duff and other organic matter through careful timing and control of post-harvest burns, and by retaining large logs on the ground where possible.

3 Comply with State of Oregon Best Management Practices Management practices used on the Forest to comply with BMPs will, as a minimum, meet state water quality standards (See FEIS, Appendix J "Best Management Practices" for more information)

Fish Habitat and Water Quality Management

Management of fish habitat and water quality consists of two major components: 1) protective measures, such as maintenance of vegetation along streams and on unstable slopes, and 2) habitat improvement and watershed restoration projects Levels of management of both vary by alternative.

FISH TERMINOLOGY

Anadromous fish - Those species that mature in the sea and migrate back into streams to spawn Salmon, steelhead, and cutthroat trout are examples

Class I - Streams or stream segments that have one or more of the following characteristics

- Direct source of water for domestic use,
- Used by large numbers of fish for spawning, rearing or migration,
- Flow enough water to be a major contributor to the quantity of water in a Class-I stream

Class II - Streams or stream segments that have one or both of the following characteristics

- Used by moderate though significant numbers of fish for spawning, rearing or migration,
- Flow enough water to be a moderate or not clearly identifiable contributor to the quantity of water in a Class-I stream, or be a major contributor to a Class-II stream

Class III - All other perennial streams or stream segments not meeting higher class criteria

Class IV - All intermittent streams or stream segments not meeting higher class criteria

Landtype - An area that has a defined arrangement of specific landforms and soils

Landtype Association (LTA) - A group of landtypes similar in landform, rock types, and soils that make up a large portion of the Forest

High risk slope - A slope with a high probability of experiencing a landslide as a result of timber harvest

Low or Moderate risk slope - A slope with a low or moderate probability of experiencing a landslide as a result of timber harvest

Riparian area - An area with distinctive wetland values and characteristics that is comprised of both aquatic and associated ecosystems

Stream buffer - An area of soil and vegetation left along a stream to protect the channel or water from management activities

Streamside management unit (SMU) - A stream influence and protection zone, where special care is necessary to protect and maintain dynamic channel equilibrium, fish habitat and water quality The goal of the SMU is to meet state water quality standards and maintain fish habitat in all Class-I and -II streams

Vegetation leave area - Unstable steep slopes where soil and vegetation is left undisturbed to protect the area from management activities

Protective Measures

Measures used to protect fish habitat and water quality on land managed for timber are as follows Most apply only in some alternatives, as Table II-14 illustrates

1 Restrict or prohibit timber harvesting near perennial streams (buffers); buffers have been shown to be effective (Gibbons and Salo 1973, Heifetz et al. 1986, others) and should extend 50 to 100 feet, on the average, from each side of the stream, depending on the alternative and stream class,

2. Restrict or prohibit timber harvesting near intermittent streams (stream buffers, an average of 50 feet on each side of the stream);

3. Prohibit timber harvesting on sloped sites within all landtypes which have a high and/or moderate risk of landslides (Bush 1982, vegetation leave areas);

4. Prohibit timber harvesting on all lands within high risk landtypes (Bush 1982);

5 Limit the percentage of land in a watershed that is made up of clearcuts and plantations less than 10 years old.

Improvement Projects

Many practices used to manage watersheds and fish habitat on the Forest are intended to improve or restore channel conditions Projects consist of stabilizing steep slopes, constructing and maintaining roads to prevent landslides, managing vegetation in the riparian zone to benefit fish habitat and stream structure, building structures to create spawning and rearing habitat for fish, modifying blockages to fish passage, and providing resting pools in streams with a bedrock bottom. These projects are often effective, but those confined to stream channels are generally feasible only in streams (probably less than 5% of the total) that are accessible to heavy equipment such as front-end loaders. Moving large woody debris into channels using logging equipment already set up for nearby timber sales could increase the number of streams that may be improved

Table II-14. Protective Measures For Fish Habitat and Water Quality

	ALTERNATIVE								
Protective Measure	**NC**	**A**	**B and B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
1 Buffer - Perennial Streams (1)	(2)	MR+	MR	MR	MR++	MR+	MR++	MR++	MR++
2 Buffer - Intermittent Streams	no	no	no	no	yes (3)	no	no	yes	yes
3 Leave Areas on Slopes with a High Risk of Landslides	(4)	yes	yes	yes	yes	yes	yes	yes	yes
b Low or Moderate Risk of Landslides	no	no	no	no	yes (3)	no	yes	yes	yes
4 Protection of High Risk Landtypes	no	no	no	no	no	no	no	yes	yes
5 % Harvested in 10 years	30	30	30	20	15	20	20	10	5

(1) MR = Amount of protection needed to meet MRs for fish habitat and water quality
MR+ = Moderate level above the MR level
MR++ = High level above the MR level
(2) Buffers left on parts of Class-I and -II and unstable Class-III streams
(3) In LTAs A, B, C, and D, where streams have high potential for coho salmon
(4) The TRP's underestimate of acres of high-risk soil types would result in no protection for many unstable high-risk slopes
(5) No limit

For the watershed program (primarily dealing with forested slopes, stream channels, and roads), amounts of work proposed in alternatives are directly related to amounts of timber harvested and to needs to correct projected damage to watershed conditions Work is largely financed with Knutson-Vandenberg Act (K-V) funds collected from timber sales Funding would be greatest in Alternatives NC, B, and B(Dep); followed by A and C (as a group); D, E(PA), and F (as a group); and G and H (see tables in "Outputs and Effects" later in this chapter).

Restoration projects for fish habitat are also funded by K-V funds (projected to be $34 per acre) Like the watershed program, funding for K-V projects in various alternatives is directly related to timber harvest In the 1st decade, Alternative B(Dep) would be greatest, followed by NC, B, A, C, E(PA), D, F, G, and H

Fish habitat enhancement projects are included in those alternatives in which providing fish habitat is one of the main objectives (see tables in "Outputs and Effects" later in this chapter) Most projects are intended to improve existing conditions The actual amount included is directly related to degree of emphasis on fish in the alternative, considering other resource objectives Thus, the greatest amount of fish habitat enhancement by artificial means would be in Alternative G, followed by E(PA), F, H, D, and A All alternatives that include a fish habitat improvement program would also require a commensurate stream/riparian survey program to identify projects Projects would help alleviate conditions, identified with a basinwide perspective, that limit fish populations

Fishery enhancement projects in Alternative D would be concentrated in salmon habitat in Landtype Associations A, B, C, and D This is different than in other alternatives where projects would be dispersed throughout the Forest.

In Alternative NC, an intensive management program for restoration of fish habitat would be proposed in an attempt to reduce the degradation predicted through the 5th decade This program would include inventory of fish habitat, log jam removal, culvert modification, improvement of in-channel habitat, and erosion control Part of this program would be funded by K-V money, and the rest by funds similar to those used for fish habitat enhancement projects in other alternatives

Fish Habitat and Water Quality in Various MAs

Fish habitat is managed in conjunction with other resources such as undeveloped areas, spotted owl habitat, and Wildernesses Protective measures are planned in MAs in which substantial timber is being harvested on a regulated basis (14 and 15), while habitat improvement projects would also be planned in several other MAs

Management of Wildlife Habitat

Wildlife habitat is managed in a variety of ways in the alternatives Timber harvesting is prohibited on some lands where certain species require old-growth habitat, and used to maintain desired age and species conditions on others

WILDLIFE TERMINOLOGY

Indicator species - Plants or animals whose population parameters show the effects of land and resource management practices and actions on themselves, other species, or an ecosystem which is being treated as a management unit (Salwasser and Hunkel 1981) The TRP did not define this term, but used it for spotted owls in a way that implied a definition similar to that used for Alternatives A through H

Key wildlife habitat - An area necessary for breeding, foraging and/or shelter of wildlife, habitats that may be eliminated or significantly reduced as a result of intensive timber management Key habitats include dead and defective trees, deciduous and mixed habitat, older forest stands, riparian vegetation, and meadows

Key wildlife species - Used only in Alternative NC The TRP defined this as "species that may be eliminated or reduced significantly as a result of intensive timber management, including animals that require solitude during critical periods of their lives, and have a high probability of being disturbed during these periods by recreationists or activities associated with timber harvesting "

Limited habitat - A habitat that, without special provisions, is subject to reduction below levels necessary to maintain viable populations (USDA Forest Service 1984c) The TRP did not define this term, but implied "a habitat that is subject to being reduced to very low levels " Alternatives A through H defined this term as "a habitat that, without special provisions, is subject to reduction below levels necessary to maintain viable populations" (USDA Forest Service 1984c)

Sensitive species - Those plants and animals identified by the Regional Forester for which population viability is a concern (FSM 2670)

Special habitat - A habitat which has a special function not provided by plant communities and successional stages, is biological in nature, and can be created or altered by management (Thomas 1979)

Viable population - A population capable of existing and functioning as an independent unit on a specified area, over a specified time, under a set of anticipated environmental conditions (Salwasser and Hunkel 1981).

Silverspot Butterfly

The Oregon silverspot butterfly, a federally-listed threatened species, lives on Mt Hebo and in several areas along the Pacific Ocean near the Rock Creek Wilderness Alternatives A through H would manage butterfly habitat in accordance with the U S Fish and Wildlife Service recovery plan for the species

(Stine 1982) and the Forest's plan to implement recovery actions (Clady and Parsons 1984; Hammond 1989).

At the time the TRP was written, the Oregon silverspot butterfly was not listed as a threatened species The TRP did not include any management provisions or discussion regarding the butterfly. Approximately three-quarters of the 1,926 acres of butterfly habitat is forest fringe area which provides shelter and feeding habitat. Alternative NC may include a small amount of the forested acres in potential timber yield calculations

All habitats of the species would be managed in the same way in all alternatives. The habitat consists of meadows and adjacent forest To maintain desired conditions in the meadows, and to modify areas that are not presently suitable, some burning, mowing and brush control would be required. Some openings may be cut in the forest at the Mt. Hebo area to enhance its ability to provide food and protection to the adult butterflies Opportunities to cut trees would be more limited at Rock Creek due to proximity of the Wilderness. The 1,926 acres of habitat is included in MA 1.

Northern Spotted Owl

The northern spotted owl prefers well-spaced, old-growth conifer habitat It is listed as threatened by the State of Oregon and sensitive by the Pacific Northwest Region of the Forest Service, and is proposed as threatened by the U S Fish and Wildlife Service A multilayered forest stand with large dead and defective trees (both standing and fallen) is needed. Normally, this condition will occur late in natural succession of a timber stand

Because other species also prefer old growth, the northern spotted owl was identified by the Region as an indicator species with specific management requirements (MRs) to assure viability of the species Quantity and distribution of habitat necessary to sustain viable populations of spotted owls and associated species are described in the Supplement to the Northwest Regional Guide (USDA Forest Service 1984a and 1988a) and other regional direction (Sirmon 1983).

Numbers of Spotted Owl Habitat Sites (SOHAs) and their sizes vary by alternative, as Table II-15 illustrates (see Appendix I for a map of SOHAs for each alternative). Twenty-two are the minimum, but as many as 37 are protected in Alternative H. Size of each SOHA is 2,000 acres in all alternatives.

At the time the TRP was written, there was no regional direction for management of spotted owls. However, an interagency task force had been appointed to develop statewide recommendations regarding habitat requirements for self-sustaining populations of an older forest wildlife community, using spotted owl as an indicator species. These recommendations were not developed prior to completion of the TRP Therefore, the TRP provided interim direction for protection of spotted owl habitat, stating that timber yields would be adjusted later during land management planning

Table II-15. Acres and Number of Spotted Owl Habitat Sites

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Acres Per Site	NA	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Number of Sites	NA	22	22	22	22	22	29	25	27	37

To maintain options for management of spotted owl habitat, the TRP provided interim protection of older forest stands where populations of spotted owls were known to exist, based on 1976-77 surveys. These stands were to be undisturbed until allocations were made through land management planning. The TRP did not specify number, size, or location of these sites, but stated that about 13,000 acres of old growth associated with known owl locations would be protected Review of historical survey data shows that by 1977, spotted owls had been found in 30 locations on the Forest Old growth associated with these owls totaled 13,800 acres, with a range of 88 to 864 acres per site Alternative NC would include these old-growth acres in the commercial forest land base Habitat sites meeting minimum size and distribution standards would not be established in Alternative NC Except in areas reserved from timber harvest (such as Wilderness), acreage surrounding each protected old-growth stand would be harvested

Spotted owl management consists of protecting habitat characteristics favored by spotted owls from adverse modification, and restricting activities that could cause nest abandonment or mortality of young (see S&Gs in MA 3 of Forest Plan, Chapter IV for more specific information).

Spotted Owl Habitat in Various MAs

MA 3 consists of SOHAs managed primarily for spotted owls, and is distributed across the Forest to assure that owls interbreed. Spotted owl habitat is also managed in conjunction with other reserved areas which contain relatively large areas of old growth. These include silverspot butterfly habitat on Mt Hebo (MA 1), Special Interest Areas (MA 5), Cascade Head Scenic-Research Area (MA 6), Cascade Head Experimental Forest (MA 7), undeveloped areas (MA 11), Wildernesses (MA 12), and Research Natural Areas (MA 13).

Although spotted owl habitat is compatible with resources emphasized in other MAs, suitable habitat in blocks large enough to support viable owl pairs would be present mainly in Wildernesses and undeveloped areas Table II-16 illustrates habitat capability for owls in various areas in the 5th decade.

Table II-16. Habitat Capability for Spotted Owl Pairs in Managed SOHAs and Reserved Sites

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Reserved Sites	NA	8	8	8	8	8	8	8	8	8
Managed as SOHAs	NA	22	22	22	22	22	29	25	27	37
Other Areas (2)	NA	7	5	5	6	8	5	11	20	25
Total	5 (2)	37	35	35	36	38	42	44	55	60

(1) Relatively undisturbed areas like Wassen Creek
(2) TRP did not specify a breakdown of total habitat remaining by reserved sites, managed SOHAs, or other areas

Bald Eagle

The bald eagle, a federally-listed threatened species in Oregon, requires habitat consisting of scattered old-growth conifer trees near open water (see Chapter III "Wildlife" for more details) Bald eagle habitat is provided in two primary ways. 1) protecting it from timber harvest, and 2) keeping activities away from nest sites to prevent disruption of reproduction (see S&Gs in MA 4 for more specific information) Each habitat site must be at least 125 acres to conform with the Recovery Plan (USFWS 1986), as Table II-17 illustrates.

Table II-17. Acres and Number of Bald Eagle Habitat Sites

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Acres/Site	40	125	125	125	125	125	125	125	325	625
Number of Sites	93 (1)	23	23	23	23	23	23	23	23	23

(1) Alternative NC would designate 198 sites to be managed on a 300-year rotation A third of these sites (66), would be 200-300 years old at any one time and suitable for nest sites An additional 27 sites would be provided on reserved lands

This habitat occurs naturally In Alternatives A through H, it would be provided as described above Alternative NC would manage 7,920 acres of commercial forest land to provide habitat A total of 198 sites (each 40 acres) would be managed on a 300-year rotation, with 66 sites providing suitable habitat at any point in time Sites would be managed intensively (with numerous commercial thinning entries) until 200 years of age No further management would occur between the ages of 200 to 300, when suitable habitat would be provided An additional 27 sites, including 1,080 acres, would be available on reserved lands

Bald Eagle Habitat in Various MAs

MA 4 consists of sites managed primarily for bald eagles, and is found along the coast and on major rivers throughout the Forest In addition to managed sites, habitat conditions for eagles would be provided in other areas reserved from timber harvest, including spotted owl habitat (MA 3), Special Interest Areas (MA 5), Cascade Head Scenic-Research Area (MA 6), Sand Lake Recreation Area (MA 8), Sutton Recreation Area (MA 9), Oregon Dunes National Recreation Area (MA 10), undeveloped areas (MA 11), Wildernesses (MA 12), and Research Natural Areas (MA 13) Bald eagle habitat is compatible with resources emphasized in these MAs

Roosevelt Elk

Best foraging habitat for elk is meadows or pastures. These can occur naturally or be created through clearcut harvest, and higher populations of elk are maintained by more careful scheduling of timber harvest and by forage improvement projects. Hunting and transplanting of elk are also important, and are responsibilities of the Oregon Department of Fish and Wildlife (ODFW). It is assumed that the agencies will cooperate in elk management, including a transplant program.

Each of Alternatives A through H has a different potential for producing elk. Timber is harvested and forage enhanced to produce desired numbers of elk In some alternatives, habitat would be enhanced by scattering clearcuts within a subbasin. In others, permanent meadows would be created, the forage base would be improved (such as seeding for winter forage and fertilizing), or elk would be transplanted. Differences in management practices are outlined in Table II-18

The TRP deferred a decision on management of elk, stating that the Forest, in cooperation with ODFW, would determine population goals through land management planning. Under Alternative NC, the Forest would provide habitat to maintain Forest elk habitat capability at the 1979 level. This could include reducing harassment and delaying timber harvest in some drainages to provide appropriate forage to cover ratios for big game

Table II-18. Variations in Elk Management Practices

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Meadows Created (Acres)	no	no	no	no	8,700	no	1,000	no	3,900	no
Forage Seeding	no	yes	no (2)	no (2)	yes	no (2)	yes	no (2)	yes	no (2)
Distribution of Harvest	no (1)	yes	no	no	yes	no	yes	no	yes	no
Transplants	no	yes	no	no	yes	no	yes	no	yes	no

(1) The TRP stated timber harvest might be delayed in some drainages
(2) If needed to mitigate unanticapated adverse effects, this alternative may include forage seeding

Elk Habitat in Various MAs

Meadows providing elk habitat will be present in most MAs, but additional habitat will be created and managed only in MAs 14 and 15, in which timber is harvested on a regulated basis. Alternative NC would maintain existing meadow habitat Additional forage areas would be provided as a result of timber harvest Management of elk by specific areas was not addressed in the TRP.

Mature Conifer Habitat

Two indicator species, marten and pileated woodpecker, and other species they represent are dependent upon mature conifer habitat for food, cover, and nesting sites. This habitat occurs naturally in undisturbed areas which are dominated by conifers, such as Wildernesses and SOHAs, among others. Because these areas are not evenly distrubuted across the Forest, they can provide only a portion of the habitat needed for viable populations.

The Region identified marten and pileated woodpecker as MR species and provided the Forest with criteria for managing them (Sirmon 1984) Forest decisions on how the habitat is managed are also discussed.

To provide remaining habitat in Alternatives A through H, timber would be cut on 100-year rotations. These stands would be suitable as habitat from ages 80 to 100 Providing this habitat by preserving stands is neither economically efficient nor biologically necessary. Alternative NC would manage timber on a 80-90 year rotation, and no special management would be planned to provide mature conifer habitat The TRP stated that additional acreage of mature conifer habitat would be needed to provide desired population levels for marten The level was to be determined through land management planning

Old-growth stands would also provide habitat for species requiring mature conifer MRs for mature conifer consist of some sites that are 300 contiguous acres dispersed about every 2-1/2 to 3 miles, and other sites that include 160 acres in contiguous blocks within 1 mile of the site center The smaller sites are for marten, while the larger sites are for both marten and pileated woodpeckers.

Mature conifer habitat, in addition to the MR level, is provided in alternatives that emphasize nongame wildlife Both size (160-250 acres) and number of sites vary by alternative (Table II-19)

Table II-19 Acres and Number of Mature Conifer Habitat Areas

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Managed Marten Areas	N/A	69	69	69	69	69	69	69	69	69
Managed Woodpecker Areas	N/A	25	25	25	25	25	25	25	25	25
Mature Acres in each Habitat Area										
Pileated Woodpecker	N/A	300	300	300	300	300	500	300	300	300
Pine Marten	N/A	160	160	160	160	160	250	190	160	160
Minimum Number of Acres Managed for Mature Conifer Habitat (1)	N/A	18,540	18,540	18,540	18,540	18,540	27,250	20,610	18,540	18,540

(1) Total numbers of acres managed on a 100-year rotation vary by alternative, ranging from 27,250 to 18,540 Fewer acres are managed specifically for mature conifer habitat when acres in an alternative are managed for other uses such as undeveloped areas, Wilderness, visual quality, longer timber rotations, and spotted owls

Mature Conifer Habitat in Various MAs - In MAs 14 and 15, long timber rotations provide mature conifer Although not managed specifically for this habitat, some areas outside commercial forest land (i e , Wildernesses, SOHAs, and Special Interest Areas) would provide considerable mature conifer habitat suitable for marten and pileated woodpeckers All forested MAs include some mature conifer or old growth Thus, mature conifer, like old growth, can be provided in conjunction with many other resources

Mature Deciduous Mix

Species associated with mature deciduous-mix habitat include sharp-shinned hawk, western grey squirrel, and several species of warblers Deciduous-mix stands mature between 50 and 100 years. Habitat must be disturbed periodically, either by fire or through timber harvest

Habitat will be provided in alternatives which emphasize nongame wildlife (Table II-20) Alternatives F, G, and H would manage specified amounts of deciduous-mix habitat on 100-year rotations to replace older stands and maintain 50% or more of the habitat in hardwoods The TRP recognized deciduous mix as a key wildlife habitat, but did not identify any indicator species or distinguish between upland and riparian acres of deciduous-mix habitat.

Table II-20. Acres Managed for Mature Deciduous Mix Habitat

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Acres	0	0	0	0	0	0	0	43,200	71,400	72,000

Mature Deciduous-Mix Habitat in Various MAs - Deciduous-mix habitat may be found naturally in a number of MAs. Because it is dependent on disturbance, however, habitat will be managed through timber harvest only in MAs 14 and 15. Numbers of acres of deciduous mix provided in these MAs are shown above. Additional habitat will be provided in MAs 14 and 15 by activities such as visual and riparian management and planting deciduous trees in areas with root rot See the MA discussions in Forest Plan, Chapter IV for more information

The TRP stated that 35,000 acres of deciduous-mix habitat would be available in areas not scheduled for harvest, such as Streamside Management Units (SMUs), riparian zones, and soil leave areas. Of this total, approximately 24,000 acres would be comparable to upland acres included in Alternatives F through H under mature deciduous-mix habitat. Alternative NC would leave most of these acres unharvested, rather than actively managed for mature habitat. Information on yield reductions for the TRP indicates that about 5,000 acres within SMUs would be managed on 150-year rotations to provide deciduous-mix habitat.

Dead and Defective Tree Habitat

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 in the Region and is included as an MR (Sirmon 1984). A group of dependent primary cavity excavators has been identified as the indicator for the habitat.

Minimum percent of biological potential of dead and defective trees that would be provided in subbasins of about 2,000 to 5,000 acres would vary by alternative, as shown in Table II-21. The TRP did not identify any indicator species for this habitat, but recognized the need to manage for primary cavity excavators. Alternative NC would manage dead and defective tree habitat to support a minimum of 40% of maximum population levels of dependent species. Management objectives were not established by subbasin in the TRP. The TRP stated that guidelines to implement the proposed level would be developed at a later date.

Table II-21. Biological Potential for Dead and Defective Tree Habitat (1)

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Percent of Biological Potential	40(2)	40	20	20	20	20	40	50	60	60

(1) Forest-wide levels by Alternative
(2) The TRP did not specify habitat levels by subbasin, this is a Forest average

Dead and Defective Trees in MAs - Dead and defective trees are provided in all MAs, the level varying by MA (Table II-22). Alternative NC would manage dead and defective tree habitat to meet Forest-wide standards; objectives would not be established by subbasin or MAs

Table II-22. Dead and Defective Tree Habitat

Management Area	Population Level
1	variable
2	100%
3	100%
4	variable
5	variable
6	variable
7	variable
8	variable
9	variable
10	variable
11	100%
12	100%
13	100%
14	variable
15	variable

Grass-Forb Habitat

Grass-forb habitat is found in meadows and clearcut units across the Forest Timber must be clearcut to assure presence of desired conditions Meadows created in this way are transitory because brush and trees quickly reclaim areas Thus, more habitat is provided in alternatives with more timber harvest Due to the size of the timber program, no additional habitat is needed in any of the alternatives

The TRP did not recognize grass-forb as a potentially limited habitat Existing meadows (totaling 3,000 acres) were identified as habitat that would be available through time Alternative NC would not make any special provisions for management of grass-forb habitat

Grass-Forb Habitat in MAs - Grass-forb habitat would occur in meadows and early successional stages of timber harvest units Habitat will be managed only in MAs 14 and 15, where timber is harvested

Riparian Habitat - This habitat is found adjacent to rivers and streams. Timber on riparian acres will be harvested in some altenatives, thereby creating early successional stages intermixed with more mature riparian communities Wildlife will respond to such changes in vegetative structure, although the total area of riparian zone (77,000 acres) will remain unchanged

Species favored by disturbance will benefit from harvested areas, while species that prefer older-aged, undisturbed sites will continue to exist elsewhere in the riparian zone. In alternatives without timber harvest in the riparian zone, natural disturbance will provide enough early stages of vegetation to maintain associated wildlife species Overall changes to existing riparian wildlife communities are expected to be small in all alternatives

Threatened and Endangered (T&E) Species

Federally-listed T&E species on the Forest include Aleutian Canada goose, peregrine falcon, brown pelican, bald eagle, and Oregon silverspot butterfly. All except the silverspot butterfly had been listed as T&E by the U S. Department of Interior at the time the TRP was written. Management for all except bald eagle would be the same in Alternatives A through H and is outlined in Forest-wide S&Gs (see discussions of bald eagle and silverspot butterfly earlier in this section). No action would be taken which would adversely affect recovery, and to the extent possible, management will aid recovery of the species.

Alternative NC would not prescribe special management practices for the brown pelican, Aleutian Canada goose, or peregrine falcon, as the TRP identified these species as "basically dependent on nonforested habitats unaffected by timber management." Management of bald eagle in Alternative NC is discussed earlier in this section.

Sensitive Species

Including the above T&E species, there are 19 species of animals and 23 species of plants on the Forest listed as sensitive by the State of Oregon and the Regional Forester. See "Management of Spotted Owl Habitat" in this section for more discussion on that species, which is proposed for listing as threatened by the U.S Fish and Wildlife Service Management of the remaining species does not vary in Alternative A through H, and is specified in Forest-wide S&Gs.

The Regional Forester's sensitive species list did not exist when the TRP was written. Alternative NC would not include special management practices for any sensitive species except spotted owl

Special Habitats

In Alternatives A through H, special habitats such as lakes and ponds, freshwater marshes, rocky ocean beaches, talus slopes, and colony nesting areas would be protected from adverse activities by Forest-wide S&Gs which do not vary by alternative

The TRP did not label these habitats as "special" However, it identified most of them as wildlife habitats that would be unaffected by timber harvest and would remain unchanged through time Alternative NC would not provide specific management guidelines for these areas

Management of Recreation

Forest resources are managed for recreational purposes in order to:

- Encourage and facilitate public enjoyment and understanding of the Forest, coastal environment and local history,
- *Provide a variety of recreational opportunities and settings that can enhance quality of life for* area residents and recreationists;
- Provide opportunities for Forest visitors to observe, participate in, and learn about management of National Forests; and
- Assist in building a diversified, strong and stable economy adjacent to the Forest.

A variety of recreational opportunities are available, ranging from developed to dispersed (dispersed recreation occurs outside developed areas). Recreational opportunities are further classified according to their location along the Recreation Opportunity Spectrum (ROS). ROS is a conceptual framework which describes six classes of recreational opportunities based on control, level of facility development, amount of information provided onsite, and probability of encountering other users Four ROS classes *occur on the Forest: Semiprimitive Nonmotorized (SPNM), Semiprimitive Motorized (SPM), Roaded* Natural, and Rural

From the range of settings, activities, and other considerations withon these four classes, the Forest focuses planning and management on the following:

1. Developed sites,
2. Off-road use of vehicles;
3. Areas with recreational designations or special recreational opportunities - including Oregon Dunes National Recreation Area (NRA), Cascade Head Scenic-Research Area (CHSRA), Sutton Recreation Area, Sand Lake Recreation Area, Special Interest Areas (SIAs), Wildernesses, and undeveloped areas. In addition, several rivers are eligible for consideration as part of the national Wild and Scenic (W&S) Rivers System
4. Trail use and development; and
5. *Hunting and fishing.*

Developed Recreation - Developed recreational opportunities are provided in sites such as campgrounds and picnic grounds. In all alternatives, capacity would be great enough to meet projected demand for developed sites. New sites would be constructed as necessary Therefore, plans to manage *developed recreation do not vary by alternative All existing sites would be managed as cost-effectively* as possible All or some portions of sites may be closed when use is low Developed-site capacity needed to meet projected demand by decade is shown in Table II-23

Table II-23. Developed Site Capacity (1)

DECADE	Capacity M PAOT (2)
Current	9 7
1st (Planned)	9 9
2nd (Anticipated)	10 7
3rd (Anticipated)	11 6
4th (Anticipated)	12 6
5th (Anticipated)	14 0

(1) M PAOTs are calculated based on the assumption that the Forest will provide developed sites to meet demand
(2) M PAOT = people at one time (in thousands)

Off-road Use of Vehicles - Most off-road vehicle (ORV) use on the Forest takes place in the Oregon Dunes NRA and Sand Lake and Sutton recreation areas. Amounts of land available for ORV use in the Oregon Dunes NRA and Sand Lake would not vary by alternative The amount of land available for ORV use in the Sutton Area would vary by alternative, ranging from 0 to 330 acres (see the Sutton Area discussion in this section). Most of the remainder of the Forest would be open to ORV use in all alternatives Exceptions are:

1 Wildernesses, undeveloped areas, SIAs, Oregon silverspot butterfly habitat, CHSRA, Cascade Head Experimental Forest (CHEF), Research Natural Areas (RNAs); and

2 Other specific locations where motor vehicle use must be restricted (See Forest Plan, Appendix E for specific locations where ORV use would be limited or prohibited when the Preferred Alternative is implemented.) According to the S&Gs (see Forest Plan, Chapter IV), some of the area open to ORV use, such as bald eagle and spotted owl habitat areas, would be closed on a case-by-case basis at certain times of the year.

Management of Special Areas

The following areas are described in Chapter III Management of some areas varies by alternative, while for others it does not Specific direction for their management is in Forest Plan, Chapter IV.

Oregon Dunes National Recreation Area (NRA) - In all of the alternatives, management of the Oregon Dunes NRA would be consistent with the existing management plan (USDA Forest Service 1979c) The plan is summarized in the discussion of MA 10 in Forest Plan, Chapter IV.

Cascade Head Scenic-Research Area - Management of CHSRA would also be consistent with the existing management plan (USDA Forest Service 1976) in all alternatives The plan is summarized in the discussion of MA 6 in Forest Plan, Chapter IV

Sand Lake Recreation Area - The Sand Lake Management Plan (USDA Forest Service 1980b) guides management of this area in all alternatives. The plan is summarized in the discussion of MA 8 in Forest Plan, Chapter IV.

Sutton Recreation Area - Six management alternatives were analyzed for the Sutton Area These alternatives provide a range of ORV use, site development, horse use, and other recreational opportunities while maintaining integrity of sensitive species habitat Sutton alternatives have been incorporated into FEIS alternatives as shown in Table II-24.

Table II-24 Sutton Alternatives

Sutton Area Alternatives	FEIS Alternatives
Alt 1	Alt F, G, and H
Alt 2	Alt C
Alt 3	Alt B and B(Dep)
Alt 4	Alt D
Alt 5	Alt A
Alt 6	Alt E(PA)

Sutton Alternative 6 is the preferred management approach and has been incorporated into Alternative E(PA) Analysis of the Sutton alternatives is documented in Appendix F.

Alternative NC does not include any of the six Sutton alternatives since they were not developed at the time the TRP was written It is reasonable to assume that management of the Sutton Area would be the same as in Alternative A

Special Interest Areas - Two SIAs, Cape Perpetua Scenic Area and Marys Peak Scenic-Botanical Area, already have been established In the alternatives, two additional SIAs are considered - Mt Hebo and Kentucky Falls In some alternatives, Cape Perpetua Scenic Area would be expanded Table II-25 gives sizes of SIAs included in alternatives

Table II-25. Special Interest Area Acreage

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Cape Perpetua	990+ (1)	1,960	164	164	1,960	164	2,780	1,960	1,960	1,960
Marys Peak	510 (1)	924	924	924	924	924	924	924	924	924
Mt. Hebo	0	0	1,684	1,684	1,684	0	1,684	1,684	1,684	1,684
Kentucky Falls	0	0	0	0	1,200	0	1,680	2,769	2,769	0 (2)
TOTAL	1,500	2,884	2,772	2,772	5,768	1,088	7,068	7,337	7,337	4,568

(1) This figure is from the TRP It is not the full acreage in this area since some of the acres were included in the general nonforest or meadow categories rather than here

(2) All of the Kentucky Falls area in Alternative H is in the N Fork Smith River Undeveloped Area

Management direction for SIAs, except for Mt Hebo, is provided in MA 5 in Forest Plan, Chapter IV Direction for Mt Hebo is in MA 1, along with habitat of the Oregon silverspot butterfly

Wildernesses and Undeveloped Areas - Both Wildernesses and undeveloped areas provide semiprimitive recreational opportunities Sizes of Wildernesses do not vary by alternative, but numbers of miles of trail construction in them do Numbers of acres that would be managed as undeveloped areas do vary by alternative. Each is discussed later

Wild and Scenic Rivers - Eligibility of rivers for inclusion in the National W&S Rivers System was determined using two processes. One was an evaluation of four rivers on the Nationwide Rivers Inventory that was included in the DEIS. The other involved use of a simplified version of a process developed by the Interagency W&S Rivers Committee, and done by a special team set up as a result of public comments on the DEIS, primarily from the Oregon Rivers Council.

Eligibility did not vary by alternative, and is not discussed further here (See Chapter III for more information on criteria used and specific recommendations for eligibility) The rivers found to be eligible must be managed in such a way that their status is not reduced

Several of the rivers had no more than 6% frontage in NFS ownership, so a full eligibility analysis was not done at this time. These rivers must be managed as if they are eligible so that W&S River options are protected until a study is done.

Trail Use and Development - Due to steep, brushy terrain on the Forest, amounts of non-vehicular recreational use are closely related to amounts of trail Miles of trail to be constructed vary by alternative and are shown in Table II-26

No trail program is identified in the TRP For comparison, it would be reasonable to assume a trail program which is the same as Alternative A

Table II-26. New Trail Construction Through the 5th Decade

	ALTERNATIVE									
MILES	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
New Construction in 1st Decade (Planned)	NA	19 8	28 3	28 3	51 8	19 8	71 0	57 1	61 7	45 3
New Construction Through 5th Decade (Anticipated)	NA	60 8	60 0	60 0	113 0	45 4	155 5	161 3	215 5	156 9
Total Trail Mileage on the Forest	NA	140.3	140 6	140 6	193 6	126 0	236 1	241 9	296 1	237 5

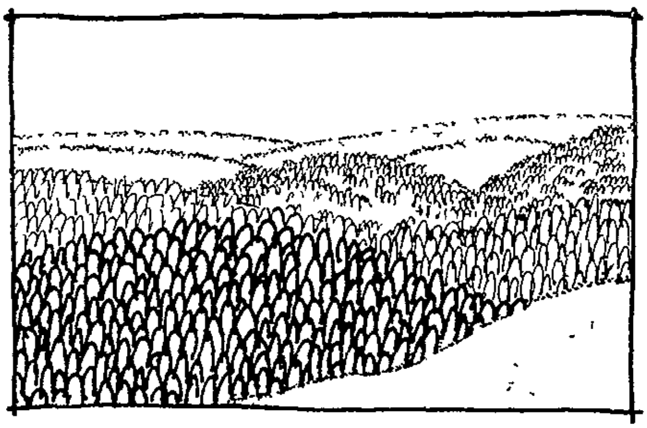
Hunting and Fishing - The Forest manages fishing and hunting opportunities by providing habitat for fish and game species and by controlling access for users. The amount and quality of habitat affects populations When populations are higher, opportunities for hunting and fishing are greater Amounts of habitat vary by alternative; thus, fishing and hunting use - expressed as wildlife and fish user days (WFUDs) - varies substantially (See "Fish" and "Wildlife" earlier in this chapter).

Management of Visual Resources

The visual resource, or scenery, is managed by establishing standards for all National Forest System (NFS) land, and planning projects to meet those standards. The standards, called Visual Quality Objectives (VQOs), are defined in USDA Forest Service (1974). VQOs prescribe how much modification of the landscape is allowed VQOs are established for NFS lands in MA S&Gs (see Forest Plan, Chapter IV)

Landscapes seen from most heavily travelled roads on the Forest are considered sensitive viewsheds Management of these viewsheds varies substantially by alternative Table II-27 shows which viewsheds will be protected, and VQOs assigned for each, in each alternative Recommendations of the Visual

Management System are given as well Refer to MA 14 in Appendix D for a description of how viewsheds are managed, and to the glossary for more information on VQOs



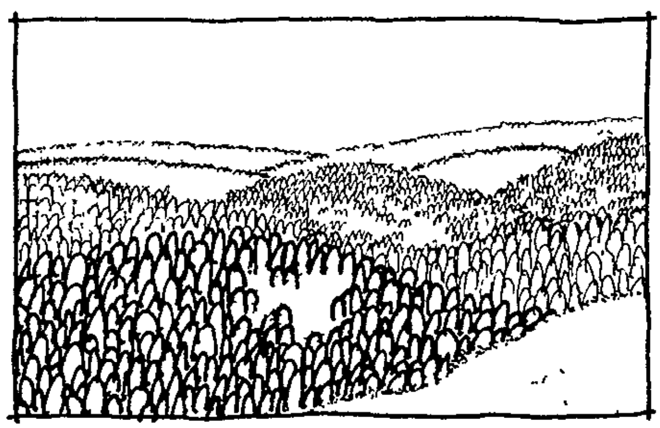


Table II-27. Protection Levels of Viewsheds (1)

VIEWSHEDS	Total	ALTERNATIVE								
	Acres	NC	A	B (2)	C	D	E(PA)	F	G (3)	H
Sensitivity Level 1										
Highway 101 - Coastal	4,286		2		2	2	2	2	2	Pres
Highway 101 - Hebo	6,294		2		2		2	2	2	Pres
Highway 38	2,609				2		2	2	2	Pres
Highway 34	7,689		2	.	7		2	2	2	Pres
Highway 18	1,836		2	.	7		2	2	2	Pres
Highway 126	1,532				7		2	2	2	Pres
Three Capes Road	3,154		2	.	7	.	7	2	2	Pres
Marys Peak Road	6,254		7		7		4	2	2	Pres
Mercer Road	54				7		7	2	2	Pres
Highway 36	4,128				7		7	7	2	Pres
Sensitivity Level 2										
Highway 22	3,256		7		7		7	7	7	8
Mt Hebo Road	1,710		8		7		7	7	7	8
Smith River Road	1,426				7		9	7	7	8
Five Rivers Road	4,261		7		.		9	7	7	8
Yachats River Road	3,435		7				9	7	7	8
Sand Beach Road	2,413		7	.			7	7	7	8
Nestucca River Road	2,620		7				7	7	7	8
Little Nestucca River Road	2,913		7				7	7	7	8
North Fork Siuslaw River Road	4,098						9	7	7	8
Canal Creek Road	786		7				9	7	7	8
Canal Creek Campground	45		7				7	7	7	8
Harlan Road	1,272		7	.			9	7	7	8
North Fork Smith River Road	1,847						9	7	7	8
Fall Creek Road	566		7				9	7	7	8
Canary-Ada Road	1,235						9	7	7	8
Lobster Creek Road	2,698		7				9	7	7	8
Big Elk Campground	24		7				7	7	7	8
Elk Creek Road	1,474		7				9	7	7	8
Deadwood Creek Road	1,293						9		7	8
Linslaw Road	361						9		7	8
Highway 229	416		7				7		7	8
Indian Creek Road	3,768		.			.	9		7	8
Sweet Creek Road	1,456						9		7	8

(1) Key *Scenic Viewshed Protection Levels* 2 = foreground retention, middleground partial retention, 4 = foreground partial retention, middleground partial retention, 7 = foreground partial retention, middleground modification, *Non-scenic Viewshed Protection Levels* 8 = foreground partial retention, middleground maximum modification, 9 = foreground and middleground modification, Pres = foreground and middleground preservation *No Special Scenic Protection* ( ) = foreground and middleground maximum modification

(2) Protection levels for Alternative B(Dep) are the same as for Alternative B

(3) This is the level of scenic protection which is recommeded through use of the process in USDA Forest Service (1974)

The TRP does not specify which VQOs were assigned to which viewsheds However, in the Multiple Use Plan Resource Base (MUPRB), on which the TRP was based, a total of about 82,300 acres was identified as having a recommended VQO of retention or partial retention. After adjustments for Wildernesses and allowance for overlap with sites such as vegetation leave areas, about 49,165 acres were to be managed for visual quality (Table II-28)

Table II-28 Management for Visual Quality in TRP

VISUAL QUALITY	ACRES
foreground - retention	1,015
foreground - partial retention	3,390
foreground - modification	4,530
middleground - retention	2,045
middleground - partial retention	38,185

The MUPRB explained that acreage in middleground partial retention (from which 100% yields were predicted) "will not meet VQOs 100% - due to clearcutting - not rotation age " This means that viewshed management in Alternative NC would be different in some way from that in other alternatives Therefore, descriptions of viewshed management in MA 14 (given in Forest Plan, Chapter IV) are not directly applicable to Alternative NC

Viewsheds *in* Management Areas - *Management of scenic viewsheds, found in MA 14 and a number* of other MAs, is described in Forest Plan, Chapter IV Table II-29 shows the number of acres that overlap MA 14 The greatest amount of overlap is with spotted owl habitat.

Table II-29 Acres of Scenic Viewsheds in Management Areas

MANAGEMENT AREA	ALTERNATIVE								
MAcres	A	B	B(Dep)	C	D	E(PA)	F	G	H
M.A. 14	27,418	0	0	19,671	6,765	33,666	41,730	45,071	44,414
Other Management Areas	30,345	0	0	24,558	3,770	17,568	32,185	36,138	15,575
Total Scenic Protection	57,763	0	0	44,229	10,535	51,234	73,915	81,209	59,989

The TRP called for protection measures on 49,165 acres specifically for visual resources These were lands where the visual resource was the most constraining resource For Alternative NC, this acreage is roughly comparable to that listed in MA 14 (Scenic Viewsheds) for Alternatives A through H in Table II-29. It is not completely comparable because it includes some acreage in the foreground modification category which is not included in other alternatives, and because it was assigned yield predictions which are much higher than those used in other alternatives

The TRP protected visual resources on a total of 82,321 acres, either by meeting VQOs or by some other, more constraining management direction The 33,000 acre difference between acres specifically protected and total acres occurs in areas that overlap with other critical resource areas, such as soils, where those other resource values are more constraining, or are so sensitive that they were included in the marginal component

Acreage of viewsheds in MAs other than MA 14 is not known for Alternative NC because viewsheds to be protected were not specified in the TRP, and MAs were not part of the TRP planning process

Therefore, there is no way to tell where viewsheds overlap with other areas with special management direction.

Management of Wilderness

The Oregon Wilderness Act of 1984 established three Wildernesses on the Forest: Cummins Creek, Drift Creek, and Rock Creek. These include about 22,200 acres. No further areas will be considered for Wilderness in this plan

Primitiveness of each Wilderness varies by alternative, and is directly related to miles of trail planned for construction Table II-30 shows miles of new wilderness trails planned for the 1st decade and total wilderness trail anticipated by the end of the 5th decade.

Table II-30. Wilderness Trails Planned

	ALTERNATIVE									
MILES	NC (1)	A	B	B(Dep)	C	D	E(PA)	F	G	H
Cummins Creek										
New 1st Decade	9 0	9 0	9 0	9 0	13 0	9 0	9 0	3 0	3 0	0
Total 5th Decade	12 0	12 0	12 0	12 0	26 0	12 0	12 0	26.0	26 0	3 0
Drift Creek										
New 1st Decade	0	0	8 5	8 5	0	0	7 0	8 5	8 5	0
Total 5th Decade	8 5	8 5	17 0	17 0	8 5	8 5	15 5	23 0	23 0	8 5
Rock Creek										
New 1st Decade	0	0	0	0	0	0	0	0	7	0
Total 5th Decade	0	0	0	0	0	0	0	0	15 5	0
TOTAL										
New 1st Decade	9 0	9 0	17 5	17 5	13 0	9 0	16 0	11 5	18 5	0
Total 5th Decade (2)	20 5	20 5	29 0	29 0	34 5	20 5	27 5	49 0	64 5	11 5

(1) This assumes the same level of trail development as Alternative A.
(2) The totals in the 5th decade include 3 existing miles of trail in Cummins Creek and 8 5 miles of existing trail in Drift Creek

Each Wilderness was inventoried to determine the existing Wilderness Resource Spectrum classification Because of their small size, short time required to walk out of these areas, and nearby sounds of logging and road traffic, each Wilderness was classified as semiprimitive As semiprimitve Wildernesses, these settings will be managed as predominantly unmodified natural environments Concentration of users will remain low, with potential for occasional contacts with other parties Wildernesses will be managed to provide moderate opportunities for exploring and experiencing isolation, independence, closeness to nature, tranquility and self reliance Opportunities for moderate to high degrees of challenge and risk will be availalable.

In accordance with S&Gs for managing semiprimitive Wildernesses (FSM 2322 03), facilities (including trails) will be harmonious with the natural landscape Campsites will continue to provide a moderate degree of solitude and be set back from trails, meadows and streams Trails will be constructed and maintained to more and most difficult standards

Management of Undeveloped Areas

Seven areas on the Forest are presently unroaded and undeveloped· Hebo-Nestucca, Drift Creek Adjacent, Wassen Creek, and four areas in the Oregon Dunes NRA. One additional area (North Fork of the

Smith River) could revert to an undeveloped condition Areas in the Oregon Dunes NRA would be managed as undeveloped areas in all alternatives. Management of other areas varies by alternative, as illustrated in Table II-31. See Appendix C for numbers of acres in each area that remain undeveloped in each decade, by alternative Table II-32 shows miles of new trails planned for the 1st decade and total trails anticipated by the end of the 5th decade in undeveloped areas

Table II-31 Undeveloped Area Management

	ALTERNATIVE									
MAcres	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
Wassen Creek	0	0	0	0	4 8	0	4 7	4 8	9 2	9 2
Drift Creek Adjacent	0	0	0	0	2 6	0	2 6	6 7	6 7	8 2
Hebo-Nestucca	0	0	0	0	0	0	0	4 7	4 7	13 8
North Fork Smith River	0	0	0	0	0	0	0	0	0	5 8
Oregon Dunes NRA areas	20 0	20 0	20 0	20 0	20 0	20 0	20 0	20 0	20 0	20 0
Total	**20.0**	**20.0**	**20.0**	**20.0**	**27.4**	**20.0**	**27.3**	**36.2**	**40.6**	**57.0**

Table II-32 Trails Planned (1)

	ALTERNATIVE									
MILES	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Wassen Creek										
New 1st Decade	0	0	0	0	17 5	0	12 5	13 0	11 0	11 0
Total 5th Decade	0	0	0	0	17 5	0	12 5	17 5	26 5	20 0
Drift Creek Adjacent										
New 1st Decade	0	0	0	0	5 5	0	4 5	9 5	7 5	8 0
Total 5th Decade	0	0	0	0	5 5	0	4 5	9 5	9 5	8.0
Hebo-Nestucca										
New 1st Decade	0	0	0	0	0	0	0	6 5	6 5	6 5
Total 5th Decade	0	0	0	0	0	0	0	15 0	15 0	36 5
North Fork Smith River										
New 1st Decade	0	0	0	0	0	0	0	0	0	4 5
Total 5th Decade	0	0	0	0	0	0	0	0	0	8 5
Threemile Lake										
New 1st Decade	3 5	3 5	3 5	3 5	3 5	3 5	3 5	0	0	0
Total 5th Decade	9 0	9 0	9 0	9 0	9 0	9 0	9 0	9 0	9 0	9.0
Forest Total										
New 1st Decade	3 5	3 5	3 5	3 5	26 5	3 5	20 5	29 0	25 0	30 0
Total 5th Decade	9 0	9 0	9 0	9 0	32 0	9 0	26 0	51 0	60 0	82 0

(1) See Table II-39B for the Forest totals, of which this is a part

Undeveloped Areas in the MAs

Management direction for undeveloped areas is provided in three MAs: MA 1 (for part of Hebo-Nestucca), MA 10 (for 19,990 acres in the Oregon Dunes NRA), and MA 11 See Table II-33 and Forest Plan, Chapter IV for more information on management of these areas.

Table II-33. Acres of Undeveloped Areas in Management Areas

		ALTERNATIVE									
	Management Areas	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
1	Silverspot Butterfly	0	0	0	0	0	0	0	140	140	570
10	Oregon Dunes NRA	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
11	Undeveloped Areas	0	0	0	0	7,400	0	7,300	16,160 (1)	20,370 (1)	36,060 (1
	TOTAL	**20,000**	**20,000**	**20,000**	**20,000**	**27,400**	**20,000**	**27,300**	**36,300**	**40,600**	**56,600**

(1) Includes land which is presently roaded or developed which would be closed to future development and allowed to revert to an undeveloped condition

Management of Research Opportunities

Research Natural Areas (RNAs) - The Forest presently contains two RNAs (Flynn Creek and Neskowin Crest) that are present in all alternatives. These are part of a national system of RNAs designed to protect examples of major ecosystems in the country [36 CFR 219 12 (m)]. Another three areas (Reneke Creek, Sand Lake, and Cummins/Gwynn Creek) are being considered for designation, the number varying by alternative Two other potential RNAs included in the DEIS (Threemile Creek and Tenmile Creek) will now be considered in subsequent planning for the Oregon Dunes NRA Table II-34 shows RNAs considered for designation in each alternative.

Table II-34. Potential RNAs

ALTERNATIVE	POTENTIAL RNAs TO BE CONSIDERED
NC	Reneke Creek
A	Reneke Creek
B	none
B(Dep)	none
C	none
D	Sand Lake
E(PA)	Reneke Creek, Sand Lake, Cummins/Gwynn Creek
F	Reneke Creek
G	Reneke Creek, Sand Lake
H	Reneke Creek, Sand Lake, Cummins/Gwynn Creek

In all alternatives, these areas would be managed to maintain natural systems Thus, management activites such as timber harvesting and road building would not be permitted, while some recreational use would be allowed (See discussion of MA 13 for specific information on how RNAs would be managed)

Management of RNAs is also discussed in other MAs in which they are found Table II-35 provides a summary of acres managed for RNAs by MA for each alternative These are summarized as follows

1 The Gwynn Creek portion of the potential Cummins/Gwynn Creek RNA would be managed in conjunction with MA 5 (Cape Perpetua SIA) in Alternatives E(PA) and H

2. The existing Neskowin Crest RNA would be managed in conjunction with MA 6 (CHSRA) in all alternatives

3 The Cummins Creek portion of the potential Cummins/Gwynn Creek RNA would be managed in conjunction with MA 12 (Cummins Creek Wilderness) in Alternatives E(PA) and H

4 Flynn Creek, Reneke Creek, and Sand Lake would be managed in MA 13

Table II-35. Acres of RNAs in Management Areas

		ALTERNATIVE									
	Management Area	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
5	SIAs	0	0	0	0	0	0	1,000	0	0	1,000
6	CHSRA	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190
12	Wilderness	0	0	0	0	0	0	3,800	0	0	3,800
13	RNAs	1,167	1,167	688	688	688	929	1,408	1,167	1,408	1,408
	TOTAL	2,357	2,357	1,878	1,878	1,878	2,119	7,398	2,357	2,598	7,398

Cascade Head Experimental Forest (CHEF) - Since 1934, CHEF has been managed as a center for research related to growing trees in coastal environments The Forest Plan will be consistent with the existing management plan for the area, and the area would be managed the same in all alternatives. The western third of CHEF is included in MA 6 (CHSRA) and would be retained in a relatively natural state. It would be used primarily for recreation and as a control area for research. The eastern two-thirds of CHEF, which makes up MA 7, would be the locale for research involving vegetation changes

Management of Other Forest Programs

Several Forest programs (i e., fire and cultural resources) would be managed in the same way in all alternatives For more information on how these resources would be managed, see FEIS, Chapters III and IV and Forest-wide S&Gs in Forest Plan, Chapter IV. Management of the road, minerals, and lands programs (the latter includes exchanges, special use permit issuance, corridors, and facilities) does vary by alternative.

Management of Road Construction and Maintenance - Since most roads on the Forest are for timber harvest activities, amounts of road construction, reconstruction, and maintenance would all be greater in alternatives in which more land is managed for timber production. (Road needs would be more indirectly related to timber harvest volume.) In all alternatives, however, at least 80% of the land tentatively suitable for timber production can be reached by the 2,500 miles of existing roads. (See FEIS, Chapter III "Facilities" for a discussion of the present status of the road system)

Construction of New Roads - Amounts of roads to be constructed in the 1st decade range from 34 miles/year in Alternatives B and B(Dep) to 12 miles/year in Alternative H (Table II-36). More roads would be constructed in alternatives in which more presently undeveloped areas would be available for timber harvest Some roads would be constructed in the 2nd decade to provide access to timber scheduled for harvest in all alternatives, if the Plan were extended. Projected needs for the planning horizon of 50 years (other than the 1st decade) are somewhat tentative, and the transportation system will remain flexible to respond to future management needs.

Table II-36. First Decade Road System

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
NEW CONSTRUCTION										
Amount (Miles/Yr)	34	33	34	34	33	30	30	27	16	12
Costs (MM$)	4 9	4 8	4 9	4 9	4 8	4 3	4 3	3 9	2 3	1 4
RECONSTRUCTION										
Amount (Miles/yr)	77	77	77	77	76	77	76	63	50	44
Costs (MM$)	3 6	3 6	3 6	3 6	3 6	3 6	3 6	3 0	2 4	1 7
MAINTENANCE										
Amount (Miles/yr)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Costs (MM$)	2 5	2 5	2 5	2 5	2 5	2 5	2 5	2 5	2 5	2 5

(1) Entire system - includes coop-maintenance

Permanent Road Closures - In Alternatives G and H, large blocks of land would be unsuitable for timber production As a result, some existing roads could be permanently closed, eliminating needs for maintenance Exact numbers of miles to be seasonably or permanently closed has not been determined for each alternative, however

Road Reconstruction and Maintenance Cost (in the 1st decade) -- Size of the road system is about the same in Alternatives A through F, so these costs would be similar (Table II-36)

Management of Minerals - Each alternative would affect mineral exploration and development in two ways

- By numbers of acres open and closed to exploration and development of leasable and saleable minerals
- By restrictions on access and operations to mitigate impacts on surface resources

Availablility of reserved lands for mineral leasing depends on whether implementation of development activities could meet land management direction On acquired lands, permits or leases are subject to conditions ensuring that lands are used for the purpose for which they were acquired or are being administered

Policies and procedures by which mineral use authorizations for federally owned leasable minerals are to be processed may be found in the Interagency Agreeement between the Forest Service and BLM dated June 19, 1984 Consent authority for leasing rests with the Secretary of Agriculture, through the Forest Service

Alternatives A, B, B(Dep), C, D, and E(PA), which would have the fewest acres unsuitable for timber production, would have more acres available for lease without access restrictions Alternatives F, G, and H would have more acres with access restrictions (Table II-37) Lands closed to mineral entry include congressionally designated areas (i e , Wildernesses, Oregon Dunes NRA and CHSRA) Additional acres would be *recommended for administrative mineral withdrawals, including* SIAs, RNAs, *and* T&E species habitats

A high rating for access restrictions would apply to lands used for spotted owl habitat management, old-growth groves removed from timber production, and undeveloped areas established for unroaded recreational opportunities A low rating indicates few restrictions and would apply to lands managed primarily for timber production

These restrictions would also affect ease of exploration. Because potential oil and gas areas on the Forest are generally quite small, development of the resource could proceed though at increased cost Deposits could be reached for extraction through directional drilling from accessible areas

Table II-37. Oil, Gas, and Mineral Extraction -- Acres

	ALTERNATIVE									
Acres	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
OIL & GAS LEASES										
Withdrawn	60,097	61,991	59,838	59,838	62,750	60,078	64,706	64,720	68,939	72,139
Restrictions										
High	0	42,951	44,389	44,389	45,077	43,971	54,810	56,930	74,884	103,565
Moderate	60,980	38,457	10,637	10,637	30,308	17,302	44,574	52,769	55,979	55,322
Low	504,352	487,962	516,497	516,497	493,226	510,010	467,271	456,942	431,559	400,335
COMMON MINERALS										
Available Acres	508,034	380,800	403,200	403,200	387,600	341,100	357,200	314,200	182,700	132,700
Relative Demand	Very high	High	High	Very High	High	High	High	Mod	Low	Lowest

Areas open for common mineral extraction (primarily rock used for road surfacing) vary by alternative, depending on numbers of acres not allocated for special management. Alternatives A, B, B(Dep), C, D, and E(PA) would least affect availability (Table II-37). These alternatives would also produce more demand for road rock because of high timber sale levels and corresponding construction, reconstruction, and maintenance of roads. Alternatives F, G, and H would have reduced availability of land for common mineral extraction. These alternatives would also produce less demand for road rock because timber harvesting would be reduced.

Management of Lands and Special Uses - Effects of alternatives on lands programs are closely tied to kind and number of restrictions on uses of land. Numbers of acres available for land exchange would be greater in Alternatives A, B, B(Dep), C, D, and E(PA) than in Alternatives F, G and H, because fewer acres would be designated for special management, such as SIAs, RNAs, and undeveloped areas This same relationship exists with special uses More acres with special management means greater reductions in availability of special use permits and greater restrictions that would be needed in the permits

Availability of electronics sites would be the same in all alternatives. Existing sites on Mt. Hebo (including Main, South, and East Points), Cougar Mountain, Hyack Ridge, Cummins Peak, Table Mountain, Cape Perpetua, Cannibal Mountain, Butler Peak, Marys Peak (including the main point, Federal Aviation Administration area, and West Ridge), Franklin Ridge, Herman Peak, Goodwin Peak and Henderson Peak would be maintained for electronic uses. New sites would be established on Buzzard Butte, Ball

Mountain, Yachats Mountain, Blodgett Peak, Saddle Mountain, Klickitat Mountain, Cape Mountain, and Fairview Mountain.

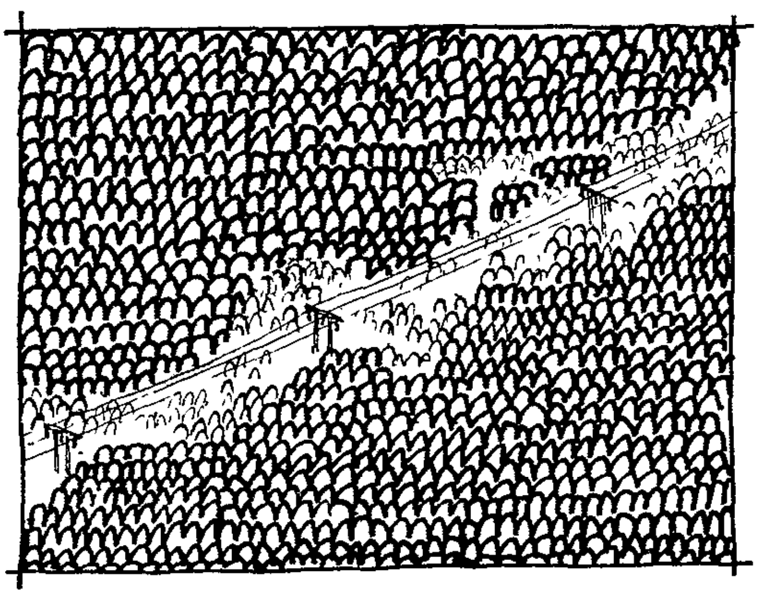
Effects of the alternatives on the rights-of-way program would vary depending on timber sale schedules Alternatives with higher sale levels would require more rights-of-way for logging activities. Numbers of rights-of-way required by each alternative are estimated based on historic trends and displayed in Table II-38

Table II-38 Estimated Rights-of-Way Needed in the 1st Decade

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Number Needed Per Year	21	15	16	18	15	14	14	12	6	3

None of the alternatives would adversely affect the land purchase program, because purchases are authorized by Congress annually for areas that currently qualify (Lands that qualify for purchase are identified in Chapter III "Lands and Special Uses") None of the alternatives will affect title claims, which are generated by actions of others on NFS lands

Corridors - No new requests for utility corridors are anticipated in the next 10 years, since the Forest is located in an area currently transected by four major east-west BPA corridors. Additionally, a north-south corridor exists on the western side of the Forest Three of the corridors are located predominantly on private land Any proposed expansion of corridors would be directed toward existing corridors None of the alternatives would therefore affect future designation of corridors Management direction for utility corridors is described in Forest-wide S&Gs



OUTPUTS AND EFFECTS

This section presents resource outputs, some environmental effects (see Chapter IV for a complete description), activities, and costs associated wıth each alternative (assuming that the ASQ for each year will be harvested). Table II-39 includes those outputs and effects which can be reasonably quantified; Part A is for alternatives, and Part B for benchmarks. Table II-40 includes those outputs, effects, actıvitıes, and costs which are qualitatıve and which cannot (or should not) be quantified. The content of the two tables (see the following pages) have equal signıficance; the only reason for separating them is that qualıtative informatıon requires more space to present in tabular form

Table II-39A. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
RECREATION						
Developed Recreation Use (1)	MRVD's					
1st Decade		780 5 (2)	817 2	817 2	817 2	817 2
2nd Decade		868 2	904 1	904 1	904.1	904 1
5th Decade		1,175 4	1,224 0	1,224 0	1224.0	1,224 0
Nonwilderness Dispersed Recreation Use (1)	MRVD's					
Rural and Roaded						
1st Decade		(3)	567 2	564 7	564.7	571 6
2nd Decade			601 7	599 0	599 0	605 9
5th Decade			705 7	702 2	702 2	709 1
Semıprımıtıve Motorized (1)	MRVD's					
1st Decade		415 7 (4)	415 7	415 7	415 7	415 7
2nd Decade		450 6	450 6	450 6	450 6	450 6
5th Decade		482 0	482 0	482 0	482 0	482 0
Semıprimıtıve Nonmotorızed	MRVD's					
1st Decade		18 0 (5)	18 0	17 8	17 8	29 5
2nd Decade		18 0	18 0	18 0	18 0	34 9
5th Decade		18 0	18 0	18 0	18 0	35 4
Wilderness Use	MRVD's					
1st Decade		10 3 (6)	10 3	18 3	18 3	12 5
2nd Decade		10 3	10 3	18 5	18 5	20 7
5th Decade		10 3	10 3	18 5	18 5	21 0
Trail Construction/ Reconstruction	Average Annual Miles					
1st Decade		(7)	2 0	2 8	2 8	5 2
2nd Decade		(7)	1 3	0 9	0 9	2 3
5th Decade		(7)	0 6	0 6	0 6	1 0
Total Trail System	Miles					
1st Decade		(7)	100 6	108 1	108 1	142 4
2nd Decade		(7)	113 0	117 1	117 1	165 4
5th Decade		(7)	140 3	140 6	140 6	193 6
Additional Capacity From Developed Site						
1st Decade	PAOT	12 5 (2)	250	250	250	250
2nd Decade		40 0	775	775	775	775
5th Decade		102 5	1425	1425	1425	1425

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
RECREATION						
Developed Recreation Use (1)						
1st Decade	MRVDs	817 2	817 2	817 2	817 2	817 2
2nd Decade		904 1	904 1	904 1	904 1	904 1
5th Decade		1,224 0	1,224 0	1,224 0	1,224 0	1,224 0
Nonwilderness Dispersed Recreation Use (1)						
Rural and Roaded						
1st Decade	MRVDs	567 2	577 9	573 3	582 9	574 3
2nd Decade		601 7	622 0	608 6	619 1	609 4
5th Decade		705 7	730 5	714 5	727 8	715 5
Semiprimitive Motorized (1)						
1st Decade	MRVDs	415 7	415 7	415 7	415 7	415 7
2nd Decade		450 6	450 6	450 6	450 6	450 6
5th Decade		482 0	482 0	482 0	482 0	482 0
Semiprimitive Nonmotorized						
1st Decade	MRVDs	18 0	22 7	30 8	30 0	33 9
2nd Decade		18 0	30 4	41 1	39 0	50 5
5th Decade		18 0	30 4	49 8	55 5	67 7
Wilderness Use						
1st Decade	MRVDs	10 3	12 8	11 2	12 0	8 1
2nd Decade		10 3	18 7	17 6	19 7	8 2
5th Decade		10 3	18 7	29 1	37 6	11 5
Trail Construction/ Reconstruction	Average Annual					
1st Decade	Miles	2 0	7 1	5 7	6 2	4 5
2nd Decade		0 8	3 9	3 6	4 2	4 7
5th Decade		0 6	1 2	1 2	2 0	1 4
Total Trail System						
1st Decade	Miles	100 6	151 2	137 7	142 3	125 9
2nd Decade		108 3	190 2	174 0	184 5	172 6
5th Decade		126 0	236 1	241 9	296 1	237 5
Additional Capacity From Developed Site						
1st Decade	PAOT	250	250	250	250	250
2nd Decade		775	775	775	775	775
5th Decade		1,425	1,425	1,425	1,425	1,425

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
Total Developed Site Capacity						
1st Decade	PAOT	9,783 (2)	9,910	9,910	9,910	9,910
2nd Decade		10,186	10,685	10,685	10,685	10,685
5th Decade		13,261	14,035	14,035	14,035	14,035
Forestwide Visual Quality Objectives (VQOs)						
Preservation	Acres	(8)	45,776	45,296	45,296	52,728
Retention	Acres	(8)	14,877	9,168	9,168	14,193
Partial Retention	Acres	(8)	37,304	4,878	4,878	27,605
Modification	Acres	(8)	21,826	0	0	19,473
Maximum Modification	Acres	(8)	511,578	572,019	572,019	517,362
Viewshed VQOs						
Preservation, Retention and Partial Retention	Acres	49,170 (9)	35,937	0	0	24,756
Roadless Areas Assigned to Roaded Management Prescriptions, But Which Have No Development Activities Planned for Next 10 Years	Acres	20,000 (10)	46,000	46,500	46,000	46,500
Unroaded Areas Assigned to Undeveloped Management Prescriptions	Acres	20,000 (11)	20,000 (11)	20,000 (11)	20,000 (11)	27,400
WILDLIFE & FISH						
Wildlife Use	WFUDs (M)					
1st Decade		143 5 (12)	163 5	149 4	152 3	175 4
2nd Decade		166 9 (12)	166 9	159 9	159 9	190 7
5th Decade		178 0 (12)	178 0	162 8	162 6	219 5
Fish Use	WFUDs (M)					
1st Decade		30 7	34 2	35 1	35 1	35 1
2nd Decade		20 7	33 8	33 0	33 2	33 7
5th Decade		11 7	31 7	27 6	23 7	29 1
Anadromous Fish Commercial Harvest	Mpounds per year					
1st Decade		200 (13)	223	229	229	229
2nd Decade		135	220	215	220	220
5th Decade		76	207	180	172	190
Anadromous Fish Habitat Improvement	Mpounds per year					
1st Decade		0 1	0 4	0	0	0
2nd Decade		0 1	0 4	0	0	0
5th Decade		0 1	0 4	0	0	0
Coho Smolt Habitat Capability	M Smolts					
1st Decade		830 (13)	926	951	951	950
2nd Decade		561	914	892	898	912
5th Decade		316	858	748	640	787

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	Unit	D	E(PA)	F	G	H
Total Developed Site Capacity						
1st Decade	PAOT	9,910	9,910	9,910	9,910	9,910
2nd Decade		10,685	10,685	10,685	10,685	10,685
5th Decade		14,035	14,035	14,035	14,035	14,035
Forestwide Visual Quality Objectives (VQOs)						
Preservation	Acres	45,536	53,314	61,935	66,391	120,057
Retention	Acres	9,951	18,784	20,830	23,304	10,964
Partial Retention	Acres	8,225	39,231	51,420	55,567	27,302
Modification	Acres	0	41,808	20,678	21,220	0
Maximum Modification	Acres	567,649	478,224	476,498	464,879	473,038
Viewshed VQOs						
Preservation, Retention and Partial Retention	Acres	4,286	39,402	53,237	59,990	59,989
Roadless Areas Assigned to Roaded Management Prescriptions, But Which Have No Development Activities Planned for Next 10 Years	Acres	46,600	44,400	46,400	46,100	46,900
Unroaded Areas Assigned to Undeveloped Management Prescriptions	Acres	20,000 (11)	27,300	36,200	40,600	57,000
WILDLIFE & FISH						
Wildlife Use						
1st Decade	WFUDs	149 3	161 5	154 2	155 4	139 4
2nd Decade	(M)	157 8	171 7	162 7	166 1	148 4
5th Decade		168 0	185 3	177 7	194 4	154 7
Fish Use	WFUDs					
1st Decade	(M)	36 4	36 3	36 7	37 6	38 1
2nd Decade		35 7	34 7	35 8	37 3	38 0
5th Decade		37 8	34 6	38 5	40 4	41 4
Anadromous Fish Commercial Harvest	Mpounds per year					
1st Decade		237	237	239	245	249
2nd Decade		233	226	234	243	248
5th Decade		247	226	251	264	270
Anadromous Fish Habitat Improvement	Mpounds per year					
1st Decade		0 7	1 0	1 2	1 5	0 8
2nd Decade		0 7	1 0	1 2	1 5	0 7
5th Decade		0 7	1 0	1 2	1 7	0 8
Coho Smolt Habitat Capability	M Smolts					
1st Decade		985	982	993	1,018	1,032
2nd Decade		966	938	970	1,009	1,028
5th Decade		1,023	936	1,041	1,094	1,120

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
Stream Survey	Miles per year					
1st Decade		115	35	0	0	0
2nd Decade		115	35	0	0	0
5th Decade		115	35	0	0	0
Management Indicator Species						
Bald Eagle	HCI (# of Sites)					
1st Decade		93	23	23	23	23
2nd Decade		93	23	23	23	23
5th Decade		93	23	23	23	23
Spotted Owls	HCI (# of Pairs)					
1st Decade		14 (14)	53	50	49	51
2nd Decade		14	46	40	39	41
5th Decade		8	37	35	35	36
Pileated Woodpecker	HCI (# of Pairs)					
1st Decade		(15)	432	435	427	437
2nd Decade		(15)	365	371	363	375
5th Decade		(15)	184	175	175	180
Elk	HCI (# of Animals)					
1st Decade		(15)	10,288	8,994	9,458	12,328
2nd Decade		(15)	9,230	9,202	9,200	12,791
5th Decade		(15)	8,022	7,096	7,072	12,843
Marten	HCI (# of Animals)					
1st Decade		(16)	251	237	232	239
2nd Decade		(16)	235	207	204	210
5th Decade		(16)	203	210	206	209
Dead and Defective Trees	HCI (% of Biological Potential)					
1st Decade		40	69	68	68	67
2nd Decade		40	62	60	60	60
5th Decade		40	53	46	47	47
Wildlife Habitat Improvement	Acres					
1st Decade		(17)	2,890	3,590	250	6,750
2nd Decade		(17)	2,820	4,970	2,340	17,900
5th Decade		(17)	2,820	21,060	10,560	44,960
Existing Old-Growth Stands	MAcres					
1st Decade		24	27	22	22	23
2nd Decade		24	26	22	22	23
5th Decade		10 (18)	21	20	21	21

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
Stream Survey	Miles per year					
1st Decade		60	100	100	120	70
2nd Decade		60	100	100	120	70
5th Decade		60	100	100	120	70
Management Indicator Species						
Bald Eagle	HCI (# of Sites)					
1st Decade		23	23	23	23	23
2nd Decade		23	23	23	23	23
5th Decade		23	23	23	23	23
Spotted Owls	HCI (# of Pairs)					
1st Decade		51	51	53	55	57
2nd Decade		43	49	46	53	55
5th Decade		38	42	44	55	60
Pileated Woodpecker	HCI (# of Pairs)					
1st Decade		444	460	453	443	494
2nd Decade		390	403	403	400	481
5th Decade		192	200	227	283	338
Elk	HCI (# of Animals)					
1st Decade		9,175	10,174	8,917	9,123	7,734
2nd Decade		9,106	10,147	8,822	9,349	7,873
5th Decade		7,903	8,851	8,196	10,195	8,121
Marten	HCI (# of Animals)					
1st Decade		239	246	246	258	259
2nd Decade		215	225	225	260	253
5th Decade		211	203	220	272	264
Dead and Defective Trees	HCI (% of Biological Potential)					
1st Decade		70	68	71	77	82
2nd Decade		64	62	66	75	81
5th Decade		52	50	57	72	80
Wildlife Habitat Improvement	Acres					
1st Decade		200	4,110	2,510	4,310	80
2nd Decade		3,780	3,442	5,200	4,620	60
5th Decade		190	3,498	6,160	6,130	60
Existing Old-Growth Stands	MAcres					
1st Decade		23	31	26	34	34
2nd Decade		22	24	26	34	34
5th Decade		21	23	24	34	34

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
RANGE						
Permitted Grazing						
1st Decade	MAUMs	2 (19)	2	2	2	2
2nd Decade		2	2	2	2	2
5th Decade		2	2	2	2	2
TIMBER						
Allowable Sale Quantity (20)	MMBF					
1st Decade		438 (21)	351	381	439	365
Allowable Sale Quantity (20)	MMCF					
1st Decade		92 5 (21)	65 9	69 1	79 8	66 5
2nd Decade		105 0	65 9	69 1	67 3	66.5
5th Decade		104 7	65 9	69 1	57 5	66 5
Timber Sale Program Quantity (20)	MMCF					
I ASQ		92 5 (21)	65 9	69 1	79 8	66 5
II Non-Chargeable		2 9	2 3	2 4	2 6	3 5
Total Timber Sale Program Quantity18 (20)		95 4	68 2	71 5	82 4	70 0
Reforestation	Acres					
1st Decade		8,600	6,300	5,700	6,700	5,800
2nd Decade		9,400	5,800	5,500	5,400	5,200
5th Decade		5,400	5,000	5,800	6,200	5,700
Precommercial Thinning	Acres					
1st Decade		2,400	2,400	2,400	2,400	2,400
2nd Decade		2,700	3,000	2,800	4,100	2,800
5th Decade		1,500	2,200	2,900	2,000	2,700
Long-Term Sustained Yield Capacity (LTSYC)	MMCF	109 3	69 4	80 4	80 9	77 2
Timber Growth in 5th Decade as % LTSYC	Percent	(22)	110	88	97	89

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
RANGE						
Permitted Grazing	MAUMs					
1st Decade		2	2	2	2	2
2nd Decade		2	2	2	2	2
5th Decade		2	2	2	2	2
TIMBER						
Allowable Sale Quantity (20)	MMBF					
1st Decade		332	332	288	151	72
Allowable Sale Quantity (20)	MMCF					
1st Decade		60 6	61 2	52 6	28 2	13 5
2nd Decade		60 6	61 2	52 6	28 2	16 2
5th Decade		60 6	61 2	52 6	28 2	17 0
Timber Sale Program Quantity (20)	MMCF					
I ASQ		60 6	61 2	52 6	28 2	13 5
II Non-Chargeable		2 3	2 4	2 1	2 2	1 4
Total Timber Sale Program Quantity18 (20)		62 9	63 6	54 7	30 4	14 9
Reforestation	Acres					
1st Decade		5,200	5,200	4,600	2,700	1,200
2nd Decade		4,700	5,200	4,300	2,400	1,200
5th Decade		5,300	5,800	4,600	2,100	1,300
Precommercial Thinning	Acres					
1st Decade		2,200	2,300	2,000	1,200	900
2nd Decade		2,700	2,600	2,200	1,000	800
5th Decade		2,500	3,000	2,100	4,200	600
Long-Term Sustained Yield Capacity (LTSYC)	MMCF	68 6	72 5	59 6	30 2	18 4
Timber Growth in 5th Decade as % LTSYC	Percent	90	89	93	109	105

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
SOIL AND WATER						
Water Yield	MAcFt					
1st Decade		3,758	3,758	3,757	3,760	3,757
2nd Decade		3,756	3,756	3,756	3,756	3,756
5th Decade		3,756	3,756	3,757	3,755	3,757
Sediment	MCuYd per Yr					
1st Decade	(Index)	101 (23)	76	71	86	71
2nd Decade		117	75	71	85	69
5th Decade		48	44	50	44	51
Improved Watershed Conditions	Acres					
1st Decade		30	30	30	35	30
2nd Decade		30	30	30	35	30
5th Decade		30	30	30	35	30
MINERALS						
Energy Minerals Produced	Billion					
1st Decade	BTUs	0	0	0	0	0
2nd Decade		0	0	0	0	0
5th Decade		0	0	0	0	0
Nonenergy Minerals	MM$					
1st Decade		0 3	0 3	0 3	0 4	0 3
2nd Decade		0 2	0 2	0 2	0 2	0 2
5th Decade		0 2	0 2	0 2	0 2	0 2
Mineral Operation Plans	Number		0	0	0	0
FIRE MANAGEMENT						
Fuel Treatment	Acres/Yr					
1st Decade		(24)	3,810	3,810	3,810	3,810

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
SOIL AND WATER						
Water Yield	MAcFt					
1st Decade		3,757	3,757	3,756	3,753	3,752
2nd Decade		3,755	3,755	3,755	3,753	3,753
5th Decade		3,756	3,756	3,755	3,753	3,752
Sediment	MCuYd Per Yr (Index)					
1st Decade		66	67	60	32	17
2nd Decade		59	67	56	27	13
5th Decade		46	55	42	19	13
Improved Watershed Conditions	Acres					
1st Decade		25	25	20	20	20
2nd Decade		25	25	20	20	20
5th Decade		25	25	20	20	20
MINERALS						
Energy Minerals Produced	Billion BTUs					
1st Decade		0	0	0	0	0
2nd Decade		0	0	0	0	0
5th Decade		0	0	0	0	0
Nonenergy Minerals	MM$					
1st Decade		0.3	0.3	0.3	0.2	0.15
2nd Decade		0.2	0.2	0.2	0.15	0.1
5th Decade		0.2	0.2	0.15	0.15	0
Mineral Operation Plans	Number	0	0	0	0	0
FIRE MANAGEMENT						
Fuel Treatment	Acres/Yr					
1st Decade		3,810	3,810	3,810	2,270	1,020

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
ROADS						
Road Construction	Miles/Yr					
1st Decade		34 (24)	33	34	34	33
2nd Decade		8	8	8	8	7
5th Decade		0	0	0	0	0
Road Reconstruction	Miles/Yr					
1st Decade		77 (24)	77	77	77	76
2nd Decade		121	117	121	120	116
5th Decade		74	73	74	74	73
Roads Suitable for Public Use Passenger Car	Miles					
1st Decade		800 (24)	800	800	800	800
2nd Decade		910	910	910	910	900
5th Decade		910	910	910	910	900
High Clearance Vehicle Only	Miles					
1st Decade		1,700 (24)	1,700	1,700	1,700	1,400
2nd Decade		1,590	1,590	1,590	1,590	1,600
5th Decade		1,690	1,690	1,690	1,690	1,700
ECONOMICS						
Operational Costs	MM$/Yr					
1st Decade		(24)	15 3	15 5	17 0	16 4
2nd Decade		(24)	15 7	15 7	17 1	16 6
5th Decade		(24)	16 7	16 6	16 9	17 5
Investment Costs	MM$/Yr					
1st Decade		(24)	17 2	16 8	16 3	16 2
2nd Decade		(24)	15 4	15 5	15 2	15 9
5th Decade		(24)	11 2	15 2	12 4	17 6
Market Benefits	MM$/Yr					
1st Decade		(25)	77 8	87 7	100 4	85 5
2nd Decade		(25)	86 7	100 9	113 3	96 7
5th Decade		(25)	105 6	111 1	91 4	109 9
Nonmarket Benefits	MM$/Yr					
1st Decade		(26)	17 8	17 5	17 6	18 4
2nd Decade		(26)	17 9	18 9	18 9	20 1
5th Decade		(26)	22 7	22 3	22 4	24 3
Returns to Government	MM$/Yr					
1st Decade		(24)	70 1	80 0	92 7	77 9
2nd Decade		(24)	77 4	92 6	105 0	88 3
5th Decade		(24)	95 8	101 3	81 7	100 2
Payments to Counties	MM$/Yr					
1st Decade		(27)	17 5	20 0	23 2	19 5
2nd Decade		(27)	19 4	23 2	26 3	22 1
5th Decade		(27)	24 0	25 3	20 4	25 0

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
ROADS						
Road Construction	Miles/Yr					
1st Decade		30	30	27	16	12
2nd Decade		8	7	5	4	3
5th Decade		0	0	0	0	0
Road Reconstruction	Miles/Yr					
1st Decade		77	76	63	50	44
2nd Decade		92	105	98	66	61
5th Decade		69	71	65	52	48
Roads Suitable for Public Use Passenger Car	Miles					
1st Decade		800	800	800	800	800
2nd Decade		910	900	880	860	850
5th Decade		910	900	880	860	850
High Clearance Vehicle Only	Miles					
1st Decade		1,700	1,700	1,700	1,700	1,700
2nd Decade		1,590	1,600	1,620	1640	1,650
5th Decade		1,690	1,700	1,720	1740	1,750
ECONOMICS						
Operational Costs	MM$/Yr					
1st Decade		16 0	16 3	15 7	14 6	13 7
2nd Decade		16 2	16 5	16 0	14 8	14 1
5th Decade		17 0	17 3	16 8	15 6	14 8
Investment Costs	MM$/Yr					
1st Decade		14 6	15 5	13 4	9 3	5 2
2nd Decade		12 4	13 7	12 1	8 3	4 8
5th Decade		10 5	12 0	10 5	7 1	4 3
Market Benefits	MM$/Yr					
1st Decade		78 0	77 4	66 7	38 9	22 3
2nd Decade		90 5	86 7	77 4	44 9	27 6
5th Decade		100 3	100 3	86 7	56 5	41 2
Nonmarket Benefits	MM$/Yr					
1st Decade		17 4	18 0	17 8	18 0	17 4
2nd Decade		18 9	19 5	19 3	19 5	18 9
5th Decade		22 4	23 3	23 6	24 4	22 9
Returns to Government	MM$/Yr					
1st Decade		70 4	69 9	59 1	31 2	14 7
2nd Decade		82 2	78 4	69 1	36 6	19 3
5th Decade		90 5	90 6	76 9	46 7	31 4
Payments to Counties	MM$/Yr					
1st Decade		17 6	17 5	14 8	7 8	3 7
2nd Decade		20 6	19 6	17 3	9 1	4 8
5th Decade		22 6	22 6	19 2	11 7	7 9

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	NC	A	B	B(DEP)	C
EMPLOYMENT OPPORTUNITIES						
Human Resource Program	Enrollees					
1st Decade		220 (24)	220	220	220	220
2nd Decade		220	220	220	220	220
5th Decade		220	220	220	220	220
Changes in Jobs	M Jobs					
1st Decade		(24)	1 5	2 4	3 5	2 1
Changes in Income	MM$					
1st Decade		(24)	34	53	77	46
RESOURCE USE						
Area available for Specific Resource Uses						
Timber Harvest	Acres	508,034	380,786	403,205	403,205	387,622
Grazing	Acres	508,034	487,962	516,497	516,497	493,226
Mineral Exploration (Limited Restrictions)	Acres		487,962	516,497	516,497	493,226
Acreages of Available Timber Harvest Prescriptions						
Commercial Thin	Acres/Yr	2,800	618	36	6	14
Clear Cut	Acres/Yr	9,230	6,278	5,728	6,736	5,796
Shelterwood	Acres/Yr	0	0	0	0	0
Selection Cut	Acres/Yr	0	0	0	0	0
Lands Tentatively Suitable for Timber Production	Acres	(28)	537,746	537,746	537,746	537,746
Lands Suitable for Timber Production	Acres	508,034	380,786	403,205	403,205	387,622
Lands With Timber Yield Reductions	Acres					
Full Yield (Timber)		405,095	280,948	365,603	365,603	323,842
50-90% of Full Yield (Visual, Wildlife)		102,939	99,838	37,602	37,602	63,780
1-49% of Full Yield		0	0	0	0	0
No Yield ("Unregulated")						

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Quantitative Outputs and Effects by Alternative

OUTPUTS/EFFECTS		ALTERNATIVE				
	UNIT	D	E(PA)	F	G	H
EMPLOYMENT OPPORTUNITIES						
Human Resource Program	Enrollees					
1st Decade		220	220	220	220	220
2nd Decade		220	220	220	220	220
5th Decade		220	220	220	220	220
Changes in Jobs	M Jobs					
1st Decade		1 3	1 5	0 6	-1 9	-3 6
Changes in Income	MM$					
1st Decade		30	35	13	-43	-78
RESOURCE USE						
Area available for Specific Resource Uses						
Timber Harvest	Acres	341,150	357,203	314,155	182,689	132,706
Grazing	Acres	510,010	467,271	456,942	431,559	400,335
Mineral Exploration (Limited Restrictions)	Acres	510,010	467,271	456,942	431,559	400,335
Acreages of Available Timber Harvest Prescriptions						
Commercial Thin	Acres/Yr	65	600	72	205	282
Clear Cut	Acres/Yr	5,217	5,200	4,606	2,671	1,200
Shelterwood	Acres/Yr	0	0	0	0	0
Selection Cut	Acres/Yr	0	0	0	0	0
Lands Tentatively Suitable for Timber Production	Acres	537,746	537,746	537,746	537,746	537,746
Lands Suitable for Timber Production	Acres	341,150	357,203	314,155	182,689	132,706
Lands With Timber Yield Reductions	Acres					
Full Yield (Timber)		286,897	288,751	208,898	79,722	59,274
50-90% of Full Yield (Visual, Wildlife)		54,253	68,452	105,257	102,967	73,432
1-49% of Full Yield		0	0	0	0	0
No Yield ("Unregulated")						

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39A Cont. Footnotes

TABLE II-39A FOOTNOTES

(1) For the reasons why the number of RVDs varies so little by alternative, see Appendix B "Forest Planning Model"
(2) Information on developed recreation is unavailable in the TRP, but a reasonable assumption is that it would be the same as the other alternatives.
(3) The TRP did not display a recreation program for the Forest Reasonable assumptions can be made about some of the categories in this table because they are limited areas of land This category is the general dispersed area of the Forest, and it is not possible to estimate probable use
(4) Information on SPM areas is unavailable in the TRP, but since the acreage would be the same as in the other alternatives, it is assumed that acres would be the same as the other alternatives
(5) This assumes the same management and trail development in the Oregon Dunes NRA roadless areas as in Alternative A.
(6) This assumes the same management and trail development in the Wildernesses as in Alternative A.
(7) There is no information about trails in the TRP
(8) The TRP did not provide information on individual Forest-wide VQOs, and there is no reasonable way to determine them
(9) This figure from the TRP is not directly comparable to viewshed figures for other alternatives because it includes some acreage of the Modification VQO in foregrounds, and does not meet the Partial Retention VQO in middleground
(10) Assumes none outside the Oregon Dunes NRA.
(11) Areas in Oregon Dunes NRA Only
(12) 1st-decade WFUDs were estimated from available information
(13) This information was not included in the TRP These estimates were derived by using the CSHCI with the timber harvest schedule contained in the TRP and making a series of assumptions about location and timing of timber harvest in landtype associations.
(14) The TRP set aside 13,000 acres on an interim basis for the spotted owl It was assumed in this analysis that those acres would be harvested in the 5th decade because they were included in the potential yield calculations
(15) Due to lack of data for some factors, an HCI could not be calculated Estimates suggest that, by the end of the 5th decade, fewer than 30 pileated woodpeckers could be supported and elk habitat capability would be greater than needed for 2,500 animals.
(16) Due to lack of data for some factors, an HCI could not be calculated Estimates suggest that fewer than 40 marten could be supported by the end of the 5th decade
(17) Wildlife habitat improvements were not documented in the TRP
(18) This figure does not include 13,000 acres which the TRP set aside on an interim basis for spotted owls See footnote 14
(19) Range resources were not considered in the TRP AUMs are assumed to remain the same as current situation
(20) Includes both hardwood and conifer Table II-9 gives the relative amount in each category
(21) The ASQ and TSPQ for Alternative NC are equal to the potential yield in the TRP, plus estimated volume in green salvage material
(22) This information was not calculated in the Timber RAM model for the TRP
(23) These figures are derived using current calculation methods and inventories In the TRP, the estimated amounts are 64 MCuYd/Yr in the 1st decade and 59 MCuYd/Yr in the 5th The TRP underestimates the amount of sediment for four reasons· 1) the effectiveness of leave areas for preventing accelerated landslides is assumed to be 70% in the TRP rather than 52% as in the FEIS, 2) the inventory of high-risk landtypes used in the TRP was 126,000 acres, but the current inventory of high-risk landtypes is 220,957 acres, 3) slopes with a "high" risk of landslide in low-risk landtypes were not considered, and 4) sediment from dry ravel following controlled burns is not estimated in the TRP
(24) This information is not available in the TRP If estimated with the same assumptions used for Alternatives A through H, the result would probably be similar to B(Dep) in the 1st decade
(25) Only timber benefits were estimated in the TRP These would be $96 million per year in the 1st decade If estimated with the same assumptions used for Alternatives A through H, the result would probably be similar to B(Dep) in the 1st decade
(26) The only nonmarket benefit displayed in the TRP was $4 2 million per year of wildlife-related recreation in the 1st decade If analyzed with the same assumptions used for Alternatives A through H, the result would be similar to Alternative B
(27) The TRP estimated payments to counties generated by harvest of full potential yield would be $24 million per year in the 1st decade If estimated with the same assumptions used for Alternatives A through H, the result would probably be similar to B(Dep) in the 1st decade
(28) No stratification of lands tentatively suitable for timber production was done for the TRP, and there is no reasonable way to do that now

ASQ = Allowable Sale Quantity, AUM = Animal Use Month, BF = board feet, BTU = British Thermal Unit, CF = cubic feet, CSHCI = Coho Smolt HCI, HCI = habitat capability index, M = thousand, MM = million, NRA = National Recreation Area, PAOT = Persons At One Time, RVD = Recreation Visitor Day, TSPQ = Timber Sale Program Quantity, VQO = Visual Quality Objective, WFUD = Wildlife and Fish User Day


C Toombs

The following part of Table II-39 gives resource outputs, environmental effects, activities, and costs for benchmarks See "Development and Use of Benchmarks" earlier in this chapter for the reasons why the results for the Timber and PNV benchmarks are more up-to-date and extensively presented Results from the older benchmarks are shaded to highlight this difference.

Table II-39B. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
RECREATION					
Developed Recreation Use (1)	MRVDs				
1st Decade		(2)	780 5	780 5	780.4
2nd Decade		(2)	868 2	868 2	857.5
5th Decade		(2)	1175 4	1175 4	919.5
Nonwilderness Dispersed Recreation Use (1)	MVRDs				
Roaded					
1st Decade		(2)	557 1	557 1	551.9
2nd Decade		(2)	586 6	586 6	578.8
5th Decade		(2)	670 9	670 9	670.9
Semiprimitive Motorized (1)	MRVDs				
1st Decade		(2)	280 1	280.1	280.1
2nd Decade		(2)	305 4	305 4	305.4
5th Decade		(2)	337 4	337 4	333.4
Semiprimitive Nonmotorized (1)	MRVDs				
1st Decade		(2)	14 8	14 8	11.5
2nd Decade		(2)	16 7	16 7	11.5
5th Decade		(2)	16 7	16 7	11.5
Wilderness Use (1)	MRVDs				
1st Decade		(2)	15 5	15 5	7.0
2nd Decade		(2)	17 6	17 6	7.0
5th Decade		(2)	17 6	17 6	7.0
Trail Construction/ Reconstruction	Average Annual Miles				
1st Decade		(2)	2 8	2 8	-18.8
2nd Decade		(2)	7	7	0.0
5th Decade		(2)	6	6	0.0
Total Trail System	Miles				
1st Decade		(2)	108 1	101 8	61.8
5th Decade		(2)	140 6	140 6	61.8
Additional Capacity From Developed Site					
1st Decade	PAOTs	(2)	0 0	0 0	0.0
2nd Decade		(2)	0 0	0 0	0.0
5th Decade		(2)	0 0	0 0	0.0
Total Developed Site Capacity					
1st Decade	PAOTs	(2)	9,661	9,661	9,661
5th Decade		(2)	9,661	9,661	9,661

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
RECREATION				
Developed Recreation Use (1)	MRVDs			
1st Decade		780.5	780.4	780.4
2nd Decade		868.2	857.5	857.5
5th Decade		1175.5	919.5	919.5
Nonwilderness Dispersed Recreation Use (1)	MRVDs			
Roaded				
1st Decade		569.2	551.9	551.9
2nd Decade		601.9	578.8	578.8
5th Decade		713.4	670.9	670.9
Semiprimitive Motorized (1)	MRVDs			
1st Decade		280.1	280.1	280.1
2nd Decade		305.4	305.4	305.4
5th Decade		337.4	333.4	333.4
Semiprimitive Nonmotorized (1)	MRVDs			
1st Decade		20.0 (3)	11.5	11.5
2nd Decade		30.3	11.5	11.5
5th Decade		45.6	11.5	11.5
Wilderness Use (1)	MRVDs			
1st Decade		12.6 (3)	7.0	7.0
2nd Decade		22.2	7.0	7.0
5th Decade		36.0	7.0	7.0
Trail Construction/ Reconstruction	Average Annual Miles			
1st Decade		60.0	-18.8	+18.8
2nd Decade		40.0	0.0	0.0
5th Decade		19.8	0.0	0.0
Total Trail System	Miles			
1st Decade		140.6	61.8	61.8
5th Decade		283.8	61.8	61.8
Additional Capacity From Developed Site				
1st Decade	PAOTs	12.5	0.0	0.0
2nd Decade		40.0	0.0	0.0
5th Decade		102.5	0.0	0.0
Total Developed Site Capacity				
1st Decade	PAOTs	9,786	9,661	9,661
5th Decade		13,261	9,661	9,661

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
Forestwide Visual Quality Objectives (VQOs)					
Preservation	Acres	(2)	24,064	24,064	24,064
Retention	Acres	(2)	28,850	28,850	28,850
Partial Retention	Acres	(2)	4,327	4,327	4,327
Modification	Acres	(2)	0	0	0
Maximum Modification	Acres	(2)	574,120	574,120	574,120
Viewshed VQOs Preservation, Retention, and Partial Retention	Acres	(2)	0 0	0 0	0.0
Unroaded Areas Assigned to Roaded Management Prescription, But Which Have No Development Activities Planned for Next 15 Years	Acres	(2)	None	None	None
Unroaded Areas Assigned to Undeveloped Management Prescriptions	Acres	(2)	19,990	19,990	19,990
WILDLIFE & FISH					
Wildlife Use					
1st Decade	M WFUDs	98	138	132	120
2nd Decade		30	158	143	131
5th Decade		13	167	155	139
Fish Use					
1st Decade	M WFUDS	(2)	36 3	31 1	(2)
2nd Decade		(2)	34 2	26 3	(2)
5th Decade		(2)	28 2	25 3	(2)
Anadromous Fish Commercial Harvest	Mpounds per year				
1st Decade		308	241	217	197
2nd Decade		361	236	220	211
5th Decade		366	220	211	219
Anadromous Fish Habitat Improvement	Mpounds per year				
1st Decade		0	0	0	0
2nd Decade		0	0	0	0
5th Decade		0	0	0	0

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
Forestwide Visual Quality Objectives (VQOs)				
Preservation	Acres	24,544	24,064	24,064
Retention	Acres	56,732	28,850	28,850
Partial Retention	Acres	55,328	4,327	4,327
Modification	Acres	20,867	0	0
Maximum Modification	Acres	475,091	574,120	574,120
Viewshed VQO's Preservation, Retention, and Partial Retention	Acres	61,155	0.0	0.0
Unroaded Areas Assigned to Roaded Management Prescription, But Which Have No Development Activities Planned for Next 15 Years	Acres	None	None	None
Unroaded Areas Assigned to Undeveloped Management Prescriptions	Acres	29,860 (3)	19,990	19,990
WILDLIFE & FISH				
Wildlife Use				
1st Decade	M WFUDs	120	120	120
2nd Decade		131	131	131
5th Decade		141	143	143
Fish Use				
1st Decade	M WFUDS	(2)	(2)	(2)
2nd Decade		(2)	(2)	(2)
5th Decade		(2)	(2)	(2)
Anadromous Fish Commercial Harvest	Mpounds per year			
1st Decade		231	247	282
2nd Decade		247	271	322
5th Decade		232	254	329
Anadromous Fish Habitat Improvement	Mpounds per year			
1st Decade		0	0	0
2nd Decade		0	0	0
5th Decade		0	0	0

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. *Quantitative Outputs and Effects by Benchmark*

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
Coho Smolt Habitat Capability	M Smolts				
1st Decade		1035	983	842	767
2nd Decade		1036	926	713	833
5th Decade		1147	762	684	872
Management Indicator Species					
Bald Eagle	HCI				
1st Decade	(# of Sites)	(2)	23	23	130
2nd Decade		(2)	23	23	92
5th Decade		(2)	23	23	75
Spotted Owls	HCI				
1st Decade	(# of Pairs)	(2)	54	50	33
2nd Decade (midpoint)		(2)	45	41	31
5th Decade		(2)	35	35	26
Pileated Woodpecker	HCI				
1st Decade	(# of Pairs)	(2)	432	440	374
2nd Decade		(2)	365	371	300
5th Decade		(2)	184	192	155
Elk	HCI				
1st Decade	(# of Animals)	(2)	9,059	8,550	4,525
2nd Decade		(2)	9,240	8,050	3,340
5th Decade		(2)	7,410	6,750	2,400
Marten	HCI				
1st Decade	(# of Animals)	(2)	251	257	234
2nd Decade		(2)	235	239	203
5th Decade		(2)	203	209	186
Dead and Defective Trees	HCI				
1st Decade	(% of Biological Potential)	(2)	66	64	75
2nd Decade		(2)	60	56	66
5th Decade		(2)	46	43	51

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
Coho Smolt Habitat Capability	M Smolts			
1st Decade		931	1,008	1,179
2nd Decade		1,009	1,128	1,377
5th Decade		938	1,045	1,410
Management Indicator Species				
Bald Eagle	HCI (# of Sites)			
1st Decade		147	151	160
2nd Decade		112	127	141
5th Decade		115	102	133
Spotted Owls	HCI (# of Pairs)			
1st Decade		33	39	38
2nd Decade		34	39	36
5th Decade		30	39	35
Pileated Woodpecker	HCI (# of Pairs)			
1st Decade		404	411	428
2nd Decade		341	365	394
5th Decade		160	207	261
Elk	HCI (# of Animals)			
1st Decade		2,580	2,930	2,835
2nd Decade		1,280	1,200	1,650
5th Decade		2,950	1,330	1,850
Marten	HCI (# of Animals)			
1st Decade		248	253	259
2nd Decade		218	232	243
5th Decade		202	218	240
Dead and Defective Trees	HCI (% of Biological Potential)			
1st Decade		75	75	87
2nd Decade		69	74	83
5th Decade		55	69	76

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
Wildlife Habitat Improvement	Acres				
1st Decade		70	82	82	216
2nd Decade		70	62	62	188
5th Decade		70	62	62	153
Existing Old-Growth Stands (4)	MAcres				
1st Decade		34	26	27	29
2nd Decade		34	26	27	25
5th Decade		34	20	21	18
RANGE					
Permitted Grazing	MAUMs				
1st Decade		2	2	2	2
2nd Decade		2	2	2	2
5th Decade		2	2	2	2
TIMBER					
Allowable Sale Quantity	MMBF				
1st Decade		0	383	377	460
Allowable Sale Quantity	MMCF				
1st Decade		0	68 2	71 7	95.9
2nd Decade		0	68 2	71 7	71.9
5th Decade		0	68 2	71 7	65.0
Reforestation	Acres				
1st Decade		0	5,014	7,573	7,656
2nd Decade		0	5,379	5,766	6,325
5th Decade		0	5,901	5,543	4,366
Precommercial Thinning	Acres				
1st Decade		0	5,088	5,088	2,598
2nd Decade		0	5,014	7,573	3,800
5th Decade		0	8,022	5,676	1,911
Long-Term Sustained Yield Capacity (LTSYC)	MMCF	0	80 3	83 4	75.7
Timber Growth as % LTSYC in 5th Decade	Percent	0	84 0	93 8	80.9

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
Wildlife Habitat Improvement	Acres			
1st Decade		185	168	158
2nd Decade		160	119	117
5th Decade		269	117	123
Existing Old-Growth Stands (4)	MAcres			
1st Decade		32	34	32
2nd Decade		27	34	31
5th Decade		20	34	29
RANGE				
Permitted Grazing	MAUMs			
1st Decade		2	2	2
2nd Decade		2	2	2
5th Decade		2	2	2
TIMBER				
Allowable Sale Quantity	MMBF			
1st Decade		324	267	179
Allowable Sale Quantity	MMCF			
1st Decade		66.9	55.8	37.5
2nd Decade		66.9	55.8	37.5
5th Decade		66.9	55.8	37.5
Reforestation	Acres			
1st Decade		5,140	4,608	3,045
2nd Decade		6,350	3,988	2,935
5th Decade		5,908	5,333	3,147
Precommercial Thinning	Acres			
1st Decade		2570	2598	1541
2nd Decade		2544	2184	1505
5th Decade		2614	2130	1513
Long-Term Sustained Yield Capacity (LTSYC)	MMCF	71.5	64.8	39.0
Timber Growth as % LTSYC in 5th Decade	Percent	70.7	62.3	38.3

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
SOIL AND WATER					
Water Yield	MAcFt				
1st Decade		0	3,799	3,803	3,811
2nd Decade		0	3,800	3,802	3,802
5th Decade		0	3,801	3,789	3,793
Sediment	MCuYd per Yr (Index)				
1st Decade		4	65	75	103
2nd Decade		0	68	74	91
5th Decade		0	50	48	44
Improved Watershed Conditions	Acres				
1st Decade		15	35	35	35
2nd Decade		15	35	35	35
5th Decade		15	35	35	35
MINERALS					
Energy Minerals Produced	Billion BTUs				
1st Decade		0	0	0	0
2nd Decade		0	0	0	0
5th Decade		0	0	0	0
Nonenergy Minerals	MM$				
1st Decade		0	0.3	0.3	0.4
2nd Decade		0	0.2	0.2	0.2
5th Decade		0	0.2	0.2	0.2
FIRE MANAGEMENT					
Fuel Treatment	Acres/Yr				
1st Decade		0	4,352	5,440	6,125

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
SOIL AND WATER				
Water Yield	MAcFT			
1st Decade		3,798	3,795	3,783
2nd Decade		3,799	3,790	3,782
5th Decade		3,801	3,798	3,783
Sediment	MCuYD Per Yr (Index)			
1st Decade		70	63	37
2nd Decade		76	55	35
5th Decade		44	69	26
Improved Watershed Conditions	Acres			
1st Decade		25	25	20
2nd Decade		25	25	20
5th Decade		25	25	20
MINERALS				
Energy Minerals Produced	Billion BTUs			
1st Decade		0	0	0
2nd Decade		0	0	0
5th Decade		0	0	0
Nonenergy Minerals	MM$			
1st Decade		0.3	0.3	0.3
2nd Decade		0.2	0.2	0.2
5th Decade		0.2	0.2	0.2
FIRE MANAGEMENT				
Fuel Treatment	Acres/Yr			
1st Decade		5,120	3,680	2,436

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
ROADS					
Road Construction	Miles/Yr				
1st Decade		0	34	34	32
2nd Decade		0	8	8	27
5th Decade		0	0	0	0
Road Reconstruction	Miles/Yr				
1st Decade		0	77	77	53
2nd Decade		0	121	121	60
5th Decade		0	74	74	66
Roads Suitable for Public Use Passenger Cars	Miles				
1st Decade		1,300	800	800	1,300
2nd Decade		0	910	910	1,550
5th Decade		0	910	920	1,610
High Clearance Vehicle Only	Miles				
1st Decade		1,100	1,100	1,100	1,100
2nd Decade		0	1,310	1,320	1,310
5th Decade		0	1,370	1,380	1,380
ECONOMICS					
Operational Costs	MM$/Yr				
1st Decade		5.9	16 3	16 5	13.7
2nd Decade		4.9	16 5	16 8	12.7
5th Decade		4.9	17 3	17 3	13.2
Investment Costs	MM$/Yr				
1st Decade		0.0	14 1	14 7	17.1
2nd Decade		0.0	13 6	13 6	14.3
5th Decade		0.0	9 5	11 4	10.8
Market Benefits	MM$/Yr				
1st Decade		0.7	91 6	79 1	114.6
2nd Decade		0.9	98 2	103 9	93.7
5th Decade		0.9	115 4	109 1	101.3
Nonmarket Benefits	MM$/Yr				
1st Decade		9.1	17 2	17 0	16.1
2nd Decade		7.6	18 8	18 3	17.3
5th Decade		8.6	22 5	22 1	19.6
Returns to Government	MM$/Yr				
1st Decade		0	83 9	71 5	107.3
2nd Decade		0	89 9	95 6	85.9
5th Decade		0	105 7	99 4	92.8
Payment to Counties	MM$/Yr				
1st Decade		0	21 0	17 9	25.8
2nd Decade		0	22 4	23 9	21.5
5th Decade		0	26 4	24 8	23.2

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
ROADS				
Road Construction	Miles/Yr			
1st Decade		24	29	12
2nd Decade		23	0	0
5th Decade		0	0	
Road Reconstruction	Miles/Yr			
1st Decade		53	53	41
2nd Decade		59	60	44
5th Decade		64	60	44
Roads Suitable for Public Use Passenger Cars	Miles			
1st Decade		1,300	1,300	1,300
2nd Decade		1,490	1,450	1,070
5th Decade		1,550	1,450	1,070
High Clearance Vehicle Only	Miles			
1st Decade		1,100	1,100	1,100
2nd Decade		1,270	1,240	910
5th Decade		1,320	1,240	910
ECONOMICS				
Operational Costs	MM$/Yr			
1st Decade		13.8	12.0	9.8
2nd Decade		14.2	12.2	9.9
5th Decade		16.8	12.3	10.1
Investment Costs	MM$/Yr			
1st Decade		12.4	12.8	7.5
2nd Decade		12.9	7.7	5.6
5th Decade		9.6	9.0	5.8
Market Benefits	MM$/Yr			
1st Decade		82.5	69.2	49.2
2nd Decade		91.6	76.5	55.0
5th Decade		104.8	84.4	63.7
Nonmarket Benefits	MM$/Yr			
1st Decade		16.6	16.2	16.2
2nd Decade		18.1	17.3	17.4
5th Decade		21.2	19.9	19.9
Returns to Government	MM$/Yr			
1st Decade		75.2	61.9	41.9
2nd Decade		83.6	68.5	47.0
5th Decade		94.3	76.0	55.1
Payment to Counties	MM$/Yr			
1st Decade		18.8	15.5	10.5
2nd Decade		20.9	17.1	11.8
5th Decade		23.6	19.0	13.8

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-39B Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS			
	UNIT	MINIMUM LEVEL	PNV	TIMBER	DEPARTURE
EMPLOYMENT OPPORTUNITIES					
Human Resource Program	Enrollees				
1st Decade		220	220	220	220
2nd Decade		220	220	220	220
5th Decade		220	220	220	220
Changes in Jobs	M Jobs				
1st Decade		-7.4	2 5	2 3	4.1
Changes in Income	MM$				
1st Decade		-92	55	51	57
RESOURCE USE					
Area available for Specific Resource Uses					
Timber Harvest	Acres	0	404,000	404,000	413,000
Grazing	Acres				
Mineral Exploration (Limited Restrictions)	Acres				
Acreages of Available Timber Harvest Prescriptions					
Commercial Thin	Acres/yr	0	0	0	0
Clear Cut	Acres/yr	0	5,014	7,573	7,656
Shelterwood	Acres/yr	0	0	0	0
Selection Cut	Acres/yr	0	0	0	0
Lands Tentatively Suitable for Timber Production	Acres	537,746	537,746	537,746	537,746
Lands Suitable for Timber Production	Acres	0	403,669	403,669	413,427
Land With Timber Yield Reductions	Acres				
Full Yield (Timber)		0	354,000	368,000	273,000
50-90% of Full Yield (Visual - Wildlife)		0	50,000	36,000	140,000
1 - 49% of Full Yield		0	0	0	0

Table II-39B Footnotes

(1) For the reasons why the number of RVDs vary little by alternative, see Chapter IV "Environmental Consequences of the Alternatives on Recreation" and Appendix B "Forest Planning Model"
(2) Recreation, Wilderness and visual resource outputs and effects were not analyzed
(3) See Appendix B " Analysis Prior to the Development of Alternatives" for an explanation of why the recreation outputs in the Recreation Benchmark do not always exceed those in the alternatives

Table II-39 Cont. Quantitative Outputs and Effects by Benchmark

OUTPUTS/EFFECTS		BENCHMARKS		
	UNIT	RECREATION	NON-GAME	FISH
EMPLOYMENT OPPORTUNITIES				
Human Resource Program	Enrollees			
1st Decade		220	220	220
2nd Decade		220	220	220
5th Decade		220	220	220
Changes in Jobs	M Jobs			
1st Decade		1.4	0.3	-1.6
Changes in Income	MM$			
1st Decade		20	6	-21
RESOURCE USE				
Area available for Specific Resource Uses				
Timber Harvest	Acres	396,000	406,000	215,000
Grazing	Acres			
Mineral Exploration (Limited Restrictions)	Acres			
Acreages of Available Timber Harvest Prescriptions				
Commercial Thin	Acres/yr	0	0	0
Clear Cut	Acres/yr	5,100	4,600	3,046
Shelterwood	Acres/yr	0	0	0
Selection Cut	Acres/yr	0	0	0
Lands Tentatively Suitable for Timber Production	Acres	537,746	537,746	537,746
Lands Suitable for Timber Production	Acres	396,516	406,526	214,584
Land With Timber Yield Reductions	Acres			
Full Yield (Timber)		230,000	0	143,000
50-90% of Full Yield (Visual - Wildlife)		166,000	0	72,000
1 - 49% of Full Yield		0	407,000	0

Table II-39B Footnotes

(4) Includes stands and trees

ASQ = Allowable Sale Quantity, AUM = Animal Use Month, BF = board feet, BTU = British Thermal Unit, CF = cubic feet, CSHCI = Coho Smolt HCI, HCI = habitat capability index, M = thousand, MM = million, NRA = National Recreation Area, PAOT = Persons At One Time, RVD = Recreation Visitor Day, TSPQ = Timber Sale Program Quantity, VQO = Visual Quality Objective, WFUD = Wildlife and Fish User Day

Table II-40 includes those outputs, effects, activities, and costs which are qualitative and which cannot (or should not) be quantified. It is separated from the quantitative information in Table II-39 because qualitative information requires more space to present in tabular form

Table II-40. Qualitative Resource Outputs and Environmental Effects

	ALTERNATIVE				
	NC	**A**	**B**	**B(DEP)**	**C**
Air Quality	Same as A	Temporary reductions in air quality due to slash burning would be common	Same as A	Same as A	Same as A
Visual Character of the Forest	Same as A	Most of the Forest would appear to be heavily altered, a patchwork of timber stands of different heights	Same as A	Same as A	Same as A
Changes in Recreational Use Patterns	Same as A	No significant change in recreational use patterns	Semiprimitive non-motorized capacity would increase slightly	Same as B	SPNM capacity would about double, elk hunting would become more common
Accessibility for Exploration of Mineralized Areas	Same as A	Road network would provide good access for mineral exploration	Same as A	Same as A	Same as A
Energy:					
Fuelwood for Domestic Use	Same as A	Accessibility, quality, and quantity of firewood would be relatively good	Same as A	Same as A	Same as A
Small Hydroelectric Sites	Same as A	Extensive roading would encourage development of sites as demand occurs	Same as A	Same as A	Development discouraged in the moderate amount of undeveloped lands
Conservation, In-Agency	Same as A	High energy use	Same as A	Same as A	Same as A
Transmission Corridors	Same as A	All existing corridors designated, little or no impact on future corridors	Same as A	Same as A	Same as A

Table II-40. Qualitative Resource Outputs and Environmental Effects

ALTERNATIVE				
D	E(PA)	F	G	H
Same as A	Temporary reductions in air quality due to slash burning would be common	Same as E	Temporary reductions in air quality due to slash burning would be uncommon	Same as G
Same as A	Much of the Forest would appear to be heavily altered	Same as E	Only about one half of the Forest would appear to be heavily altered	Only about one third of the Forest would appear to be heavily altered
Same as A	Same as C	SPNM capacity triples	SPNM capacity increases almost four times, fishing would be more common	SPNM capacity triples, fishing common, less dispersed roaded use
Same as A	Same as A	Access good except some reduction on undeveloped lands	Same as F	Access moderate, reductions on the undeveloped lands
Same as A	Accessibility, quality, and quantity of firewood would be moderate	Same as E	Accessibility, quality, and quantity of firewood would be relatively poor	Same as G
Same as A	Same as C	Same as C	Same as C	Same as C
Same as A	Same as A	Moderate energy use	Same as F	Lowest energy use
All existing corridors maintained, little or no impact on future corridors	Same as D	All existing corridors maintained, moderate impact on future corridors	Same as F	Same as F

Table II-40 Cont. **Qualitative Resource Outputs and Environmental Effects**

	ALTERNATIVE				
	NC	**A**	**B**	**B(DEP)**	**C**
Effect on On-Going Economic Trends:					
Changes in Employment Opportunities	Same as A	Employment opportunities associated with Forest outputs would increase above current levels, especially in the lumber and wood products industries	Same as A	Employment opportunities associated with Forest outputs would increase in the 1st decade above current levels, especially in the lumber and wood products industries, however, the increases would be temporary	Same as A
Changes in Lifestyles	Same as A	In addition to more job opportunities, there would also be more opportunities for elk hunting, fishing and recreation associated with roads On the other hand, there would be fewer opportunities for viewing natural landscapes and some wildlife species, and for recreating in undeveloped areas	Same as A	Same as A	Same as A
Community Organization	Same as B(Dep)	The changes that would result are similar to those communities have experienced in the last ten years	Same as A	The amount of conflict within communities would increase as the level of timber harvest from the Forest increases	Same as A
Forest Land	Same as A	No change in Forest land	Same as A	Same as A	Same as A

Table II-40 Cont. Qualitative Resource Outputs and Environmental Effects

ALTERNATIVE				
D	E(PA)	F	G	H
Employment opportunities associated with Forest outputs would increase slightly above current levels	Same as D	Employment opportunities associated with Forest outputs would be about the same as current levels, but would shift from lumber and wood products industries to fishing, recreation, service, trade, and government jobs	Employment opportunities associated with Forest outputs would be less than current levels, especially in the lumber and wood products industries, trade, services, and government sectors	Same as G
Same as A	Same as A	In addition to stable employment opportunities, there would be more opportunities for fishing and recreation associated with roads On the other hand there would be fewer opportunities for elk hunting, viewing natural landscapes, and recreating in undeveloped areas	There would be more opportunities for viewing some wildlife species, and recreating in undeveloped areas In addition to fewer employment opportunities, there would be fewer opportunities for elk hunting and firewood gathering	Same as G
Same as A	Same as A	Same as A	Same as A	The amount of conflict within communities would increase as the level of timber harvest from the Forest decreases
Same as A	Same as A	Same as A	Same as A	Same as A

Table II-40 Cont. Qualitative Resource Outputs and Environmental Effects

	ALTERNATIVE				
	NC	A	B	B(DEP)	C
Wetlands	Same as A	Disturbance of a few wetlands and flood plains along small streams by road construction would be very likely	Same as A	Same as A	Same as A
Flood Plains	Same as A	Disturbance of wetlands and flood plains by recreation facilities would be low, no disturbance of wetlands and flood plains by water control projects or facilities	Same as A	Same as A	Same as A
Threatened and Endangered (T&E) Species	All present T&E habitat maintained	All present T&E habitat maintained; far more than eagle recovery needs	All present T&E habitat maintained, more than eagle recovery needs	Same as B	Same as B
Game Populations and Distributions	(1)	HCI would decline	Same as A	Same as A	Elk HCI would increase
Nongame Species:					
Populations and Distributions	(2)	Habitat for most species maintained at MR levels	Same as A	Same as A	Same as A
Diversity of Habitats	(3)	Diversity index for habitats (not species) would be similar for all alternatives	Same as A	Same as A	Same as A
Wild and Scenic River Classification Potential	Same as A	Characteristics protected along Nestucca, Alsea, Siuslaw, N Fk Smith, and Umpqua rivers and Wassen and Drift (Siletz) creeks Characteristics not protected along Little Nestucca and Three Rivers	Same as A	Same as A	Same as A

SEE END OF TABLE FOR FOOTNOTES

Table II-40 Cont. Qualitative Resource Outputs and Environmental Effects

ALTERNATIVE				
D	E(PA)	F	G	H
Disturbance of wetlands and flood plains along small streams by road construction would be unlikely	Same as D	Same as D	Disturbance of wetlands and flood plains along small streams by road construction would be unlikely	Same as G
Same as A	Same as A	Same as A	Same as A	Same as A
Same as B	Same as B	Same as B	Same as B	Same as B
Same as A	Elk HCI would remain the same	Same as A	Same as C	Same as A
Same as A	Most uncommon habitats increase, long rotations benefit many species	Most habitat maintained above MR levels	Same as F	Populations would be high and habitats well distributed
Same as A	Same as A	Same as A	Same as A	Lowest of all alternatives by the 15th decade
Same as A	Same as A	Same as A	Same as A	Same as A

SEE END OF TABLE FOR FOOTNOTES

Table II-40 Cont. Qualitative Resource Outputs and Environmental Effects

	ALTERNATIVE				
	NC	**A**	**B**	**B(DEP)**	**C**
Civil Rights, Including Minorities and Women	Same as A	More job opportunities, not only with the Forest Service and through Forest Service contracts, but also in local industries	Same as A	Same as A	Same as A
Historic and Cultural Resources	High potential for impact No site impacted without SHPO concurrence	Same as NC	Same as NC	Same as NC	Same as NC
Research Values	Same as A	Opportunities for research dealing with natural systems would remain the same	Opportunities for research dealing with natural systems would be reduced	Same as B	Same as B
Land Use Changes:					
Prime Farmlands	Same as A	No change in farmland	Same as A	Same as A	Same as A
Rangelands	Same as A	All alternatives would provide very low levels of rangeland, no significant difference between alternatives	Same as A	Same as A	Same as A

(1) Elk habitat estimates are not comparable to other alternatives

(2) Early successional habitats for nongame species will be increased Late successional habitats will be maintained Nonforested habitats will remain the same

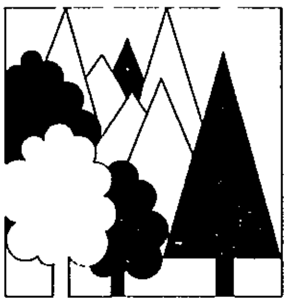


Table II-40 Cont. Qualitative Resource Outputs and Environmental Effects

ALTERNATIVE				
D	E(PA)	F	G	H
Slightly more job opportunities with the Forest Service, with Forest Service contracts, and with local industries	Same as D	Same as D	Same as F	Same as F
Moderate potential for impact No site impact without SHPO concurrence	Same as D	Same as D	Low potential for impact No site impact without SHPO concurrence	Same as G
Same as A	Same as H	Same as A	Opportunities for research dealing with natural systems would be next to highest of the alter- natives	Opportunities for research dealing with natural systems would be as high as any of the alternatives
Same as A	Same as A	Same as A	Same as A	Same as A
Same as A	Same as A	Same as A	Same as A	Same as A

(3) A diversity index was not calculated during the development of Alternative NC

Differences in Economic Values Among Alternatives

An objective of the forest planning process is to provide information that helps determine which alternative provides the mix of outputs and effects that best responds to the issues, concerns and opportunities (ICOs) and thereby maximizes the net public benefit (NPB) of managing the Forest. NPB 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), not all, of which, can be quantified. Therefore, the alternative which maximizes NPB is identified somewhat subjectively in the process of determining the alternative which best responds to ICOs while maximizing PNV.

Economic consequences of the alternatives are one component or a partial measure of NPB. This section discusses economic consequences of alternatives from two aspects. First, overall economic potentials of alternatives are discussed in terms of present net value (PNV), discounted costs and discounted benefits Then, more immediate monetary concerns are discussed in terms of annual costs, receipts, noncash benefits and cash flow. In the next section, economic consequences are discussed in a more incremental fashion Some economic consequences are displayed in the last part of Table II-39 The process used to analyze economic consequences is outlined in Appendix B, "Cost Efficiency and Net Public Benefits". Finally, effects of the alternatives on local communities are in Chapter IV

Economic consequences are based on three key assumptions:

1. Projected output levels accurately predict amounts of resources which will actually be consumed For example, recreational use will actually equal estimates of recreational use and timber harvest will equal allowable sale quantity (ASQ).

2. Prices assigned to resources are an accurate estimate of future resource values. For example, average price of timber which will be harvested on the Forest will equal the average price paid between 1977 and 1983 growing at a compound rate of 1% per year

3. Forest budget levels will be adequate to allow planned management activities.

Present Net Value

The PNV of Alternatives A through H is displayed in Figure II-7 PNV for these alternatives would range from $2 3 billion for Alternative B(Dep) to $0 8 billion for Alternative H. For Alternatives A through H, PNV is the sum of market and nonmarket priced benefits, less all management costs, discounted to the present at a 4% interest rate Analysis includes benefits and costs on the Forest as if alternatives were to continue for 150 years, even though the period covered by the Forest Plan will be 10 to 15 years. Because required information concerning non-timber benefits and costs was not provided by the 1979 Timber Resource Plan, a comparable PNV could not be calculated for Alternative NC If it had been possible to calculate PNV for Alternative NC with the same assumptions as Alternatives A through H, PNV of Alternative NC would be among the largest because of its large timber harvest potential.

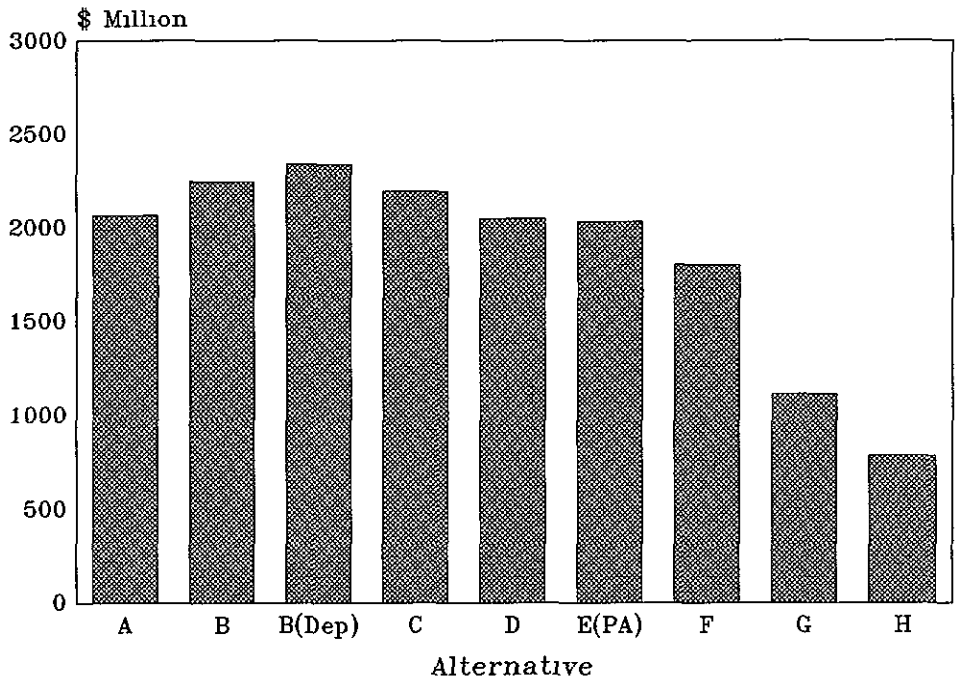


FIGURE II-7. PRESENT NET VALUE

Table II-41 displays incremental changes in PNV, benefits and costs among alternatives, discounted at 4% for 150 years Information on the Departure Benchmark developed for the Analysis of the Management Situation (USDA Forest Service 1985b) is included as a reference point for the theoretical maximum PNV of Forest resources The difference between the PNV of the Departure Benchmark and the alternative with the highest PNV, Alternative B(Dep), is due to constraints included in the FORPLAN model to make it feasible to implement alternatives

PNV of alternatives would vary with amounts of timber harvest in the 1st decade. Amounts of timber harvested in the 1st decade result from objectives of the alternative which affect: 1) size of the suitable timber land base, 2) objective of the timber program (whether to maximize PNV or volume) and 3) harvest flow objectives Alternatives with less timber harvest would be less expensive to implement primarily because of fewer reforestation and road costs However, savings from a smaller timber and road program would be more than offset by lower receipts from timber sales

Table II-41. Differences in Economic Efficiency Criteria

Alternative/Benchmark, Ranked by Decreasing PNV	Present Net Value		Discounted Costs		Discounted Benefits	
	Total	Change	Total	Change	Total	Change
NC (No Change)		(1)	(1)		(1)	
Departure Bench-mark (2)	2,362		769		3,131	
B(Dep) RPA	2,341	-21	793	24	3,134	3
B	2,245	-96	797	4	3,042	-92
C	2,192	-53	820	23	3,013	-29
A (No Action)	2,065	-127	762	-58	2,826	-43
D	2,049	-16	734	-28	2,783	-187
E(PA)	2,031	-18	756	22	2,787	4
F	1,800	-231	704	-52	2,504	-283
G	1,112	-688	582	-122	1,694	-810
H	787	-325	474	-82	1,260	-434

(1) Comparable values are not available for Alternative NC
(2) Departure Benchmark developed during the AMS adjusted to be consistent with alternatives

Variation in timber program activity among alternatives accounts for most variation in costs, benefits and PNV (Figures II-8 and II-9 and Table II-42) Because Alternative NC has a large timber harvest, it would be expected to have high discounted costs and benefits Alternative NC's PNV would be less than proportional to the timber harvest, however, because its objective to maximize timber yield would produce timber beyond economically efficient levels Other programs on the Forest do not cost as much nor do they contribute as many priced benefits as the timber program In addition, variations in benefits and costs of these programs are relatively minor

For the timber program, discounted benefits would more than compensate for increases in discounted costs among alternatives. Other programs, such as recreation, involve changes in quality of recreational experiences which are not all captured in dollar values assigned to recreational use Thus dollar benefit values for recreation, fish and wildlife do not always compensate for additional costs and ranking by costs and benefits does not follow ranking by PNV. Alternative C and E(PA) would not be in the same location if ranking were based on discounted costs. Alternative C makes the largest investments in wildlife habitat improvements Alternative E(PA) makes the largest investments in recreational facilities

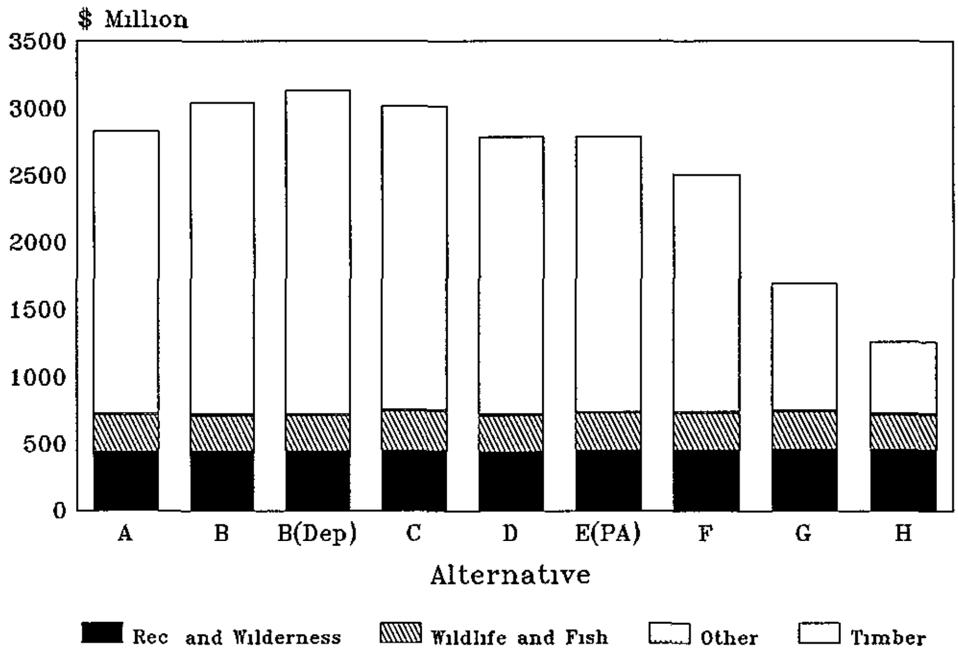


FIGURE II-8. DISCOUNTED BENEFITS BY MAJOR RESOURCE GROUP

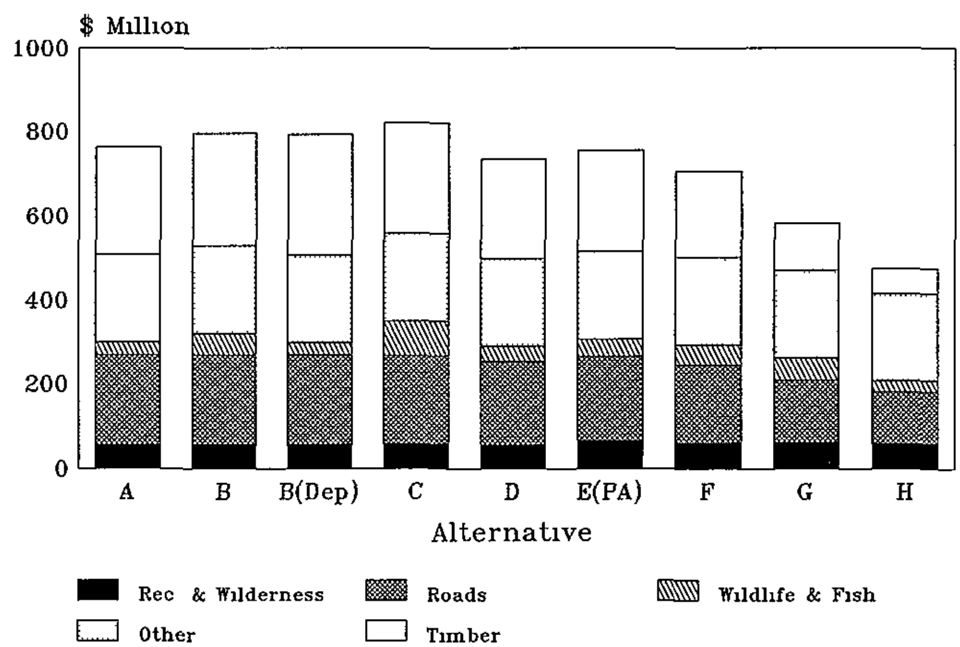


FIGURE II-9. DISCOUNTED COSTS BY MAJOR RESOURCE GROUP

Discounted benefits would range from \$3 1 billion for Alternative B(Dep) to \$1.3 billion for Alternative H. Discounted costs would range from \$0.8 billion for Alternatives A, B, B(Dep), C, and E(PA) to \$0 5 billion for Alternative H. Benefits (discounted at 4% for 150 years) would exceed discounted costs of all resource groups displayed in Table II-42 except for the "Other" category. The "Other" category would have a negative net value because these programs (primarily general administration and Job Corps) have few benefits which have been assigned dollar values.

Table II-42 Present Net Value, Discounted Benefits, and Discounted Costs by Resource

	ALTERNATIVE, Ranked in Order of Decreasing PNV									
	B(Dep)	B	C	A	D	E(PA)	F	G	H	NC
DISCOUNTED BENEFITS (1)										
Present Net Value	2,341	2,245	2,192	2,065	2,049	2,031	1,800	1,112	787	N/A
Timber	2,411	2,319	2,256	2,098	2,061	2,047	1,764	943	533	N/A
Recreation	448	448	455	446	446	452	460	464	459	N/A
Wildlife and Fish	263	263	290	271	264	276	269	275	257	N/A
Other (2)	12	12	12	12	12	12	12	12	12	N/A
DISCOUNTED COSTS (1)										
Timber	288	268	264	255	236	240	204	111	58	N/A
Roads (3)	212	212	209	212	197	200	184	147	122	N/A
Recreation	59	59	60	58	58	67	62	63	61	N/A
Wildlife and Fish	28	51	81	31	37	42	49	54	26	N/A
Other (4)	207	207	207	207	207	207	207	207	207	N/A

(1) Comparisons of benefits and costs displayed for indivual resource outputs indicate general relationships between alternatives, but they may be misleading because many outputs of multiple use management have common costs of production that cannot be attributed to individual resources

(2) Receipts from mineral leases and special uses

(3) Primarialy road construction, reconstruction, and maintenance related to timber mangement

(4) Primarily Job Corps and general administration

In all alternatives except Alternatives G and H, timber receipts would contribute about three-fourths of discounted benefits and timber and road costs would account for 60% of discounted costs Timber receipts would contribute 56% of discounted benefits in Alternative G and 42% in Alternative H. Timber and road costs would account for 44% of discounted costs in Alternative G and 42% in Alternative H

The recreation, wildlife and fish programs would contribute smaller, but significant positive economic value in all alternatives Costs of the recreation and wilderness management programs would increase with amount of land managed for undeveloped areas and Special Interest Areas and investment in recreational facilities In all alternatives recreational capacity above demand levels is not valued. Benefits for wildlife and fish would vary primarily with levels of elk habitat and riparian protection, respectively. Costs for wildlife and fish vary primarily from investment in habitat improvement

Economic benefits and costs discussed here do not include possible future mineral and energy development These values are highly speculative because of the low potential for significant development on the Forest Economic consequences of such unlikely developments would probably not vary significantly between alternatives (see "Management of Other Forest Programs" in this chapter).

Cash Flows: Budget and Receipts

This section applies to all alternatives except NC Comparable estimates of budget and receipts are not available for Alternative NC

Net cash flows, costs, receipts and noncash benefits for the 1st and 5th decades are displayed by alternative in Table II-43 Net cash flow is the difference between annual receipts of an alternative and budget (costs) required to implement that alternative Receipts are only those priced benefits for which the Forest will actually receive payment They do not include noncash benefits Noncash benefits are those such as hiking and fishing to which a dollar value can be assigned, but for which there is no fee or the full value is not collected

In Table II-43, there is no information for Alternative NC which is comparable to that for other alternatives, because the TRP only dealt with receipts and costs of the timber program. However, Alternative NC would probably be second only to Alternative B (Dep) in terms of net cash flow in the 1st decade and would have the highest net cash flows in the 2nd to 5th decades

The base value of $20 million displayed in Figure II-10 for net cash flow represents the difference between average receipts of $47 million collected in Fiscal Years 1979 through 1988 and average expenditures of $27 million in Fiscal Years 1979 through 1988 Net cash flow in the 1st decade would range from $59 million for Alternative B(Dep) to $-4 million for Alternative H Net receipts for most alternatives are projected to be significantly higher than this base in the 1st decade, primarily for two reasons:

1. In all alternatives, timber prices in the 1st decade are projected to be higher than the average price paid for timber harvested between 1979 and 1988

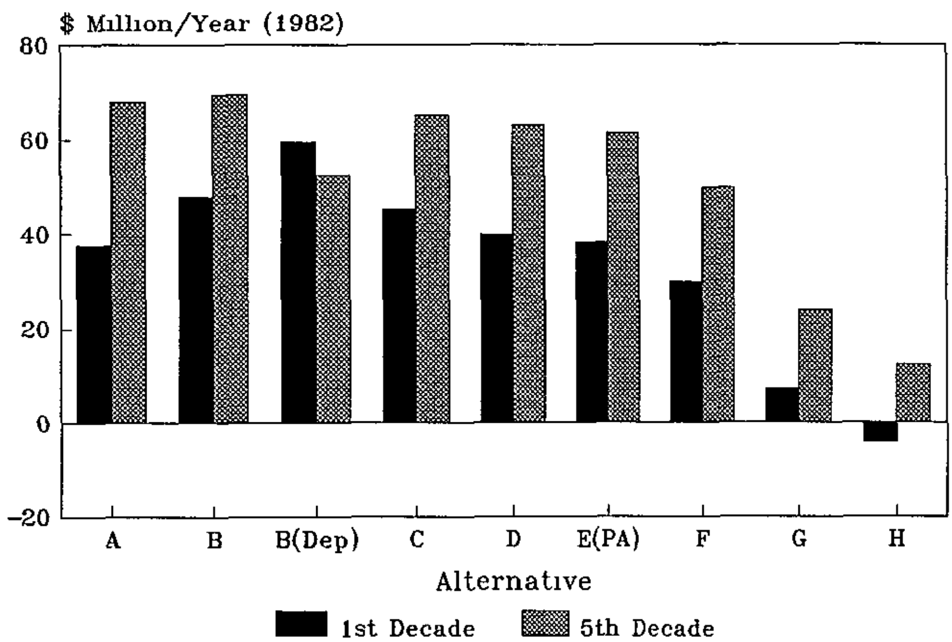
2. Timber harvest in all alternatives except F, G, and H is expected to exceed the average harvested between 1979 and 1988

Net cash flows in the 5th decade are projected to be higher than in the 1st decade for all alternatives except B(Dep) because of changes in size of the timber program, increases in price of timber, and completion of the road system Like projections for the 1st decade, projections for net cash flows in the 5th decade are dependent on price of timber being higher and amount of timber harvested being equal to ASQ.

Table II-43. Net Cash Flows, Costs, Receipts, and Noncash Benefits

	ALTERNATIVE, Ranked by Decreasing Net Cash Flows									
MM 1982 Dollars	**B(Dep)**	**B**	**C**	**D**	**E(PA)**	**A**	**F**	**G**	**H**	**NC**
1ST DECADE										
Net Cash Flows	59 4	47 8	45 2	39 8	38 1	37 6	29 9	7 30	-4 2	N/C
Costs (1)	33 3	32 3	32 7	30 5	31 8	32 5	29.1	23 9	18 9	N/A
Receipts	92 7	80 0	77 9	70 4	69 9	70 1	59 1	31 2	14 7	N/A
Noncash Benefits	25 3	23 2	26 1	25 1	25 5	25 5	25 5	25 6	25.1	N/A
5TH DECADE										
Net Cash Flows	52 5	69 5	65 1	62 9	61 3	68 0	49 6	24 0	12 4	N/A
Costs (1)	29 3	31.8	35.1	27 6	29 2	27 9	27 3	22 7	19.0	N/A
Receipts	81 7	101 3	100 1	90 5	90 6	95 8	76 9	46 7	31.4	N/A
Noncash Benefits	32 1	32 1	34 1	32 2	33 1	32 5	33 4	34 2	32 7	N/A

(1) Costs are finanaced with federal budget appropriations, timber purchaser road credits, and reforestation funds Costs do not include distribution of receipts to counties



Comparable data not available for Alternative NC

FIGURE II-10. ANNUAL NET CASH FLOW

Because timber receipts and costs dominate cash flows, ranking of alternatives by cash flows is similar to ranking by PNV. The exception is Alternative A which has lower net cash flows primarily because of higher reforestation costs. Alternative A's objective of maximizing timber yield leads to conversion of mixed hardwood stands to higher yielding conifer plantations in the 1st decade.

Average annual benefits for the 1st and 5th decades are displayed by alternative in Table II-39 for two categories: market and nonmarket Market resources include timber, commercial fish and fur animals, livestock forage, campgrounds, minerals and special uses Benefits for market resources include actual receipts plus additional assigned values for commercial fish and fur animals, livestock forage and campgrounds Nonmarket resource benefits are values assigned to dispersed, wilderness, and wildlife- and fish-related recreation. The purpose of assigning values is to reflect full economic value even though none or part of that value is actually collected under current laws and policies Market resources account for between 65% and 85% of the benefits of alternatives

Average annual benefits for the 1st and 5th decades are displayed by alternative in Figure II-11 and Table II-43 for two other categories. receipts and noncash benefits Receipts are primarily payments for timber sales, but also include $464,000 for grazing, campgrounds, minerals and special uses Noncash benefits include values assigned to general recreation, recreation associated with wildlife and fish habitat, and commercial harvest of wildlife and fish. These noncash prices reflect value of the resource above fees that users actually pay

Receipts would exceed noncash benefits for all alternatives In the 1st decade, receipts would range from $92 million for Alternative B(Dep) to $15 million for Alternative H Receipts for most alternatives would be higher than the 1979-1988 average of $47 million. Noncash benefits would be $25 - $26 million for all alternatives Noncash benefits would not differ very much among most alternatives because recreational use is not expected to differ significantly

Receipts and noncash benefits are expected to increase by the 5th decade in all alternatives except B(Dep) which has less receipts in the 5th decade because of less timber harvest

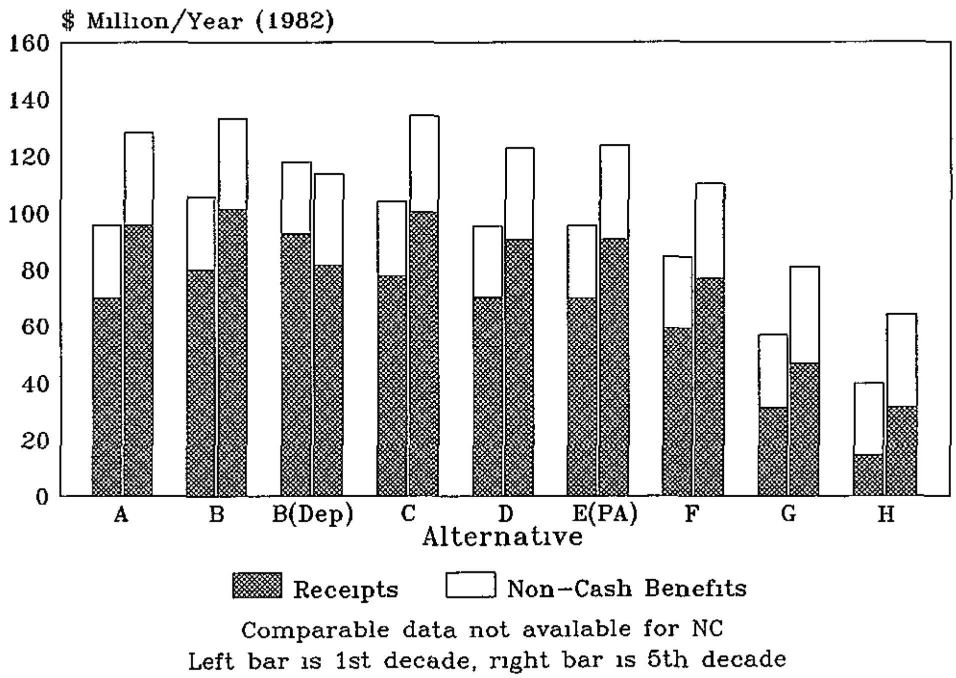


FIGURE II-11. ANNUAL RECEIPTS AND NONCASH BENEFITS

Costs required to operate the Forest under the alternatives are displayed for the 1st and 5th decades in Table II-43 and Figure II-12. Costs are also displayed in Table II-39 in two categories: capital investment, and operation and maintenance On the Forest, capital investments consist mainly of road construction and reforestation. Operation and maintenance costs include recreation management, timber sale preparation and administration, road maintenance, Job Corps and general administration. Most variation of costs between alternatives would be due to differences in capital investment costs. A portion of the costs, $7 9 million, is included in all alternatives for all decades. Most of these costs are for Job Corps and general administration.

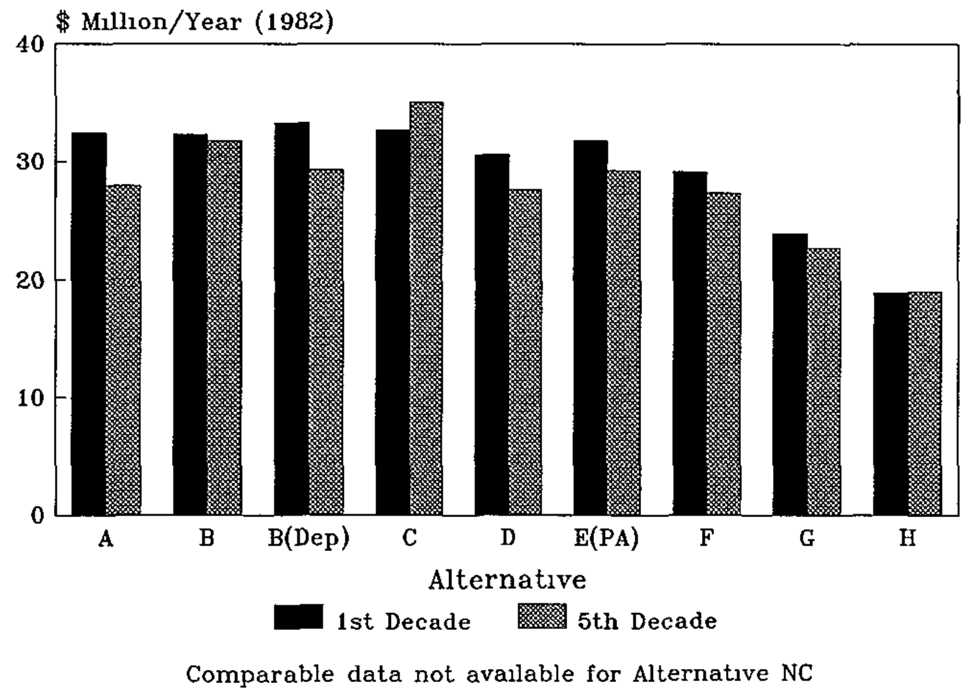


FIGURE II-12. ANNUAL COSTS

In the 1st decade, annual costs would range from $33 million for Alternative B(Dep) to $19 million for Alternative H. Annual costs would be higher than the 1979-1988 average of $27 million in all alternatives except G and H. Costs for most alternatives are expected to decrease after the road system is completed The system would be completed in the 2nd decade in all alternatives. However, costs of other activities (i e , recreation management, wildlife habitat improvement, as well as parts of the timber program) are expected to increase

Major Tradeoffs Among Alternatives

This section summarizes relationships among economic and community effects discussed in this chapter and responses of alternatives to ICOs discussed in Chapter I and Appendix A. The purpose is to highlight major tradeoffs or differences among alternatives Complete discussions of differences are found in previous sections of this chapter and in Chapter IV.

To provide a framework for assessing these tradeoffs, long-term national, regional, and local resource demands or needs are briefly summarized (more detail is provided in Chapter III). Also, selected economic values and indicators of responsiveness to major ICOs are displayed in Table II-44 Finally, differences and similarities among individual alternatives are summarized

Comparison of tradeoffs among alternatives must consider the entire array of nonpriced benefits, relationships between priced and nonpriced benefits, and qualitative nonpriced benefits relative to

PNV Comparison of alternatives within this framework forms an indicator of the NPB associated with each alternative

Table II-44. Responsiveness of Alternatives to Issues and Concerns

		ALTERNATIVE, Ranked by Decreasing PNV									
	Unit	NC	B(Dep)	B	C	A	D	E(PA)	F	G	H
Present Net Value	MM$	(1)	2,341	2,245	2,192	2,065	2,049	2,031	1,800	1,112	787
Net Cash Flow 1st decade 5th decade	MM$/Yr	 (2) (2)	 59 52	 48 70	 45 65	 38 68	 40 63	 38 61	 30 50	 7 24	 -4 12
Non Cash Benefits 1st decade 5th decade	MM$/Yr	 (3) (3)	 25 32	 25 32	 26 34	 25 32	 25 32	 25 33	 25 33	 26 34	 25 33
Timber ASQ in 1st decade	MMCF/Yr	92.5 (4)	79 8	69 1	66 5	65 9	60 6	61 2	32 6	28 2	13 5
Long Term Sustained Yield Capacity	MMCF/Yr	109 3	80 9	80 4	77 2	69 4	68 6	72 5	59 6	30 2	18 4
Lands Suitable for Timber Production											
Total Area	MAcres	*508*	*403*	*403*	*388*	*381*	341	357	314	183	133
Rotation length 60, 70, 80 Years 90 and 100 Years 100+ Years	% Area	 78 19 3	 81 13 6	 89 8 3	 81 13 6	 70 17 13	 84 7 9	 74 13 13	 66 21 13	 42 47 11	 0 55 45
Old-growth stands in 5th decade	MAcres	10 (5)	21	20	21	21	21	23	24	34	34
Sediment in 1st decade	MCYds/Yr	101 (6)	86	71	71	76	66	67	60	32	17
Coho Smolts in 5th decade	M Fish	316	640	748	787	858	1,023	936	1,041	1,094	1,120
Elk habitat capability in 5th decade	HCI	(7)	7,072	7,096	12,843	8,022	7,903	9,220	8,196	10,195	8,121
Spotted Owl habitat Pairs in 1st decade Pairs in 5th decade	SOHAs HCI (7) HCI(7)	(8) 14 8	22 49 35	22 50 35	22 51 36	22 53 37	22 51 38	29 55 42	25 53 44	27 55 55	37 57 60
Recreation/SPNM demand met in 5th decade	Percent	23 (9)	30	30	46	23	23	40	65	76	65
Viewsheds protected	Percent	(10)	0	0	31	44	5	49	66	74	74

SEE END OF TABLE FOR FOOTNOTES AND ACRONYMS

Table II-44 Cont. Responsiveness of Alternatives to Issues & Concerns

		ALTERNATIVE, Ranked by Decreasing PNV									
	Unit	NC	B(Dep)	B	C	A	D	E(PA)	F	G	H
Trails in wilderness	Miles	20 5 (11)	29	29	34 5	20 5	20 5	27 5	49	64 5	11 5
Recommended SIAs	MAcres	1,500(12)	2,770	2,770	5,770	2,880	1,090	7,070	7,340	7,340	4,570
Undeveloped areas outside ODNRA	MAcres	19,900	0	0	7,432	0	0	7,297	16,159	20,375	36,205
Recommended RNAs	Number	1	0	0	0	1	1	3	1	2	3
Contribution to counties, 1st Decade Employment	M Jobs/Yr	13	11 3	10 2	9 9	9 4	9 2	9 3	8 4	5 9	4 3
Income	MM$/Yr	(13)	230	206	199	187	183	188	166	110	75

(1) The high timber output in Alternative NC would yield a high PNV if analyzed with the same assumptions as Alternatives A-H
(2) Net cash flow could be estimated from the TRP for the timber program only This would be $53 million per year in the 1st decade If analyzed with the same assumptions, Alternative NC would probably be between Alternatives B(Dep) and B in the 1st decade, and would be the highest of all alternatives in the 5th decade
(3) Unavailable The TRP did not estimate benefits for any resource other than timber, however, non-cash benefits would probably be similar to other alternatives which emphasize timber
(4) This is the potential yield for the TRP For a discussion of the difference between potential yield and ASQ, see "Management of Timber" in this chapter.
(5) See "Management of Existing Old Growth" in this chapter
(6) 111,200 cubic yards would be expected if current modeling techniques and land base were used The TRP estimated 64,000 cubic yards See Chapter IV
(7) Numerical rating is based on results of HCI models Such models were not developed for Alternative NC, and HCIs were estimated from assumptions in the TRP.
(8) SOHAs were not developed for Alternative NC, and the number of sites identified for interim management was not available in the TRP
(9) SPNM is semiprimitive nonmotorized recreation The estimate for Alternative NC assumes the same management of roadless areas in the Oregon Dunes NRA and same level of trail development in Wildernesses and NRA roadless areas as in Alternative A.
(10) Unavailable This column shows what percentage of total acreage of visually sensitive viewsheds on the Forest is assigned a VQO of preservation, retention, or partial retention. The TRP includes acreage of retention, partial retention, and foreground modification, but not middleground modification This means total acreage of visually sensitive viewsheds is unknown for Alternative NC Therefore, there is no way to determine this percentage
(11) This assumes the same level of trail development as in Alternative A.
(12) This figure is from the TRP, but it is not the full acreage in these areas since some acres were included in the general nonforest or meadow category rather than here
(13) A comparable figure is not available for NC If estimated with the same assumptions, it would probably be between B and B(Dep)

CF = cubic feet, CY = cubic yard, HCI = Habitat Capability Index, M = thousand, M = million, ODNRA = Oregon Dunes NRA, SOHA = Spotted Owl Habitat Area

National Regional and Local Overview

The 1985 RPA Assessment concluded that demand (see Table II-1 and "Benchmark Analysis" in this chapter for more quantitative estimates of demand) for most Forest outputs is likely to rise rapidly in the future and that supplies will increase but at a much slower rate In addition, there will be continued pressure to protect and enhance the quality of the environment. Some findings of the RPA program are (USDA Forest Service 1984d):

1 By 2030, timber consumption in the U S is expected to increase 84% from levels in the late 1970s due to increases in population, and economic activity Demand will be about 87 MMCF/year.

2 Demand for habitat for salmon, steelhead, waterfowl and species dependent on mature timber, wetland, and riparian areas will increase on public lands as habitat is lost on private lands In addition, the federal list of T&E and sensitive species will increase.

3. Projections based on expected changes in population, personal income, geographic distribution, age structure, and work schedules indicate continued increase in outdoor recreation (demand for about 2,400 MRVDs on the Forest by 2030) Recreational use of wilderness will also continue to grow (demand for about 15 MVRDs by 2030)

4. Demands for nonconsumptive uses of water related to wildlife and fish habitat, hydroelectric development, recreation, and maintenance of wetlands will increase Demand to maintain or improve water quality to allow for a greater variety of uses is expected.

While demand for commercial products (timber and fish) is generally national, demand for other outputs such as recreation is regional and local Most social and economic impacts of managing the Forest are in an eight-county area in western Oregon The area includes two distinct components of the Oregon economy: 1) the coastal area which is economically dependent on tourism, fresh and processed seafood, sport fishing, and forest products, and 2) the Willamette Valley where most of Oregon's population and industries are concentrated Population growth, economic diversification, and changing social values and lifestyles affect kinds of uses and management of the Forest (USDA Forest Service 1984a, pp: 2-5) These changes include.

1 Increased residential use of land adjacent to the Forest with increased pressure to manage adjacent or visible Forest land to emphasize amenities instead of commodities

2. An increased concern with environmental issues on a daily, local basis, and more conflicts between adjacent residents and Forest activities such as burning and timber harvest

3. A preference for forest land amenities, such as unregulated, unstructured recreation, even when in conflict with economic growth

4 Increased use of Forest resources for personal goods (e g., firewood, fish and game, other food and building materials)

5. A growing demand for marketable Forest goods for construction and domestic use, a trend intensified by increasing demand for these natural products.

Economic Values and Responses to Major Issues, Concerns, and Opportunities

Alternatives differ because each responds differently to the ICOs identified for this Forest, especially the first 15 issues identified in Chapter I and Appendix A This section discusses many quantifiable indicators of those responses. It also discusses indicators of central concern to the nation as a whole, as owner of this Forest FEIS, Chapter I and Appendix A fully discuss ICOs and their indicators

In Table II-44, key quantitative indicators are used to illustrate degree of responsiveness of each alternative to ICOs, and tradeoffs between resources. Alternatives are listed in descending order of PNV, which more directly illustrates resource and economic tradeoffs. The first five indicators respond to the national concern that this Forest is managed in a financially prudent manner while quality of the physical environment is protected and enhanced. Indicators of economic consequences are: economic efficiency (measured by PNV), net cash flow in the 1st and 5th decades, and noncash benefits in the 1st and 5th decades Other displays in Chapter II and discussions in Chapter IV and Appendix E (Mapleton District) provide more detailed information about specific effects and tradeoffs. See Table II-1 in this chapter for present conditions

Measures of environmental effects often cannot be compared among alternatives because there are no comparable numbers available for Alternative NC. However, some observations can be made about the relative responsiveness of Alternative NC to ICOs Alternative NC would be considered most responsive to issues relating to levels of timber harvest as measured by timber yield, LTSYC and acres managed on short rotations. Alternative NC would be most responsive to economic issues, as indicated by PNV, net cash flow, income and employment Conversely, it would fall in the lower range of responsiveness to economic issues by the 5th decade Alternative NC would generally rank lowest on scales of indicators related to providing amenities, such as old-growth stands, coho salmon habitat, spotted owl habitat, SPNM recreational opportunities, protected viewsheds, and undeveloped areas

Differences and Similarities of Alternatives

Each alternative would meet MRs and mutiple-use and sustained-yield requirements at some level of acceptability Within these limitations, the goal of each alternative is to benefit one or more resource outputs (compared to existing conditions). To achieve this, other resource outputs must be limited or "traded off" (i e , what potential benefits would be foregone to respond to issues emphasized in that alternative). These tradeoffs are discussed for each alternative Alternatives are discussed in order of decreasing PNV.

It is apparent that some groups of alternatives are similar in terms of benefits and tradeoffs involved This is because some resources (i.e , timber, elk habitat, and economic efficiency) are complementary Nongame wildlife habitat, fish habitat, wilderness, undeveloped recreation, visual protection, and scientific values related to natural systems are another group of complementary resources Alternatives NC, A, B, B(Dep), and D tend to emphasize market outputs. Alternatives F, G, and H emphasize amenity values Alternatives C and E(PA) are an intermediate group.

Alternatives A through H would meet MRs and multiple-use and sustained-yield requirements Alternative NC does not incorporate MRs and consequently would not provide sustained yields of many resources

Alternative NC - Alternative NC would have a high PNV because of its high potential timber yield. Forest Service receipts from timber would be twice present total receipts. Net returns from timber management would be $53 million in the 1st decade. Economic benefits for which no fees would be collected were not estimated for the TRP, but would probably be about $25 million. This figure is similar to those in the 1st decade for other alternatives that emphasize timber Employment and Forest Service payments to counties would increase Potential for stability in timber dependent communities would temporarily increase

Water quality, levels of fish habitat, and habitat of wildlife dependent on later successional stages (except T&E species) would be lower in Alternative NC than for other alternatives because of the greater area harvested All old-growth and mature timber outside of special areas would be harvested within 50 years No existing unroaded areas outside the Oregon Dunes National Recreation Area (NRA) would remain undeveloped As a result, opportunities for SPNM recreation would be limited to Wildernesses and the NRA Scenery would be protected along the most visually important roads. By the end of the 5th decade, the Forest would be a mosaic of even-aged stands mostly less than 50 years old

Summary of Major Benefits and Tradeoffs for Alternative NC

BENEFIT	TRADEOFF
Highest level of timber outputs of any alternative, 50% more timber offered than cut in 1978-1987, high PNV, more jobs, net receipts, and payment to counties	Protection for soil, water and fish below NFMA management requirements (MRs) Habitat for spotted owls and species dependent on mature conifer below MRs No undeveloped areas outside the Oregon Dunes NRA. Harvest of most of the old growth outside of Wildernesses
No change of some existing plans and allocations - Marys Peak and Cape Perpetua areas, several Research Natural Areas (RNAs)	Scenery along some roads is not protected at levels recommended by the Visual Management System (VMS)

Alternative B(Dep) - Alternative B(Dep) would have the highest PNV of Alternatives A through H ($2 3 billion), because goals for other resources allow more acres harvested and timber activities to be concentrated in more valuable conifer stands Forest Service receipts in the 1st decade would nearly double. Average annual net returns would be $59 million in the 1st decade but would fall to $52 million in the 5th decade. Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $32 million in the 5th.

High timber harvest volume and Forest Service receipts would lead to increases in employment in surrounding areas and in Forest Service payments to counties Then employment related to wood products would decline over the next 4 decades. Water quality, levels of fish habitat, and most habitats of wildlife except for T&E species would be second lowest of the alternatives. Timber would be harvested in most old-growth stands available for harvest and in undeveloped portions of the Forest outside the Oregon Dunes NRA As a result, opportunities for SPNM recreation would be generally limited to Wildernesses and the NRA Scenery along visually important roads would be unprotected

Summary of Major Benefits and Tradeoffs for Alternative B(Dep)

BENEFIT	TRADEOFF
Meets RPA timber target for 1st decade, high PNV, more jobs, net receipts, and payments to counties	Timber offered for sale drops 10% after 1st decade
	Unstable slopes, riparian areas, fish habitat, and watersheds protected at MR levels
	Costly mitigation for watersheds and fish habitat
	No undeveloped areas outside the Oregon Dunes NRA.
	Harvest of much of the old growth outside of Wildernesses and SOHAs
	MR habitat level for spotted owls
	No protection of scenery
	People who want the Forest used for noncommodity resources would be less satisfied
	Loss of potential research opportunities dealing with natural systems (in potential RNAs)
	Highest costs to operate Forest
	Benefits to elk limited by departure scheduling and clumping of clearcuts

Alternative B - Alternative B would also have a high PNV, because goals for other resources allow high levels of timber activities in more valuable conifer stands. Forest Service receipts in the 1st decade would be 70% more than at present. Average annual net returns would be $48 million in the 1st decade and rise to $70 million in the 5th decade Economic benefits for which no fees would be collected would average about $25 million per year in the 1st decade and would rise to $32 million in the 5th

High levels of timber harvest and Forest Service receipts would lead to increases in employment in surrounding areas and in Forest Service payments to counties. Water quality, levels of fish habitat, and most habitats of wildlife except for T&E species would be lower than for most alternatives Timber would be harvested in most old-growth stands available for harvest and in undeveloped portions of the Forest outside the Oregon Dunes NRA As a result, opportunities for SPNM recreation would be generally limited to Wildernesses and the NRA. Scenery along visually important roads would be unprotected.

Summary of Major Benefits and Tradeoffs for Alternative B

BENEFIT	TRADEOFF
More timber offered for sale than average cut for last 10 years, high PNV, more jobs, net receipts, and payments to counties	Unstable slopes, riparian areas, fish habitat, and watersheds protected at MR levels No undeveloped areas outside Oregon Dunes NRA and few SPNM opportunities Harvest of much of the old growth outside of Wildernesses and SOHAs MR habitat level for spotted owls No protection of scenery More costs to operate the Forest Loss of potential research opportunities dealing with natural systems (in potential RNAs)

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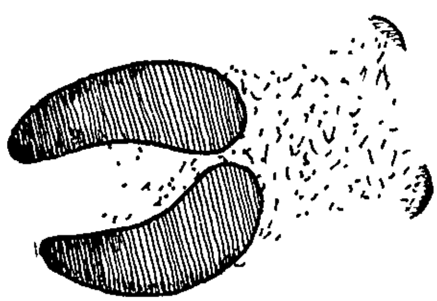
Alternative C - Alternative C would also have a high PNV ($2.2 billion), because goals for other resources allow timber activities to be concentrated in more valuable conifer stands. Forest Service receipts in the 1st decade would be 65% more than the past-10-year average. Average annual net returns would be $45 million in the 1st decade and would rise to $65 million in the 5th decade. Economic benefits for which no fees would be collected would average about $26 million per year in the 1st decade and would rise to $34 million in the 5th.

Employment and Forest Service payments would increase. Water quality, levels of fish habitat, and most habitats of wildlife except for elk and T&E species would be lower than for most alternatives. Timber would be harvested in most old-growth stands available for harvest. Substantial opportunities for SPNM recreation would be available in two undeveloped areas outside the Oregon Dunes NRA and in Wildernesses. Scenery would be protected along Highways 101 and 38

Summary of Major Benefits and Tradeoffs for Alternative C

BENEFIT	TRADEOFF
More timber offered than cut in last 10 years, high PNV, more net receipts and payments to counties	Little protection for unstable slopes, fish habitat, and watersheds in addition to MRs Relatively little habitat for spotted owls and species associated with old growth in addition to MRs Loss of potential research opportunities dealing with natural systems (in potential RNAs)
Most elk habitat of any alternative	After MR protection, highest level of timber harvest in the riparian zone MR habitat levels for nongame wildlife No closures of municipal watersheds
Variety of recreational opportunities	



Alternative A - Alternative A would have a moderately high PNV, because goals for other resources allow timber activities to be carried out to maximize timber yield. Forest Service receipts in the 1st decade would be 49% more than the past-10-year average. Average annual net returns would be $38 million in the 1st decade and rise to $68 million in the 5th decade Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $32 million in the 5th.

Employment and Forest Service payments to counties would increase. Water quality, levels of fish habitat, and most habitats of wildlife except for elk and T&E species would be lower than for most alternatives Timber would be harvested in most old-growth stands available for harvest and in undeveloped portions of the Forest outside of the Oregon Dunes NRA As a result, opportunities for SPNM recreation would be generally limited to Wildernesses and the NRA. Scenery would be protected along most visually important roads

Summary of Major Benefits and Tradeoffs for Alternative A

BENEFIT	TRADEOFF
More timber offered than cut in last 10 years, high PNV, more jobs, net receipts, and payments to counties	No protection for soil and water above MR level No undeveloped areas outside the Oregon Dunes NRA Harvest of much of the old growth outside of Wildernesses and SOHAs MR levels of habitat for spotted owls
No change - continue with existing plans except for MRs	Scenery along some roads is not protected High targets for elk habitat may not be achievable Not as cost efficient as possible

Alternative D - Alternative D has a moderately high PNV of $2.0 billion, even though goals for other market resources would often restrict timber activities Forest Service receipts in the 1st decade would be 49% more than at present Average annual net returns would be $40 million in the 1st decade and would rise to $63 million in the 5th decade Economic benefits for which no fees would be collected would average about $25 million per year in the 1st decade and would rise to $32 million in the 5th.

Employment and Forest Service payments to counties would increase. Water quality, levels of fish habitat, and most habitats of wildlife would be about average compared to other alternatives. Timber would be harvested in most old-growth stands available for harvest and in undeveloped portions of the Forest outside of the Oregon Dunes NRA. As a result, opportunities for SPNM recreation would be generally limited to Wildernesses and the NRA. Scenery would be protected along Highway 101.

Summary of Major Benefits and Tradeoffs for Alternative D

BENEFIT	TRADEOFF
Timber offered for sale is more than the average cut in last 10 years; high PNV, more jobs	No protection of unstable slopes in addition to MRs in most areas
	No special closures of municipal watersheds
	Reduced fish habitat Forest-wide compared to salmon management areas
	No undeveloped areas outside the Oregon Dunes NRA.
	Scenery protected only along Highway 101
	Harvest of much of the old growth outside of Wildernesses and SOHAs
More salmon habitat in special management areas	Less elk habitat in special management areas
	Lower timber harvest than in other areas of the Forest

Alternative E (Preferred Alternative) - Alternative E(PA) would have a moderately high PNV of $2.0 billion, even though goals for other resources would often restrict timber activities Forest Service receipts in the 1st decade would increase 48% above the past-10-year average. Average annual net returns would be $38 million in the 1st decade and would rise to $61 million in the 5th decade. Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $33 million in the 5th

Employment and Forest Service payments to counties would increase Water quality, levels of fish habitat, and habitat of T&E and most other wildlife would be about average compared to other alternatives Timber would be harvested in some old-growth stands available for harvest Substantial opportunities for SPNM recreation would be available in two undeveloped areas outside the Oregon Dunes NRA and in Wildernesses. Scenery would be protected along over one-half of the visually important roads

Summary of Major Benefits and Tradeoffs for Alternative E(PA)

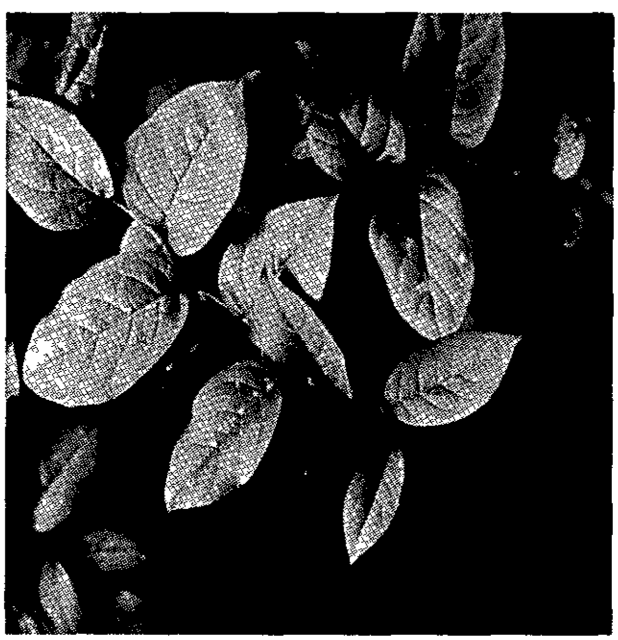
BENEFIT	TRADEOFF
Second highest amount of habitat for spotted owls	Average elk habitat
High PNV, more jobs, net receipts, and payments to counties	Some loss of old-growth conifer
Variety of recreational opportunities	No special closures of municipal watersheds
Long timber rotations to produce wildlife habitat	Some loss of timber (less than 10%) that can be offered for sale

Alternative F - Alternative F has a moderate PNV of $1 8 billion, even though goals for other resources would often restrict timber activities Forest Service receipts in the 1st decade would be 25% higher than at present. Average annual net returns would be $30 million in the 1st decade and would rise to $50 million in the 5th decade. Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $33 million in the 5th.

Forest Service payments to counties would increase, and employment would increase slightly. Water quality, levels of fish habitat, and most habitats of wildlife except elk and T&E species would be higher than for most alternatives. Timber would be harvested in some old-growth stands. Substantial opportunities for SPNM recreation would be available in three undeveloped areas outside the Oregon Dunes NRA and in Wildernesses Scenery would be protected along 80% of the visually important roads.

Summary of Major Benefits and Tradeoffs for Alternative F

BENEFIT	TRADEOFF
Variety of recreational opportunities	Reduced timber harvest and accompanying benefits
Increased habitat for nongame wildlife	Reduced elk production Reduced timber harvest and accompanying benefits
Increased protection of scenery	Reduced timber harvest and accompanying benefits

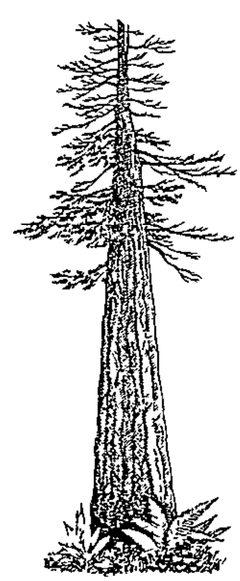


Alternative G - Alternative G would have a low PNV of $1.1 billion, because goals for other resources would reduce levels of timber activities. Forest Service receipts in the 1st decade would be 34% less than the past-10-year average. Average annual net returns would be $7 million in the 1st decade and would rise to $24 million in the 5th decade Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $34 million in the 5th

Employment and Forest Service payments to counties would decrease substantially Community members that depend on the wood products industry would be affected Because large amounts of land would be removed from the timber base, water quality, levels of fish habitat, and habitats of most wildlife except T&E species would rise above those for most other alternatives. No timber would be harvested in old-growth stands. Numerous opportunities for SPNM recreation would be available in three undeveloped areas outside the Oregon Dunes NRA and in Wildernesses Scenery would be protected along all visually important roads

Summary of Major Benefits and Tradeoffs for Alternative G

BENEFIT	*TRADEOFF*
More fish habitat (and protection of slopes and streams in municipal watersheds)	Reduced timber harvest and accompanying benefits
Highest level of dispersed recreation of any alternative	Reduced timber harvest and accompanying benefits Some reduction of elk habitat
Highest level of protection of scenery of any alternative	Reduced timber harvest and accompanying benefits
All old growth and habitat for spotted owls maintained	Reduced timber harvest and accompanying benefits



Alternative H - Alternative H would have the lowest PNV of $0.8 billion, because goals for other resources allow little timber activity. Forest Service receipts in the 1st decade would be 69% lower than at present. The Forest would have a negative cash flow in the 1st decade. Average annual net returns would be $-4 million in the 1st decade but would rise to $12 million by the 5th decade. Economic benefits for which no fees would be collected would average $25 million per year in the 1st decade and would rise to $33 million in the 5th.

Employment and Forest Service payments to counties would decrease substantially. Community members that depend on the wood products industry would be affected Large amounts of land would be removed from the timber base, so water quality, levels of fish habitat, and habitats of most wildlife except elk and T&E species would rise above those for other alternatives. No timber would be harvested in old-growth stands. Because of lack of trails, far fewer opportunities for SPNM recreation would be available in undeveloped areas and in Wildernesses than in Alternative G. Scenery would be fully protected along all visually important roads.

Summary of Major Benefits and Tradeoffs for Alternative H

BENEFIT	TRADEOFF
Most preservation of natural systems	Lowest timber harvest and accompanying benefits Limited access by trail and road and reduced public use
Highest level of habitat for species dependent on mature deciduous trees	Lowest timber harvest and accompanying benefits
Most protection for municipal watersheds	Lowest timber harvest and accompanying benefits No recreation in municipal watersheds
All old growth maintained	Lowest timber harvest and accompanying benefits
Highest level of habitat for spotted owls	Reduced elk habitat Lowest timber harvest and accompanying benefits

Tradeoffs discussed in the preceeding section are also illustrated in Figure II-13, which gives relative change of key indicators in various alternatives

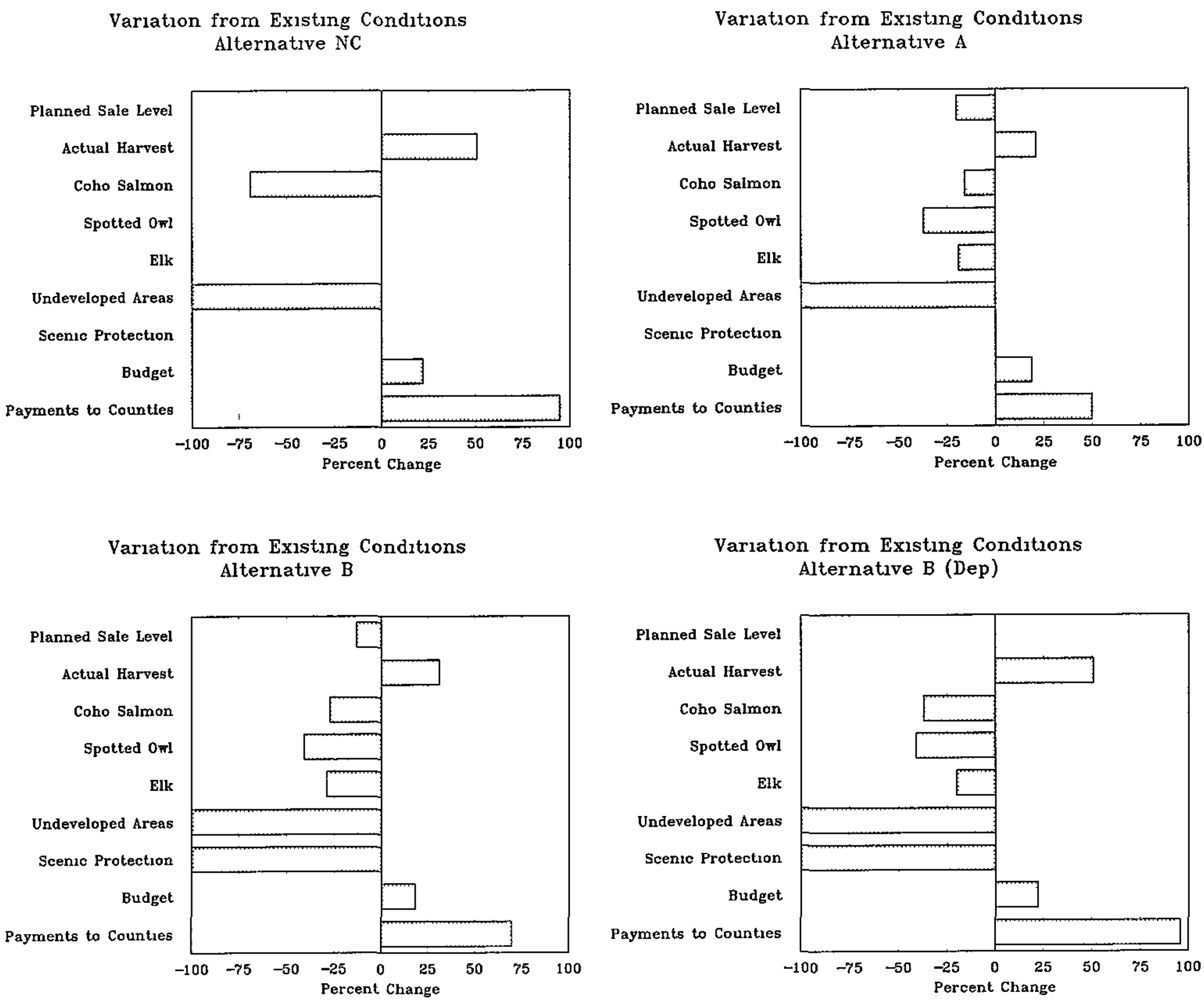


FIGURE II-13. CHANGE FROM EXISTING CONDITIONS

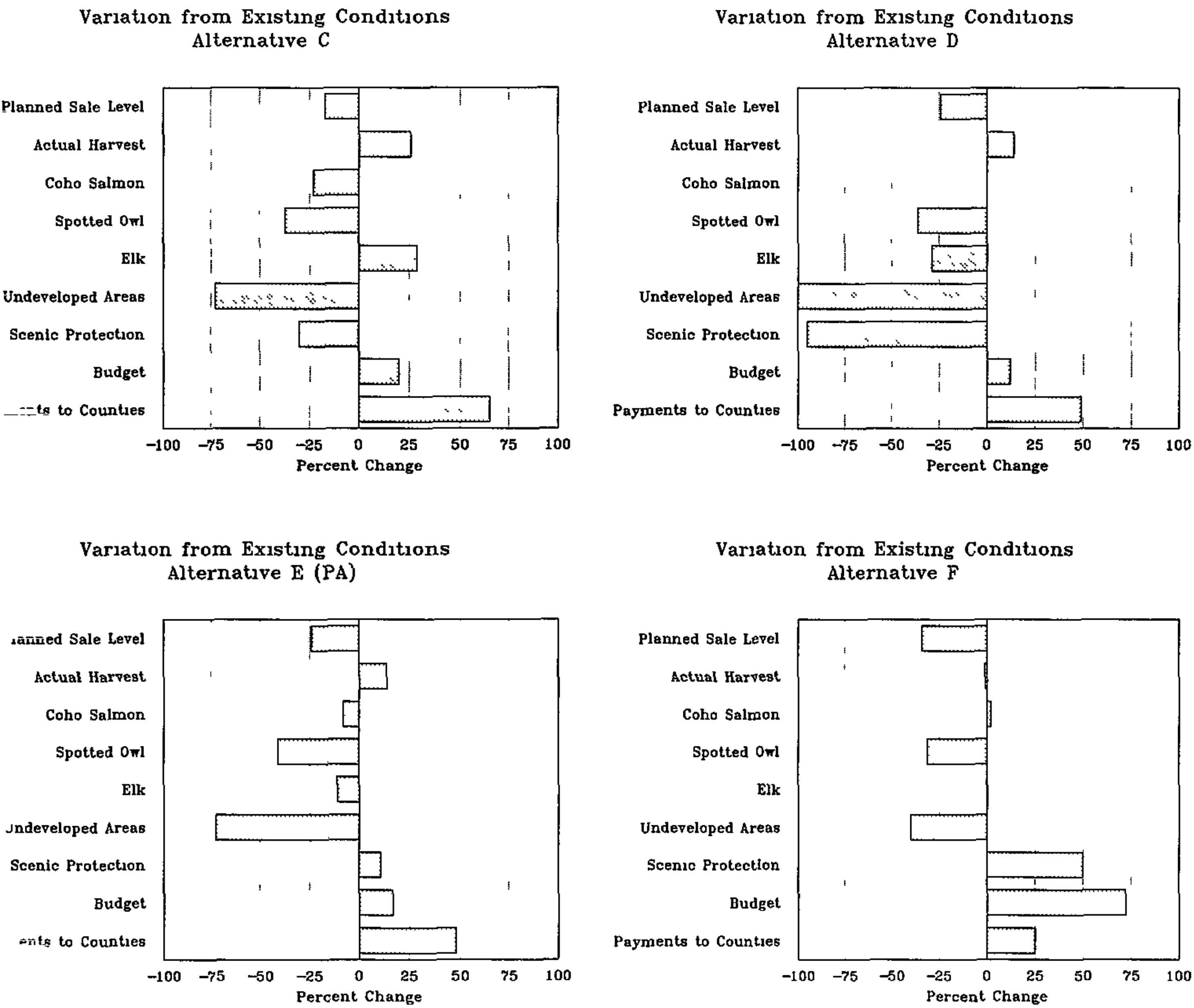
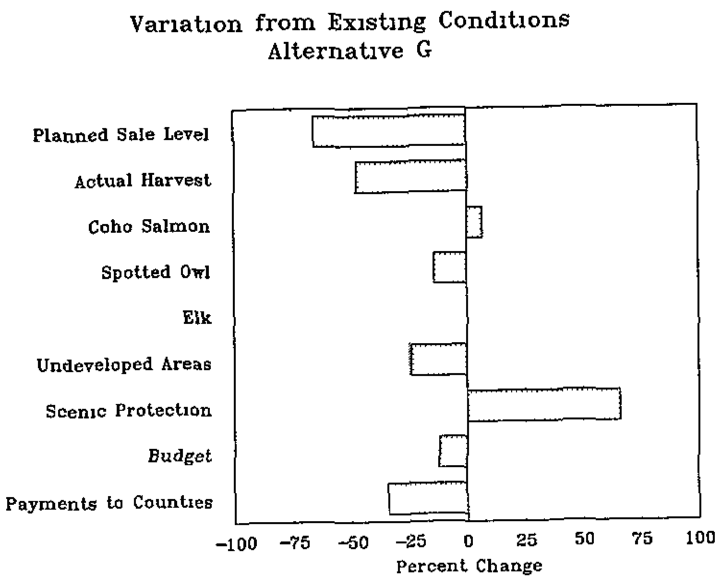


FIGURE II-13 CONT. CHANGE FROM EXISTING CONDITIONS



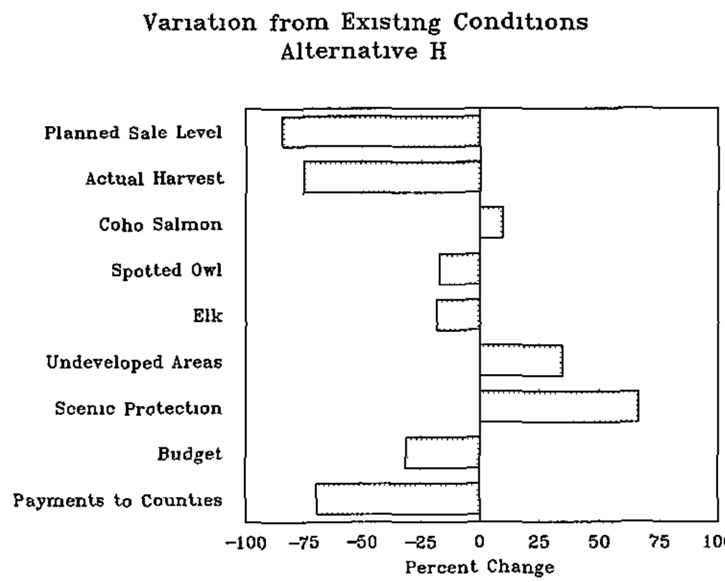


FIGURE II-13 CONT CHANGE FROM EXISTING CONDITIONS

Timber = Timber offered for sale during the 1st decade compared to: (1) the sale level projected from the 1979 TRP; and (2) the amount actually harvested during the previous decade

Coho Salmon = Smolt habitat capability in the 5th decade

Spotted Owl = Projected habitat capability in the 5th decade

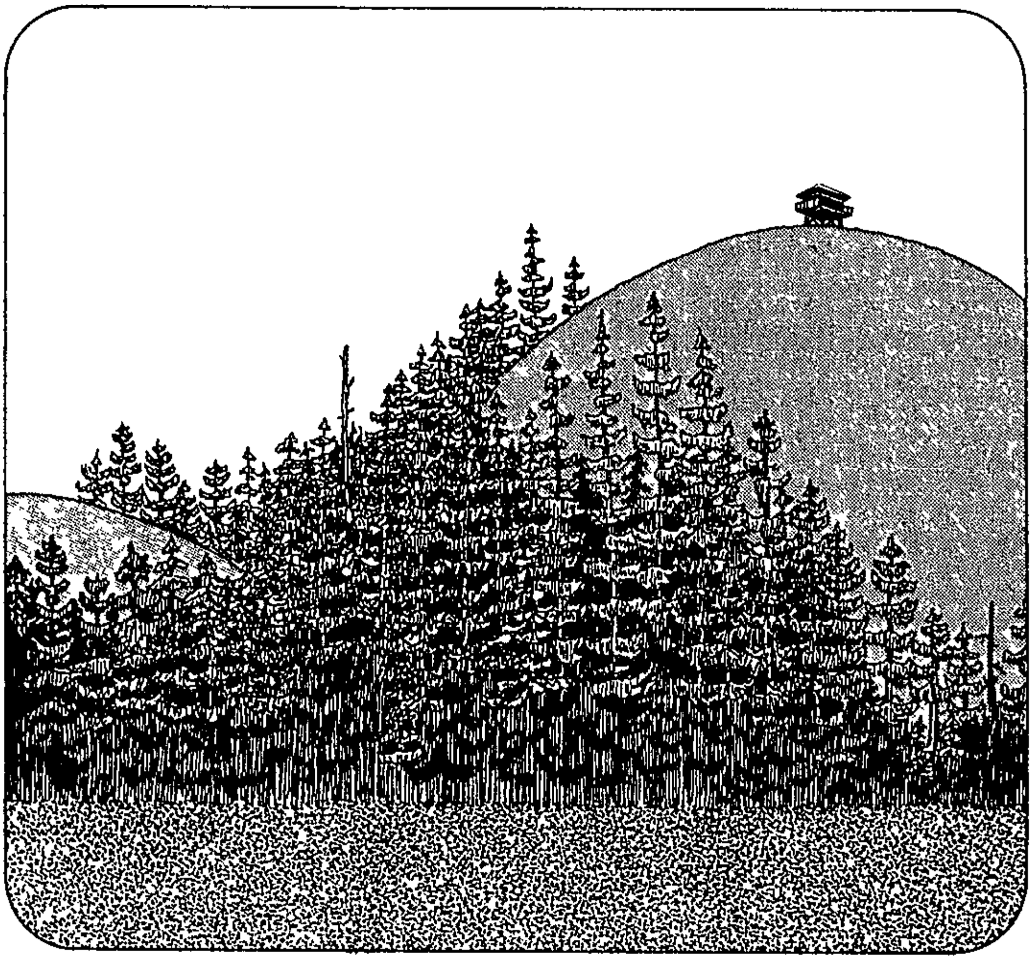
Elk = Projected habitat capability in the 5th decade

Undeveloped Areas = Existing unroaded acres assigned to undeveloped status outside the Oregon Dunes NRA

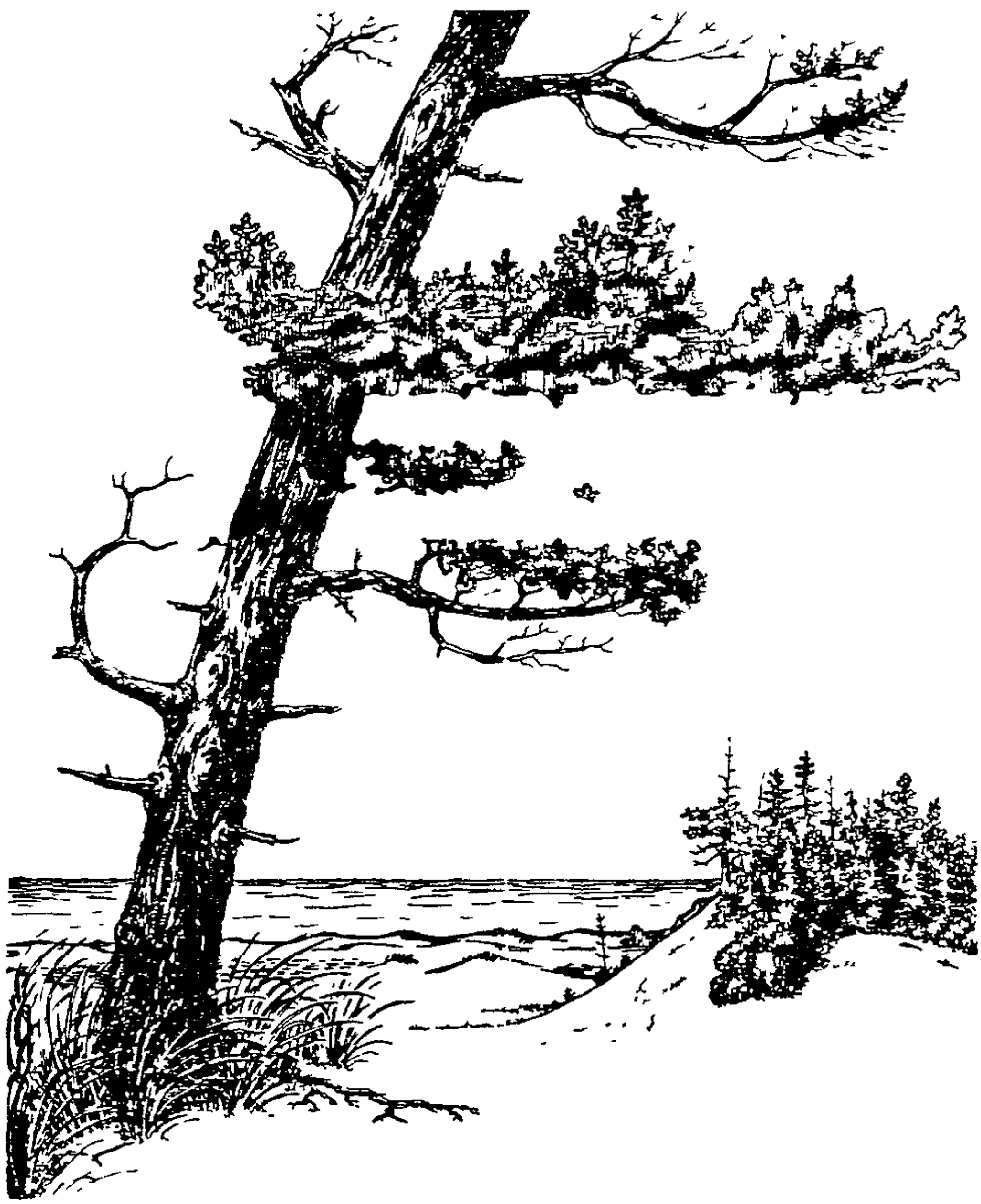
Scenic Protection = Acres with visual quality objectives of preservation, retention, and partial retention

Budget = Annual costs to operate the Forest during the 1st decade

Receipts = Payments to counties.



CHAPTER III
Affected Environment



CHAPTER III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the environment which will be affected by implementation of one of the alternatives The physical and biological characteristics of the Forest are described. Following these are discussions of landownership patterns and the social and economic settings of the Forest.

In the resource elements section of the chapter, the resources, environmental conditions, and Forest land uses significantly affected by the alternatives are discussed. Emphasis is on past, current, and projected conditions, as well as the role of the resource in managing the Forest.

CHANGES BETWEEN DRAFT AND FINAL

Changes were made to Chapter III between the 1986 draft and this final EIS as a result of newer information becoming available and in response to concerns expressed during the public comment period. The following are the major changes:

- Added or expanded discussions of plant associations, diversity and old growth
- Updated discussion of timber supply and demand and data on timber sold and harvested
- Updated domestic water supply information
- Included maps of Oregon silverspot butterfly habitat, bald eagle sites Updated discussion of northern spotted owl relative to 1988 amendment to Regional Guide Updated estimates of habitat capability and wildlife-fish user days.
- Expanded discussion of air quality.
- Updated minerals section regarding application for sand mining at Oregon Dunes National Recreation Area
- Included a map of utility corridors
- Included a section on Wild and Scenic Rivers.

PHYSICAL AND BIOLOGICAL SETTING

The Siuslaw National Forest, located in the Oregon Coast Range is comprised of approximately 631,000 acres About 604,000 acres are steep forest land mostly located between the Pacific Ocean and the crest of the Coast Range, from Tillamook in the north to Reedsport in the south About 27,000 acres of sand dunes and wetlands in a narrow coastal strip from Sea Lion Point (just south of Yachats) to Coos Bay make up most of the remaining Forest (Figure III-1)

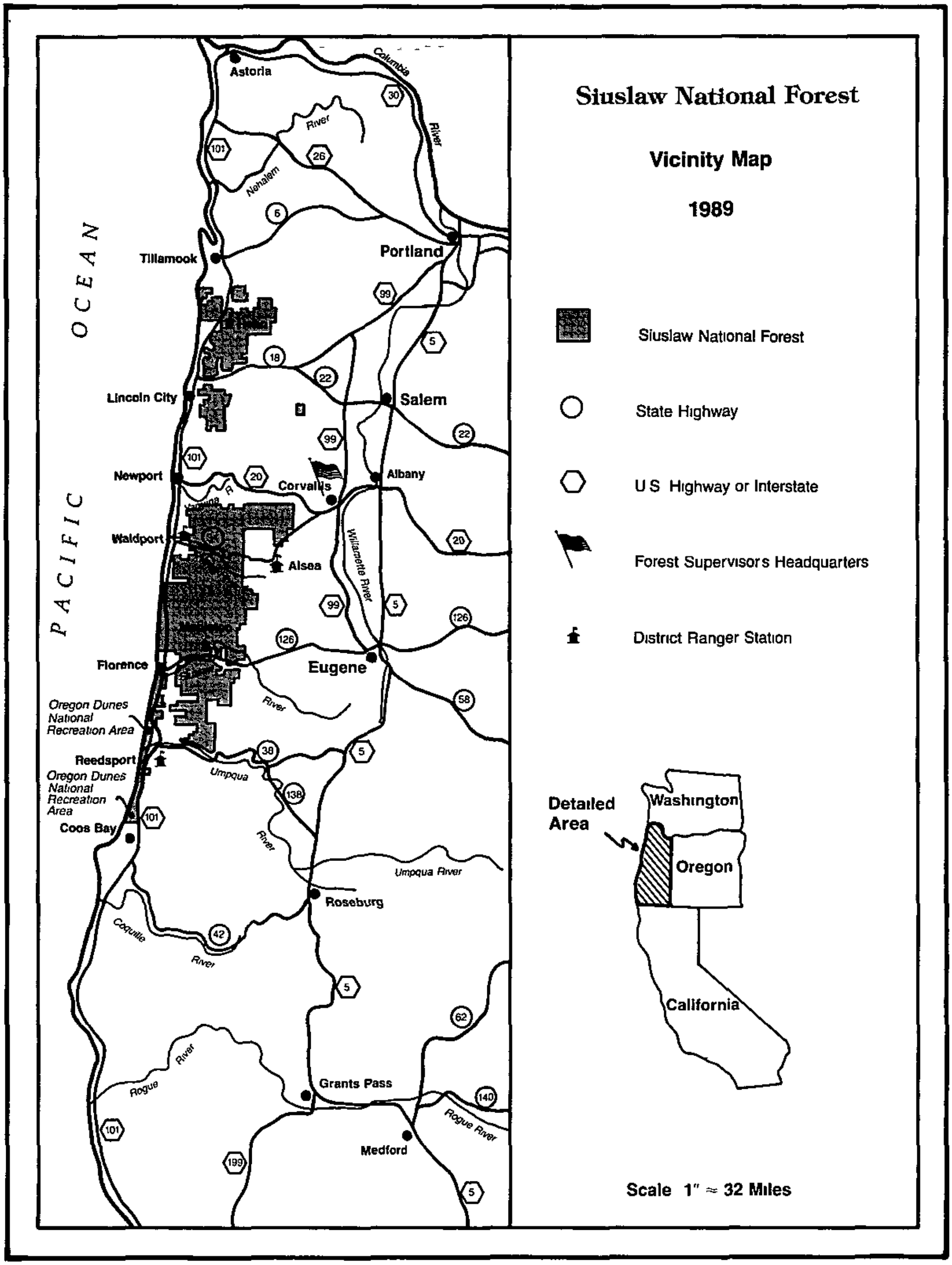


FIGURE III-1 MAP - LOCATION OF THE SIUSLAW NATIONAL FOREST

Topography, Geology, and Soil

The Oregon Coast Range is geologically young. Elevation averages 1500 feet and ranges from sea level to 4000 feet The Coast Range is mostly sedimentary rock with some volcanic flows and scattered intrusive igneous rocks. The bedrock is generally moderately hard to hard, nonpermeable on the steeper slopes, and overlain by shallow to deep soils The soils are well drained and range from loams to clay loams with generally high nutrient levels The combination of fertile soil and mild, wet coastal climate makes the Siuslaw the most productive of the National Forests

Topography is a result of rapid geologic uplifting of the bedrock, high precipitation, and subsequent widespread landslides Weathering of the sedimentary bedrock has created dense dendritic (branched) drainage patterns. The sandstone and siltstone layers generally dip to the west and form a pattern of gentle west-facing slopes and short, steep east-facing slopes (cuestaform lands) (Corliss 1973) Where volcanic or intrusive bedrock dominates, slopes range from gentle to steep, and are often rolling, broken, and uneven with lattice-dendritic drainage patterns These features are largely a result of massive landslides that rearranged whole mountain slopes. Young soils, formed on steep slopes under the influence of the active geologic erosion, are highly unstable in many areas of the Forest. Periods of high intensity rainfall on the steeper slopes, where bedrock is impermeable and soil strength is low, often trigger landslides.

Hard volcanic rocks are responsible for the ruggedly beautiful headlands along the coast, such as Cape Perpetua and Cascade Head Other special features on the Forest include the sandy and rocky ocean beaches, sand dunes, small estuaries and various wetlands (swamps, bogs, and marshes)

Climate

The Coast Range has a maritime climate due to the nearness of the Pacific Ocean and the influence of the Japanese Current. Cool, wet winters and relatively warm, dry summers are characteristic. Low pressure systems feed a stream of cool, moist air from the North Pacific Ocean onto the Oregon coast from November through March The moist air rises over the Coast Range and drops large amounts of precipitation. Occasionally, Arctic air meets an onshore flow, producing snowfall In general, snow persisting for more than a few days is limited to the tops of the highest peaks.

High pressure may develop in winter, producing periods of cold, clear weather and frost High pressure usually develops off the coast during summer, deflecting most storms north into Canada. This high pressure system occasionally breaks down during the late summer, resulting in rain during August and September Although precipitation amounts are typically small, the tendency for summer rain is greatest on the North Coast. Fog occurs often along the coast and inland river valleys during the summer Fog drip may contribute significantly to available moisture during the summer in the immediate coastal strip.

Orographic effects are pronounced in the Oregon Coast Range Major ridges receive substantially more precipitation than nearby lowlands Coastal areas average 75 to 95 inches of precipitation annually, while interior areas west of the summit receive an average of over 120 inches annually The portion of the Forest east of the Coast Range crest averages about 50 inches of precipitation each year

High potential evapotranspiration and low precipitation during warm, sunny summers may produce moisture deficits (Johnsgard 1963) Moisture deficits appear to be more pronounced in the south half of the Forest than in the north half Stands on ridges and exposed south-facing slopes with thin, rocky soils can develop substantial plant moisture stress in late summer, especially at the south end of the Forest

Temperatures are relatively mild. The average annual temperature on the Forest is 50 degrees Fahrenheit The average high in August is 73 degrees Fahrenheit, but summers are hot and dry in the interior of the Forest. Along the coast there is a cool, damp "fog belt" which can extend inland up to one mile The average low in January is 36 degrees In the winter, when high pressure obstructs the onshore flow of relatively warm air, skies clear and nighttime frost may occur. In general, winter conditions allow moderately high rates of evergreen plant photosynthesis In fact, the pattern of relatively warm, moist winters and dry summers may explain the predominance of evergreen forests in the Pacific Northwest as opposed to the deciduous forests of the Northeast (Waring and Franklin, 1979)

Streamflow

Water dominates the Forest. Approximately 5 million acre-feet (1 6 trillion gallons) of precipitation, including minor amounts of snow and fog, fall each year. Because most of this precipitation falls in the winter months, and because very little of it comes in the form of snow, winter streamflows are high and late summer streamflow is very low. Minor flooding is common in the winter. Damage is usually light as the stream channels have the capacity to carry high flows, and because facilities have been designed with the climate in mind Dryness in late summer and early fall may limit the size of cold water fish populations in a few streams

Upland streams rise and fall quickly, as a result of the frequent coastal rainstorms, and flow rapidly through V-shaped canyons The short and steep headwater streams merge into larger streams with gentler gradients and U-shaped or flat flood plains. Most large streams flow into major estuaries which empty into the Pacific Ocean

Vegetation Overview

The Forest includes productive land where more than eight important tree species thrive Conifers dominate, Douglas-fir being the most common Red alder is the most common of several deciduous species present. Sitka spruce is the climax species along the coast, and in the interior it is western hemlock. A climax species is one which would naturally prevail on a site. However, because of major fires in the 1800s, very little climax forest of either type exists today Most of the Coast Range forests are relatively young (80 to 120 years old) and predominately Douglas-fir There are only about 34,000 acres of stands with old-growth characteristics, mostly scattered in the southern half of the Forest.

Ground cover consists mostly of salmonberry, thimbleberry, vine maple, swordfern, salal, and huckleberry but other species are also found. The ground cover tends to be heavy. Disturbed land quickly becomes vegetated as seeds and roots of shrubs and herbs find a hospitable environment. This vegetation often dominates a site within a few years after timber harvest

Lodgepole pine is found in the Oregon Dunes and along the coastal strip In addition to the species found inland, the coastal strip has dense stands of gorse, Scotch broom and European beach grass which dominates the sand dunes on the ocean front. Several State of Oregon sensitive species are found along the coast including *Lycopodium inundatum* (bog club moss) and *Darlingtonia californica* (cobra plant)

Fish and Wildlife

The Coast Range harbors a variety of fish and wildlife Elk and anadromous fish are the primary game species Along with other wildlife, they also attract sightseers. Anadromous fish have a significant commercial value. The Forest contains about 1200 miles of stream habitat for three species of salmon, steelhead trout, and sea-run cutthroat trout. It is one of the few places where fish migrate from the ocean to spawning areas entirely on National Forest land Another 2000 miles of streams provide habitat for resident cutthroat trout and sculpin. Figure III-2 shows major forest streams

The Forest has 330 species of wildlife which use about 50 types of habitat Many of these species are migratory. They benefit from mild winter weather and abundant food in the estuaries and along the beaches Resident species that are hunted, threatened or endangered, unique in Oregon or have some other special attribute include deer, elk, upland birds, spotted owl, bald eagle, pileated woodpecker, marten, shore birds, and the Oregon silverspot butterfly Some of these species are dependent on habitat that is either decreasing or in short supply. Examples are those associated with old-growth conifers or with mature conifers

LAND OWNERSHIP

Land ownership patterns are highly complex around and within the Forest boundary. The Forest boundary encompasses 835,000 acres, 631,000 of which are National Forest System lands Much of the remaining 204,000 acres is managed for timber production by private industrial owners, the State Department of Forestry, the Confederated Tribes of the Siletz, and the USDI Bureau of Land Management (BLM)

SOCIAL AND ECONOMIC SETTING

Settlement Patterns

The land presently administered by the Forest has always provided its human occupants a variety of challenges and benefits The Coast Range was a formidable natural barrier It tended to isolate the Indian cultures along the coast from those of the interior Willamette and Umpqua valleys The Indians, who are known to have occupied the coastal region for nearly 7000 years, were concentrated along the estuaries They subsisted on the plentiful food resources found there and in the nearby ocean and rivers Euro-American mariners, who named a number of the Forest's volcanic headlands in the 18th and 19th centuries, were discouraged from nearing shore by inclement weather, lack of harbors, precipitous cliffs, and the otherwise forbidding environment With the exception of fur trappers, few penetrated the Coast Range Settlement was concentrated in the interior valleys and along the coast

By 1830 former fur trappers for the Hudson's Bay Company were prospering as farmers in the lush and beautiful lower Willamette Valley American missionaries who arrived in 1834 publicized Oregon through letters and preaching back East. This, and scientific and government publications about the Pacific Northwest, helped set the stage for the great overland migrations of thousands of people to the Willamette Valley during the 1840s These pioneers were primarily farmers, and those who survived the Oregon Trail trip generally prospered in the rich, productive bottomlands Other adventurers who were initially attracted to the west by the discovery of gold in California in 1848 and in southwestern Oregon in 1852 eventually settled in the Willamette and Umpqua valleys

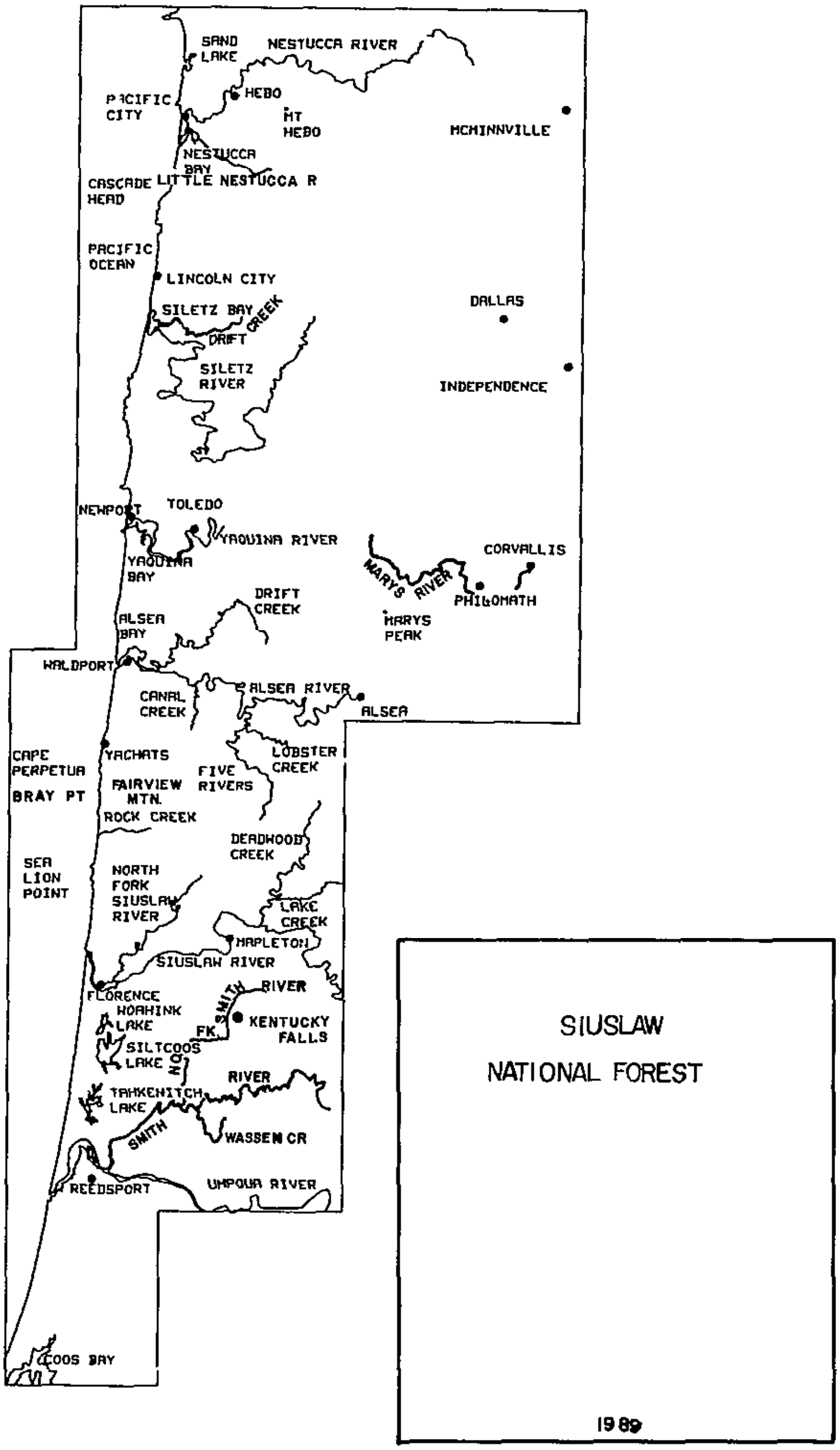


FIGURE III-2. MAJOR FEATURES ON OR ADJACENT TO THE SIUSLAW NATIONAL FOREST

In the early 1850s, the federal government began to play an even greater role in settling the area west of the interior valleys through its land and Indian policies A few settlers were attracted to the smaller valleys like the Alsea by the free lands available through the Oregon Donation Land Act The creation of the Siletz Reservation in 1856 slowed further settlement of much of coastal Oregon. However, the reservation was steadily diminished during the last three decades of the nineteenth century. Settlements spread around the estuaries and up the small river valleys into the densely forested mountains. The government also encouraged development through its exploration, survey, construction of lighthouses, and harbor improvements

Early settlers subsisted through various means, including farming, lumbering, shipbuilding, fishing, and tourism Many of these uses are still present The patterns of use of the Forest's lands are still determined to a large degree by the steep and forested terrain which makes overland travel difficult

Area of Influence

The geographical area of influence is where Forest resources such as timber, fish, recreation, and wildlife are primarily used. The quality of life and social well-being of residents in communities surrounding the Forest are affected by changes in Forest resources and activities.

The area includes eight counties in western Oregon: Benton, Coos, Douglas, Lane, Lincoln, Polk, Tillamook, and Yamhill Counties (Table III-1; Figure III-3). The Forest encompasses 7% of the total land in these counties and is a major supplier of timber, fish and wildlife habitat, domestic and municipal water, and recreation Receipts for commercial products are shared with counties to fund county road and school programs Forest receipts and local expenditures generate employment in the area of influence In addition, the Forest provides recreation opportunities and amenities

Table III-1. Siuslaw National Forest Land (September 30, 1988)

COUNTY	National Forest Land	Other Lands Administered by Forest Service (1)	Total Land Administered by Forest Service
Benton	16,296	1,720	18,016
Coos	10,830		10,830
Douglas	62,918	4,487	67,405
Lane	243,161	238	243,399
Lincoln	172,215	856	173,071
Polk	318	1,161	1,479
Tillamook	92,144		92,144
Yamhill	25 500		25,500
TOTAL	623,382	7,606	631,844

(1) For example, revested Oregon and California Railroad lands and land utilization projects

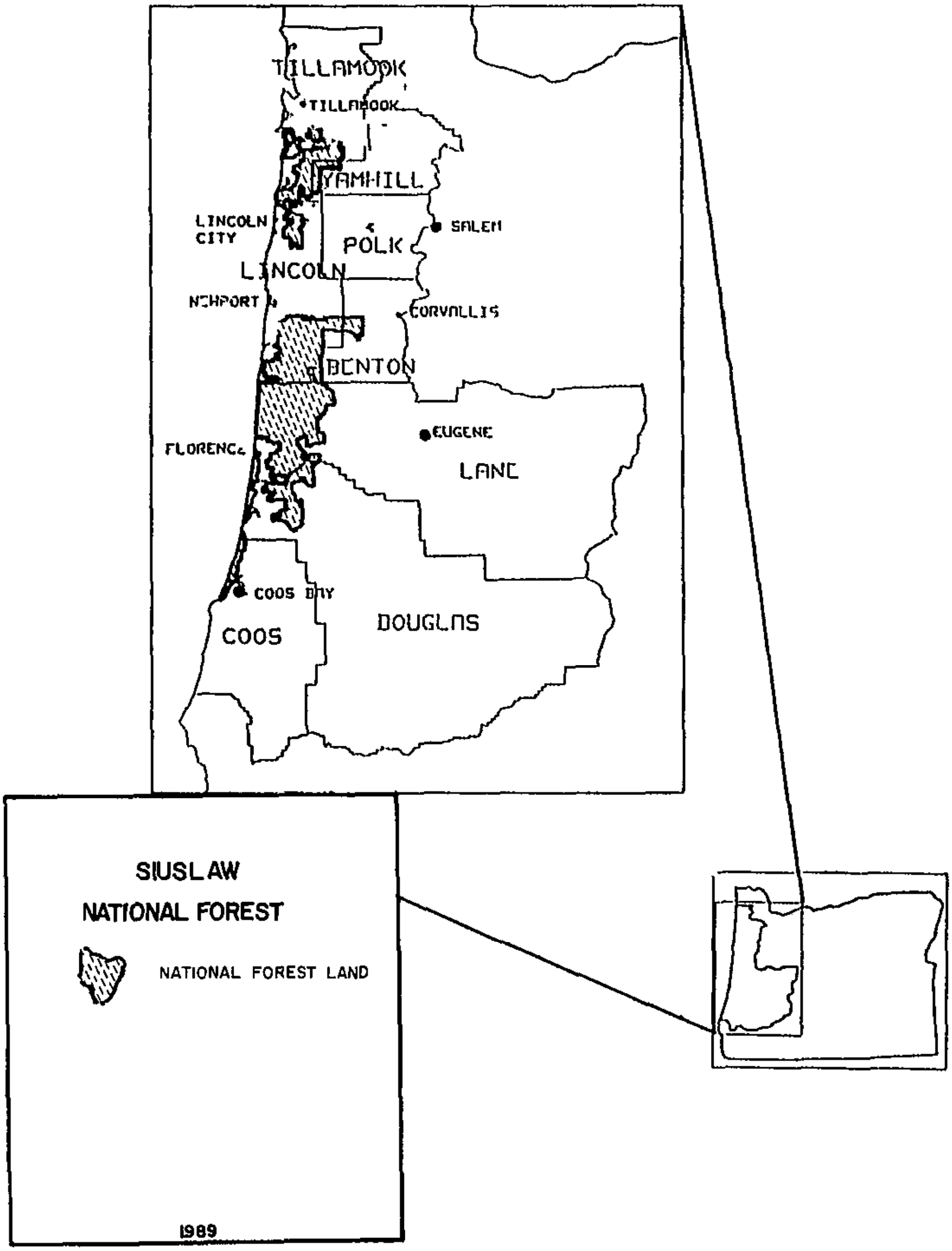


FIGURE III-3 SIUSLAW NATIONAL FOREST AREA OF INFLUENCE

Types of Communities

The eight-county area contains five distinct types of communities: coastal ports, small coastal *communities, mountain communities, small valley communities, and large valley communities* The residents of these communities depend, in varying degrees, on Forest resources Their concern for the quality and nature of the Forest environment also varies Communities adjacent to the Forest are more directly tied to the Forest outputs through their resource based economies Larger urban communities have less economic dependence on the Forest, but are affected by changes in the Forest environment and the quality of recreational opportunities

Changes in the composition of rural populations have expanded the relationship of the Forest with local communities People are moving to the rural areas for the quality of life and the availability of natural resources, and not necessarily for employment. These people include retirees, individuals seeking to escape urban life, and young people seeking self-sufficient, outdoor-oriented lifestyles Their expectations and values often differ from those of long-time residents

Coastal Ports

The economies of coastal ports such as Newport, Coos Bay, and Reedsport are dominated by resource based industries: commercial and sports fishing, fish processing, tourism, and lumber and wood products These communities are interested in expanding their economy by attracting new industries and enlarging existing ones, such as off-season tourism, fish processing, and increasing their role as regional service centers

Small Coastal Communities

Waldport, Florence, and Pacific City are examples of small communities located on bays and rivers along the coast The economies of these communities are also based on commercial and sports fishing, fish processing, tourism, and lumber and wood products Some of these communities are rapidly becoming retirement and second home centers These changes are resulting in different perceptions of the role of economic growth and development

Mountain Communities

Mountain communities such as Alsea, Mapleton, Hebo, and Toledo have timber based economies. In addition, some farming is done along river bottoms. These rural communities are generally within or adjacent to the Forest boundary, and residents' lifestyles center on the natural environment These communities are attracting people from urban areas seeking a different lifestyle. The newcomers' views often conflict with those of long-time residents on management of the Forest for consumption rather than conservation

Small Valley Communities

Many small communities on the edge of the Willamette Valley such as Willamina, Philomath and Monroe have economies dependent on the lumber and wood products industries. They also provide housing for people working in large valley communities

Large Valley Communities

Eugene, Springfield, Salem and Corvallis are large communities in the Willamette Valley that are in the eight-county area. They have more diverse economic bases than smaller valley and mountain communities Government is an important component of the economies of these cities, particularly Salem, the state capital.

The University of Oregon is located in Eugene and Corvallis is home to Oregon State University. The Forest provides educational and recreational opportunities to both university communities The diversity of people associated with the universities leads to a variety of perspectives on issues related to forest management

Population

In 1980, 25% (658,200 people) of Oregon's residents lived in the eight counties surrounding the Forest (Oregon Economic Development Dept 1984). Sixty percent of these people resided in towns and cities having populations greater than 2,500 Twenty-nine percent lived in Eugene, Springfield, and Corvallis.

Between 1950 and 1980, the population in the eight counties increased by 86%. Most of the growth (92%) occurred in communities of more than 2,500. During the 1970s, the population increased by 27% - twice the national average Population increases in Yamhill, Lincoln, and Douglas Counties exceeded 27% during the 1970s, whereas Tillamook and Coos Counties experienced growth rates below average. Rapid growth rates in Yamhill, Lincoln, and Douglas Counties reflected trends of immigration, population shifts to unincorporated areas, and retirement growth in small coastal communities.

The trend of immigration reversed when the recession started in 1979 Counties suffering the highest unemployment, Coos and Douglas, actually lost population between 1979 and 1984. The population was estimated as 672,200 in 1985 (Center for Population Research and Census, cited in Oregon Department of Human Resources 1987)

Although population growth has resumed as the economy strengthened, immigration is not expected to be as rapid as it was in the 1970s (Oregon Department of Human Resources 1985). In the eight-county area, population is expected to grow at a rate of 0 6 to 0.8% per year. Most of the growth is expected along Interstate 5 (Yamhill, Douglas, Lane, and Polk counties) and in small coastal communities. Retirees will continue to move to the coastal communities and working age people will continue to move to areas with expanding manufacturing opportunities Coos and Tillamook counties are expected to grow at a much slower rate.

The number of non-whites in the eight counties surrounding the Forest is small. In the 1980 Census, 4% of the population was classified as non-white The three major non-white groups are: Blacks (0.4% of the population), Asian and Pacific Islanders (1 0%), and American Indians (1 0%). In addition, 2.1% of the white population has Hispanic origins Benton County has the highest percentage of minorities within the eight counties

Employment and Income

Employment in western Oregon has grown during the last decade In general, labor force, unemployment, and employment have followed national economic cycles

In the 1970s, western Oregon experienced rapid growth in population, as well as in the number of people working or seeking work. For example, the labor force in the eight counties grew 50% while population grew 27% between 1970 and 1980 Rapid gains in the labor force reflect a national trend of entry of women and the post-war baby boom generation into the work force.

The labor force continued to increase until mid-1981, decreased in 1982, and then increased modestly in 1983 Employment in the eight counties did not keep pace with the number of people seeking work Unemployment increased steadily between 1978 and 1982, peaked at 12.6% in 1982, and decreased to 11 2% in 1983.

Unemployment for the eight-county area is higher than the state average Between 1976 and 1983, unemployment for the eight-county area varied from 6.6 to 12 6% while for the state it varied from 6.0 to 11.6% In general, Douglas, Tillamook, and Lane counties had the highest unemployment from 1976 to 1983. It peaked at 17.2% in Douglas County in 1982. These high rates reflect the sensitivity of local economies to national economic cycles. Conversely, Benton County had relatively low unemployment (5 3 to 7.4%) during the same time In 1988, unemployment ranged from 3 5% in Benton County to 9.6% in Tillamook County

Employment in western Oregon has not only been growing, but has been shifting from manufacturing to trade and services. Table III-2 displays manufacturing and non-manufacturing employment within the eight-county area for 1972, 1978, 1982 and 1987 Employment increased 31% between 1972 and 1978 Eighty percent of this growth was in the trade, services, and government sectors Between 1978 and 1982, employment decreased 10%. 11,400 jobs were lost in the lumber and wood products sector, and 10,200 jobs were lost in non-manufacturing sectors Employment losses were partially offset by the creation of 2,700 jobs in other manufacturing and service sectors

Employment in 1982 was still higher than in 1972, although lower than in 1978 Lumber and wood products are major components of the economy in western Oregon; however, their relative importance decreased since 1972 In 1972, 77% of manufacturing employment within the eight counties involved the lumber and wood products industry This decreased to 71% in 1978, 59% in 1982, and 56% in 1987 Even though the importance of employment in these industries has continued to decline, it still accounted for 11% to 20% of the total employment in Coos, Douglas, Lane, and Tillamook counties in 1987

Table III-2. Nonagricultural Wage and Salary Employment

TOTAL EMPLOYMENT (M Employees)	1972	1978	1982	1987
TOTAL MANUFACTURING	43 1	45 8	36 2	50 7
Lumber and Wood Products	33 2	32 7	21 3	28 6
Other Durable Goods	3 4	6 3	7 2	11 8
Food and Kindred Products	3 0	2 9	2 9	4 9
Other Nondurable Goods	3 6	4 0	4 7	5 2
TOTAL NONMANUFACTURING	108.4	152 8	142 6	165 5
Construction	6 3	9 1	5 1	6 7
Transportation, Communication and Utilities	8 7	9 6	8 6	8 4
Trade	29 6	44 0	40 2	53 5
Finance, Insurance, Real Estate	5 6	8 6	8 1	7 9
Services	20 8	32 6	33 7	43 5
Government	37 5	48 9	46 9	45 5

SOURCE Oregon Employment Division

Figure III-4 displays average income per job in the eight counties within the Forest boundary in 1982 and 1987. Personal income has increased slowly in recent years When expressed in constant $1982 dollars, purchasing power appears to have declined in all but Benton County Owing to the presence of Oregon State University, which employs over a quarter of the county's work force, Benton County has enjoyed a relatively stable economy. Benton County's gains in personal income in the last decade have accompanied growth in electronics manufacturing.

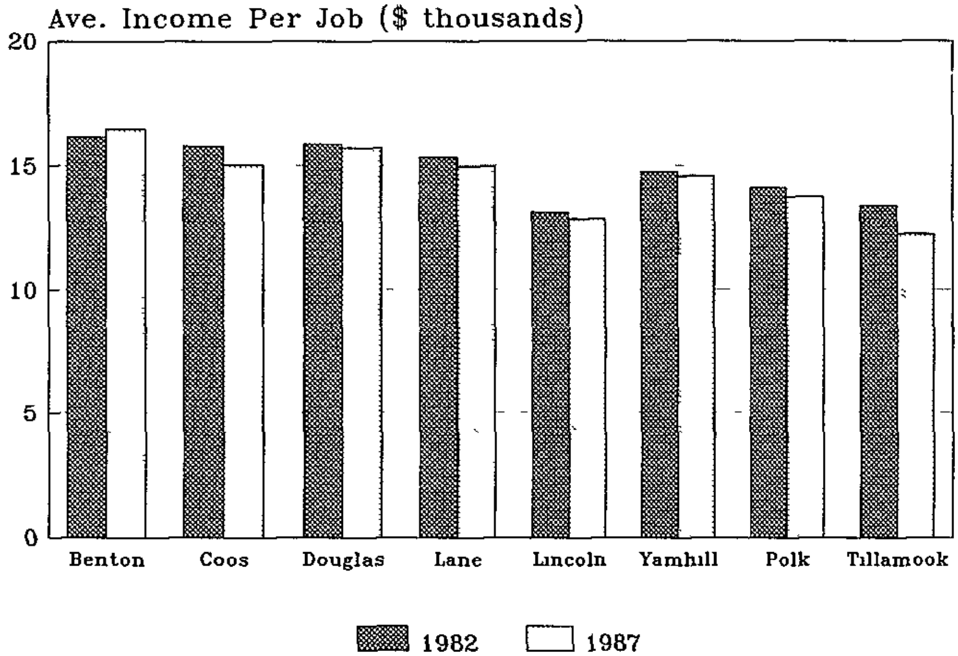
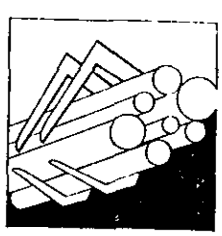


FIGURE III-4. INCOME PER JOB IN 8-COUNTY AREA 1982 AND 1987 (1982 dollars)

Forest Receipts and Expenditures

The amount of money received from the sale of Forest resources and the amount spent to operate the Forest not only affect cash flows from the U.S Treasury, but also affect local communities Twenty-five percent of the gross receipts collected on the Forest is distributed to counties for school and road programs In addition, a portion of Forest Service costs is spent locally on salaries, services, and supplies. Figure III-5 shows the receipts from Forest outputs, Forest Service payments to counties, and costs of Forest operations for 1979-1988, adjusted for inflation to 1982



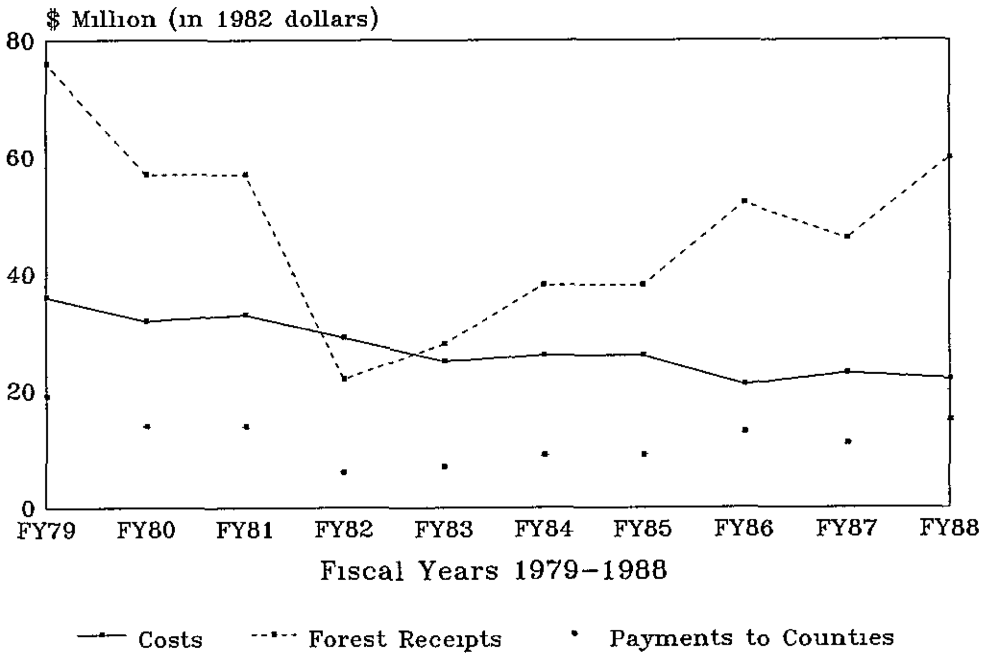


FIGURE III-5 FOREST RECEIPTS, COSTS, AND PAYMENTS TO COUNTIES

Between fiscal years 1984 and 1988, Forest receipts averaged $47 million per year (adjusted for inflation to 1982 dollars) while annual costs including purchaser road credit averaged $24 million Twenty-five percent of the receipts, or $12 million per year were distributed to counties. (Over the years 1979 to 1988, annual receipts also averaged $47 million and annual costs average $27 million) Changes in the level of receipts reflect the economic cycles in the lumber and wood products sectors while changes in Forest Service costs reflect congressional budget appropriations

Ninety-nine percent of the receipts came from timber sales, collections on timber sales, and in-kind payments for roads built by timber sale purchasers The remaining fees were collected for special use permits, mineral leases, powerlines, campground use, and grazing allotments The local share of the receipts is prorated on the amount of Forest land within each county: 39% to Lane County, 27% to Lincoln County, 15% to Tillamook County, and the remaining 19% to Benton, Coos, Douglas, Polk, and Yamhill counties

Between fiscal years 1984 and 1988, 62% of the costs were related to timber management activities including road construction and maintenance, 10% to Job Corps, 9% to general administration, 4% to recreation, 2% to management of wildlife, fish, grazing, soil, water, and 11% for minerals, real estate, fire protection facilities, and law enforcement

VEGETATION

Plant Associations

Plant associations indicate environmental and biological characteristics of a site. Plant associations are identified through intensive survey and analysis Properly classifying a site according to established plant associations allows prediction of how a site and stand will respond to disturbance or what succession of vegetation may occur without disturbance. Plant association does not change with disturbance, but the seral vegetation on a site will change through time or as a result of disturbance.

There are two major series of plant associations on the Siuslaw National Forest portion of the Oregon Coast Range. Seven plant associations occur in the Sitka spruce series along the coastal fog belt Inland, there are 16 plant associations in the western hemlock series. For certain planning purposes, these are combined into four Sitka spruce plant association groups and five western hemlock plant association groups.

The occurrence of the series or zones is strongly influenced by proximity to the Pacific Ocean and its effect on moisture and temperature. Aspect, steepness of slope, slope position, soil texture and soil depth play a role in determining which of the plant associations will occupy a site within each series.

The following discussion summarizes the occurrence of plant associations on the Siuslaw National Forest. For detailed information see Hemstrom and Logan (1986)

Geographic Patterns

Two major geographical trends in plant species occur on the Siuslaw National Forest:

1 A shift from maritime conditions near the ocean to inland conditions over the first ridges.
2. An increase in temperatures and evapotranspiration from north to south.

A steep cline exists between near-ocean maritime conditions and interior conditions. The near-ocean, strongly maritime condition is more pronounced at the north end of the Forest and coincides with the rise from sea level to the first high ridges. Climatic conditions include frequent summer fog, relatively small annual temperature variation, minor summer plant moisture stress, and a steep gradient of annual precipitation from 80 inches or less on lowlands to over 100 inches on ridges only 4 or 5 miles away

The Sitka spruce zone lies within this strongly maritime climatic area, extending inland only a short distance along rivers Slope aspect in this zone has relatively minor effects on plant geography Figure III-6 shows a typical pattern of plant associations in the Sitka spruce zone Salmonberry, salal, and swordfern are the most common understory species Salal and Sitka spruce are salt spray tolerant. The Sitka spruce/salal association is common on wind-beaten headlands Some of the highest forest productivity in the world has been measured in stands of Sitka spruce and western hemlock at Cascade Head (Fujimori 1971)

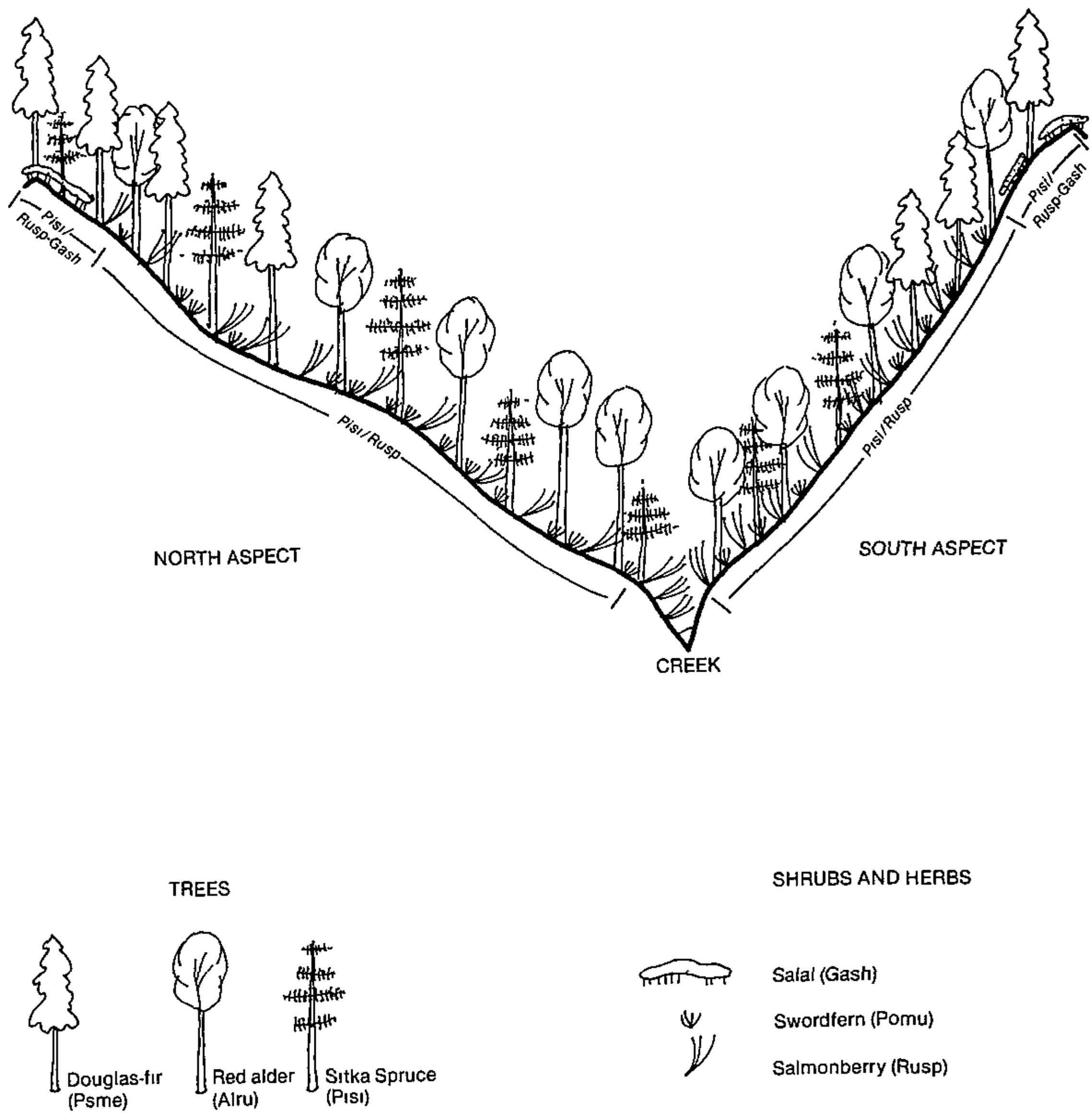


FIGURE III-6. TYPICAL PATTERN OF PLANT ASSOCIATIONS IN SITKA SPRUCE ZONE

Conditions change inland over the first major ridges. While the climate is still generally maritime, temperatures fluctuate more; summer fog is not as common; and slopes are steeper and soils usually more well-drained. Sitka spruce is absent or very rare. Slope aspect has a more pronounced effect on species geography. On south-facing slopes with thin soils, vine maple, salal, swordfern, and (to the south) rhododendron are the most common species (Figure III-7).

The second major plant geographical cline is from north to south. The climatic and soils conditions responsible are not clear, but probably include increasing summer air temperatures, increasing evapotranspiration, and steeper slopes with poorer soils, (a result of changes in geology) At the south end of the Forest, particularly inland, species composition and plant associations are more similar to those of low elevation Cascades stands. Rhododendron, salal, dwarf Oregongrape and even dry-site species like madrone, poisonoak, and hairy honeysuckle become important stand components especially on south facing slopes (Figure III-8). At the north end of the Forest, species more typical of the cooler climates at higher elevations in the Cascades are common; including fool's huckleberry, queencup beadlily, Alaska huckleberry, and devil's club. This pattern indicates a substantially cooler climate to the north. A possible reason might be more clear weather and hot summer days at the south end (Hemstrom and Logan 1986).

Natural Disturbance and Succession

Natural distrubances and successional paths in the central Oregon Coast Range differ from those of the Cascades Mountain Range. While most stands in the Cascades have not burned catastrophically for at least 200 years, few stands in the Coast Range are over 120 years old. Stands in the Oregon Cascades also experience more frequent low intensity fires (Means 1980) compared to the Coast Range Except for isolated patches, unburned old-growth stands are rare in the Oregon Coast Range (Juday 1977) Morris (1934) and Juday (1977) list several major fires since 1840 (Table III-3). These human caused fires are, for the most part, responsible for the age classes present on the forest today.

Table III-3. Major Fires in the Coast Range

Date	Location
1849	Florence Fire between the Siletz and Siuslaw Rivers, 500,000 acres
1853	Nestucca Fire, 300,000 acres
1868	Yaquina, Alsea Basin
1868	Coos Bay to north of the Umpqua River, 300,000 acres
1890	Nestucca Drainage
1902	Reburn of the 1890 Nestucca Burn
1910	Mount Hebo Burn, 8,000 acres
1929	Alsea Fire, 16,400 acres
1933	Tillamook Fire I, 261,640 acres
1939	Tillamook Fire II, 217,000 acres
1939	Smith River Burn, 44,000 acres
1945	Tillamook Fire III, 173,000 acres
1951	Tillamook Fire IV, 50,000 acres
1951	Vincent Creek Burn, 32,000 acres
1966	Oxbow Burn, 43,000 acres

Areas that burned often reburned within a few decades leaving charred and scattered surviving old trees The pattern of reburn also eliminated relatively fire sensitive western hemlock and western redcedar from large areas Fire frequency and intensity appear to have been lower in the coastal Sitka spruce zone.

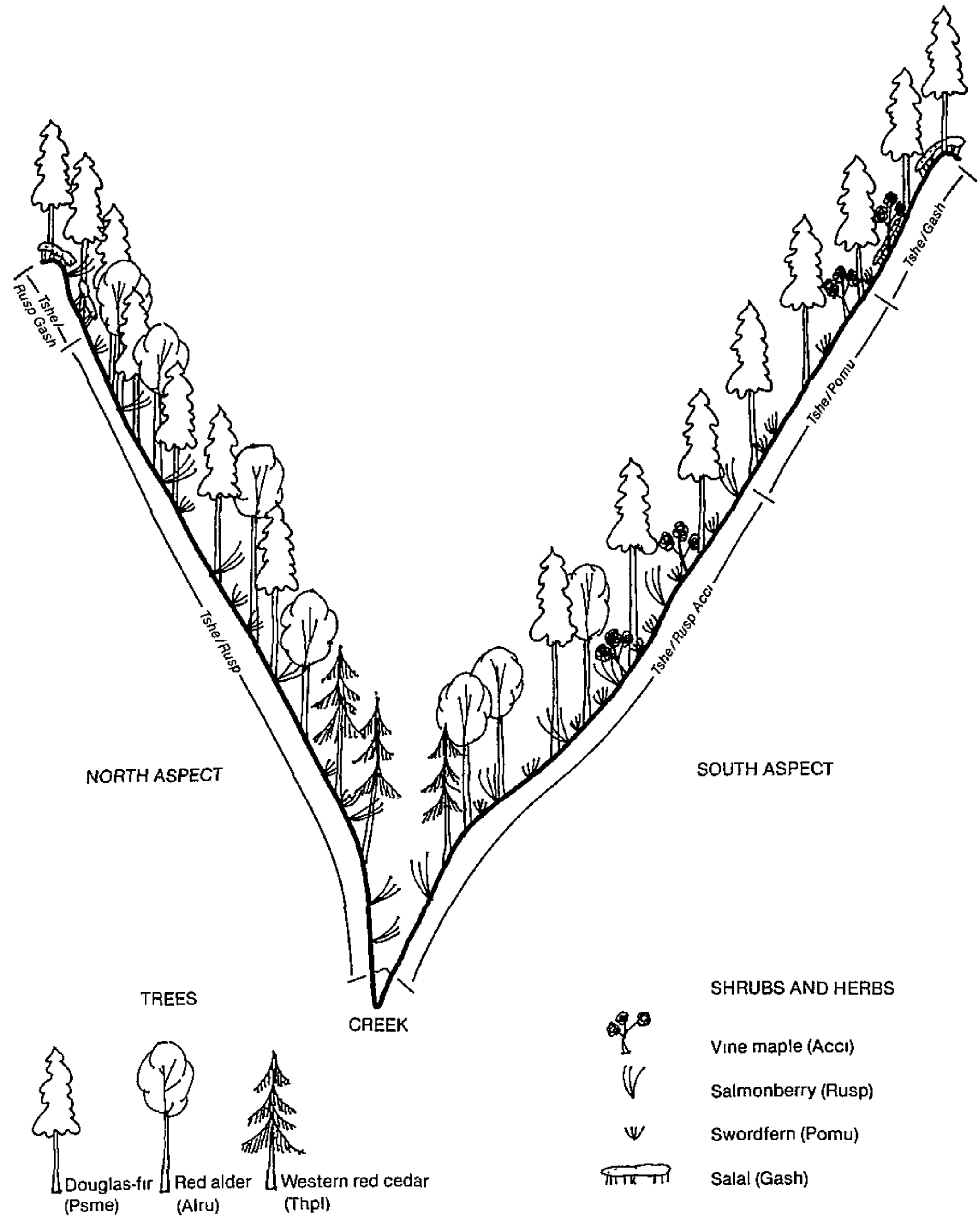


FIGURE III-7. TYPICAL PATTERN OF PLANT ASSOCIATIONS IN WESTERN HEMLOCK ZONE

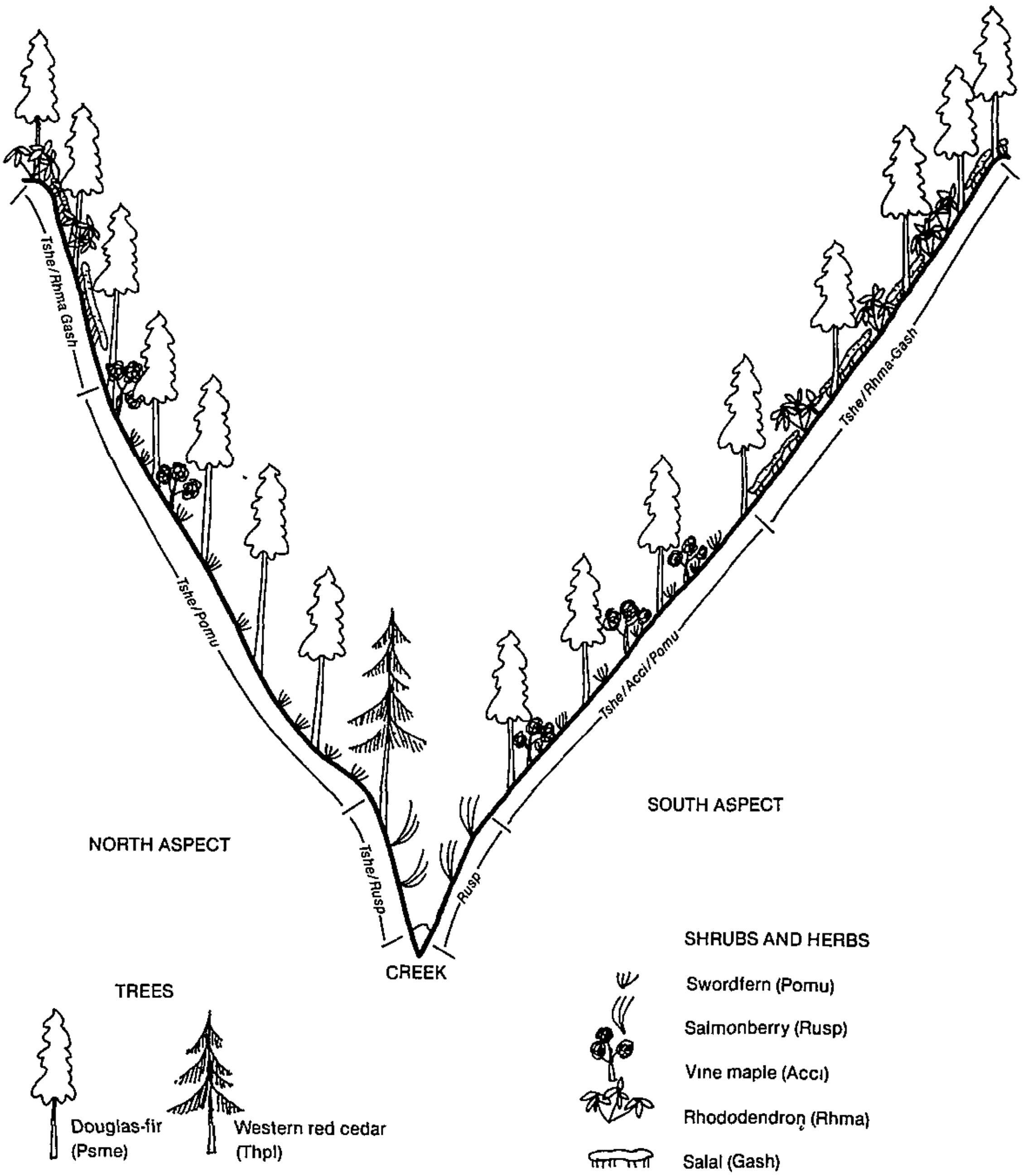


FIGURE III-8. TYPICAL PATTERN OF PLANT ASSOCIATIONS IN SOUTH END OF WESTERN HEMLOCK ZONE

Winds of hurricane force (over 74 mph) strike the Oregon Coast several times each winter (Badura et al. 1974) and occasionally exceed 100 mph at the top of Mt Hebo. Blowdown resulting from these storms can be substantial The Columbus Day storm (October 12, 1962) blew down 11 billion board feet of timber in Oregon and Washington, including large amounts on the Siuslaw National Forest Other documented major windstorms in Oregon and Washington occurred in November 1953, April 1957, February 1958, March 1963, January 1921, and January 1880 (Lynott and Cramer 1966). In general, wind storms speed successional development by opening the canopy and releasing suppressed understory climax species (Dale et al 1983).

Successional patterns have been documented for some coastal environments (Fonda 1974; Alaback 1982; Henderson 1978). Long-term natural stand development depends on several factors including disturbance type and intensity, disturbance frequency, seed source availability, and local environmental conditions A typical sequence following an intense fire would be:

1 Herbaceous phase (0 to 5 years)
2 Shrub phase (5 to 15 years)
3. Douglas-fir phase (15 to 500 years)
4. Climax conifer

Succession modeling indicates that Douglas-fir continues to dominate stand structure as long as it survives (Dale et al. 1983) After Douglas-fir density drops below about three trees per acre, the stand goes through a period of adjustment to climax composition and structure Very few examples of climax condition are found on the Siuslaw National Forest Recent fires have precluded successional development to old growth over most of the Forest

Stands generally reach closed-canopy conditions by age 10 to 15 Cover of understory shrubs and herbs drops sharply as a function of reduced light and remains low until natural or prescribed thinning opens the canopy By age 60, stand canopies are opening sufficiently to allow development of shrub and herb layers that persist into old growth and, presumably, climax. The salmonberry associations often contrast with this general pattern under natural conditions. Competition by dense shrub layers during the first 3 years following disturbance often prevent establishment of a well-stocked conifer stand Red alder is the only tree with a juvenile height growth which regularly exceeds salmonberry. Consequently, the salmonberry plant associations often support stands of red alder with widely spaced conifers and a dense shrub understory. One possible consequence of natural seral development is powerful selective pressure for rapid juvenile height growth in conifers On other sites, salal associations in particular, selective pressures would be less powerful for juvenile height growth and more for drought resistance

Many sites go through a red alder dominated stage following disturbance. Red alder seeds germinate and grow rapidly on exposed mineral soil in full sunlight Three to 5 years following disturbance, alder begins rapid height growth which allows it to overtake and suppress conifers. During the next 100 to 150 years, shade tolerant conifers may accumulate in the understory and slowly break into the canopy If seeds from shade tolerant conifers do not reach the stand, it eventually becomes a brushfield with scattered large Douglas-fir as the alder become senescent and die by age 150 Figure III-9 shows successional paths in the western hemlock/salmonberry plant association Eventually, shade tolerant conifer seed may reach the area or a new disturbance occurs There are no clear examples of this path since very few stands are over 120 years old The red alder stage may be important to long-term site fertility and checking the spread of *Phellinus weirii* root rot

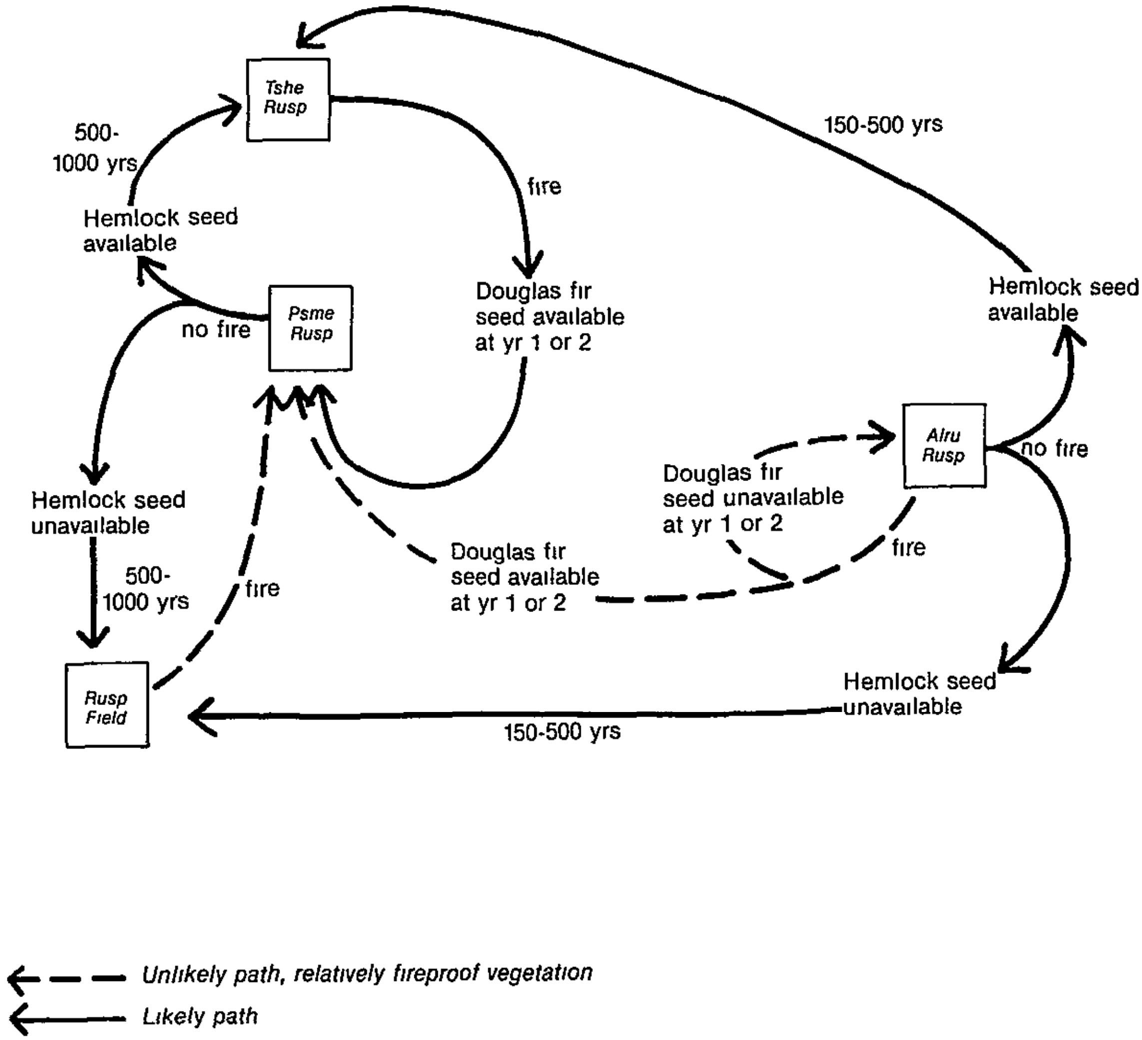


FIGURE III-9. WESTERN HEMLOCK/SALMONBERRY SUCCESSIONAL PATHS

Biological disturbances, including insects and root rots, are additional elements in stand development For example, the growth of Sitka spruce may be substantially limited by Sitka spruce weevil (Overhulser et al 1974). Occasionally, Douglas-fir bark beetles decimate large quantities of timber, often where many trees have been blown down Infestations of bark beetles are usually a symptom of stress such as insufficient moisture or physical damage Once beetles are attracted to stressed timber, they attack adjacent healthy trees of any age Young trees are rarely killed The trees most susceptible to bark beetles are between 80 and 180 years old (Berg 1970, Furness and Orr 1970). Prompt removal of the downed timber can reduce the spread of bark beetles into healthy trees

Laminated root rot, *Phellinus weirii*, is a wide spread pathogen. Pathologists estimate that about 7 5% of the forest is infected. Infected trees die or are blown down after the root system is weakened (Childs 1970; Childs and Nelson 1971) *Phellinus* occurs in patches of 1 acre or larger. These areas cannot produce a full yield of conifers Hardwood species are immune to *Phellinus* infection and a rotation of these species may be necessary before susceptible conifers can again fully occupy a site

Stand structure is an important result of successional development. Successional sequences lasting more than 150 years in conifer stands allow large accumulations of standing live and standing and down dead trees. Large live and dead boles fulfill many important ecosystem functions including: wildlife habitat, long-term nutrient storage, sites for nitrogen fixation, and sources for large woody debris in streams that provide important energy bases and channel stability (Franklin et al. 1981; Maser et al 1981) Large, continuous acreages of conifer stands over 150 years old are not common outside the Marys Peak watershed.

Live trees can grow to old-growth dimensions (e g , greater than 32 inches in diameter) relatively quickly on high quality sites, but large dead woody debris accumulates more slowly Alder dominated stands do not produce large amounts of decay-resistant woody debris, unless they are replaced by shade tolerant conifers in late succession Likewise, managed stands do not develop large standing and down dead wood accumulations, unless management practices are designed to produce large dead wood (Brown 1985)

As a result of disturbance, competition, and successional patterns, salmonberry dominated communities have become widespread. Given a sufficiently long time period and a seed source for shade-tolerant conifers, many of these sites would probably develop into swordfern or oxalis communities In fact, clearcut harvesting followed by slashburning, conifer planting, and release treatments may convert sites currently dominated by salmonberry to swordfern or oxalis types There are a good many sites, however, where salmonberry will not be eliminated and will recover when the canopy opens past age 50 Most salmonberry sites in mature stands, between 90 and 140 years old, show no signs of conversion to other communities for at least the next century. These can be considered potential natural vegetation and called plant associations. Given the apparent pattern of catastrophic fire every 300 to 500 years, they can also be considered fire climax types (Daubenmire 1968)

Management Activities and Successional Patterns

Figure III-10 and the following descriptions of stand conditions and time intervals that vegetation may be expected to stay in a stand condition are based on conditions that normally develop after clearcut harvesting on the Forest Variations of these generalized descriptions will occur with different silvicultural treatments

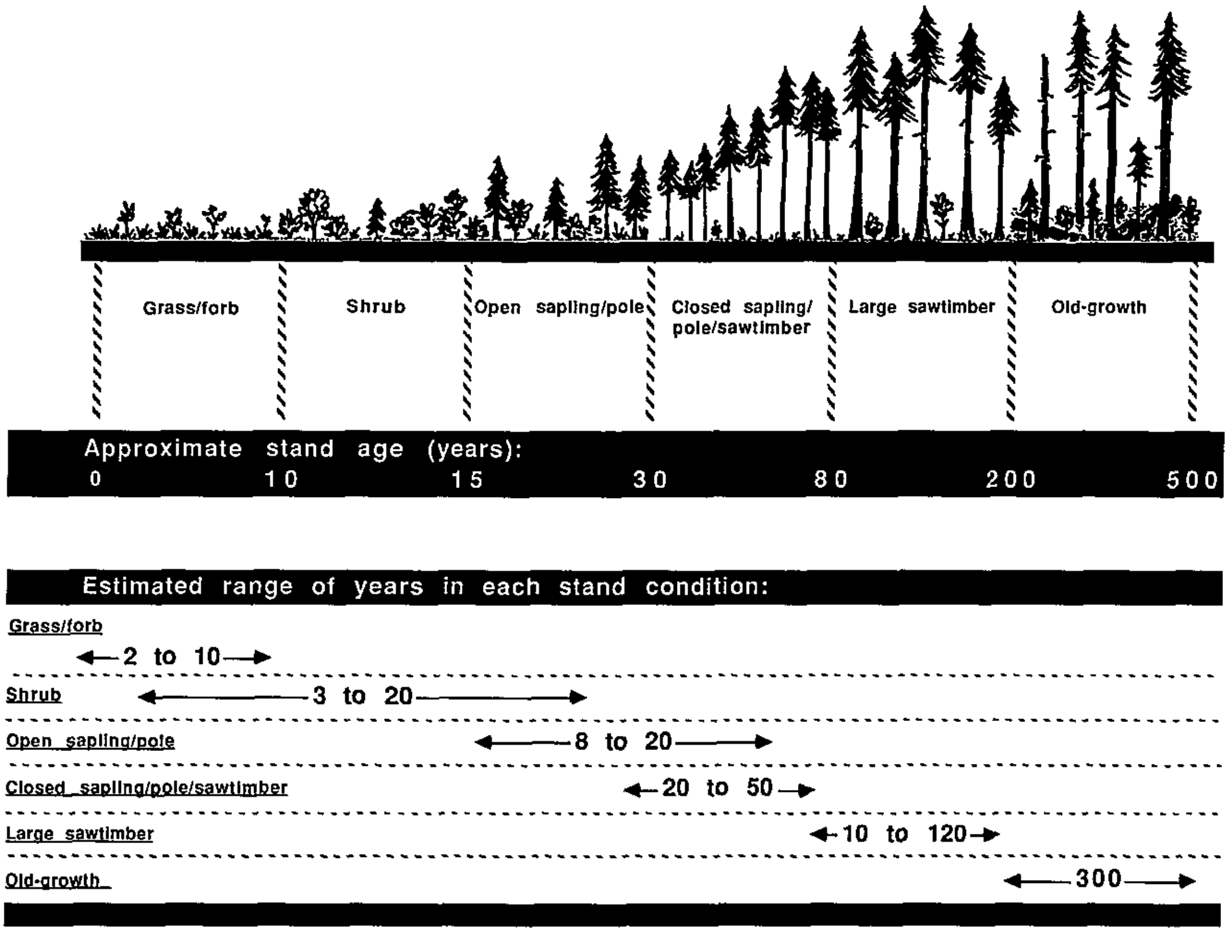


FIGURE III-10. SUCCESSION OF STAND CONDITIONS

If the harvest unit is broadcast burned, the grass/forb stand condition lasts 2 to 5 years and occasionally 10 years. After timber harvest and slash removal, resident herbs and new plants from windblown seed quickly dominate the site and give the unit a grass-forb appearance Shrubs and trees that sprout or are planted are not yet dominant.

If the unit is not broadcast burned, residual shrub species will more rapidly occupy the site and fewer windblown seeds of herbs and shrubs will invade the site. The result is that the grass/forb stage is shortened or bypassed. The shrub stand condition usually lasts 3 to 10 years but may remain for 20 years or more if tree regeneration is delayed Shrubs become the dominant vegetation providing habitat for wildlife that is different from the grass/forb stand condition Tree regeneration may be common, but trees are generally less than 10 feet tall and provide less than 30% of the crown cover Past management has included reducing competitive vegetation to allow conifers to grow.

The open sapling/pole stand condition occurs when trees exceed 10 feet in height but still have less than 60% crown canopy when they reach 1 inch d b h. A dominant shrub understory is common. This *open sapling/pole condition is very different from closed sapling/pole where tree crown cover exceeds* 60% at one inch d b h. or larger. The open sapling/pole stage may be bypassed if initial tree densities exceed 400 trees per acre. On the other hand, the open sapling/pole stand condition can be maintained or created with thinning Length of time in this condition depends on tree crown closure and subsequent stand treatment. It may last from 8 to 20 years.

Closed sapling/pole stands have very little ground vegetation because of the closed canopy. Tree crown cover exceeds 60% and often reaches 100%. Length of time in this stand condition can range from 20 to 50 years. The time is determined by rotation age and thinning treatment If stands are thinned and long rotations used, this stand condition can change to mature conifer.

None of the managed stands presently on the Forest are older than 50 years. The oldest of these are pole stands that are just beginning to acquire characteristics of mature conifer stands.

The managed mature conifer stand condition will be characterized by trees with an average diameter of 21 inches or larger Conifers will exceed 150 feet in height, and their crown cover generally will be less than 100%, permitting the development of ground vegetation With this stand condition under intensive timber management, diameters of trees may approach diameters of old growth but the very *large snags and high volumes of large down material characteristic of old growth will be lacking unless* specifically designed during silvicultural treatments (Natural mature conifer stands can have nearly as much standing and down woody material as old-growth stands) Duration of the managed mature conifer stand condition will be determined by rotation age and thinning treatments If mortality and decay are regularly minimized by thinning, this condition will last for many years; but such a stand will lack the snag component necessary for cavity nesters and the down woody material essential for many wildlife species

Old-growth stand conditions are characterized by decadence of live trees, snags, down woody material, and replacement of some of the long-lived pioneer species such as Douglas-fir by climax species such as western hemlock Stands often have two or more layers with large diameter overstory trees commonly older than 200 years. Overstory crown closure is normally less than 70%. Unless specifically planned for, occurrence of these old growth characteristics will be delayed in managed stands Old growth is discussed in more detail in a later section of this chapter.

DIVERSITY

Planning regulations define diversity as "the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan" (36 CFR 219.3). The environmentally determined occurrence of plant associations, natural disturbance and succession, and management activities all affect diversity on the Forest Focus of discussion in the FEIS and for planning purposes is on diversity of habitats. Diversity of animal species is assumed to coincide with diversity of habitats. Estimates of some animal populations are in the wildlife sections of FEIS, Chapter III and Chapter IV.

Because there is no specific index of diversity available for the Siuslaw National Forest, cover types and plant associations are displayed to indicate diversity of species and habitats. (See preceding section on "Vegetation" for a discussion of plant associations.) Both area (abundance) and spatial distribution of habitats are important diversity considerations. Because of the limits of the available data, cover types and plant associations can be displayed forest wide and by ranger district, but not for individual drainages or subbasins. The updated 1974 timber inventory and the 1986 vegetation resource inventory are the sources of the data shown in Tables III-4, III-5, III-6, III-7, and III-8.

Current Situation

In general, the age structure and species composition of tree cover across the Forest is not highly diverse, especially compared with other forests of the Pacific Northwest Because of the widespread occurrence of fires on the Forest in the 1800s the majority (58%) of the existing tree cover is in the 80-to-120 year age group The next largest age groups are 20-to-50 years old (19%) and the 10 year old group (10%). These younger groups reflect the pattern of timber harvest, most of which has occurred since the early 1950s. Over three-fourths of the Forest is in conifer cover. See Table III-4

Plant association data exhibits slightly more diversity than the tree cover because it is based on shrub species as well as potential or climax tree species. Twenty-eight percent of the Forest is in the Sitka spruce zone and 72% is in the western hemlock zone.

In the Sitka spruce zone, swordfern plant association and salmonberry plant association each occupy 12% of the Forest. In the western hemlock zone, swordfern is also the most common plant association where it occurs on 25% of the Forest. Salmonberry plant association and salal plant association each cover 19% of the Forest in the western hemlock zone; see Table III-5

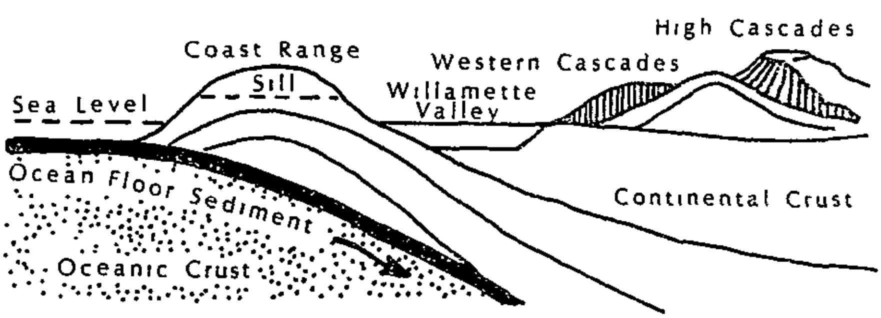


Table III-4. Acres of Existing Cover Types and Age Groups

Age Groups	Upland Acres				Riparian Acres	
	DF(1)	DF/RA(2)	RA/DF(3)	RA(4)	RA/DF	RA
10	56,100					900
20-50	86,700	4,500				16,000
60-70	42,700					
80-120	155,000	65,600	58,400		59,600	
130-190						
200+	19,300	14,500				
TOTAL	359,800	84,600	58,400		59,600	16,900

SOURCE FORPLAN data base, updated 1974 inventory
(1) DF is stands with 90% or more of canopy cover in conifers
(2) DF/RA is stands with 50-89% of canopy cover in conifers, the rest in hardwoods
(3) RA/DF is stands with less than 50% canopy cover in conifers, the rest hardwoods
(4) RA is less than 10% of canopy cover in conifers, the rest hardwoods

Table III-5. Acres of Plant Association Groups

Plant Association Group	Ranger District				
	HEBO	MAPLETON	ALSEA	WALDPORT	FOREST WIDE
SITKA SPRUCE					
SALMONBERRY (PR)	38,000	7,200		20,000	65,200
SALMONBERRY-SALAL (PRG)	1,800	900		2,400	5,100
SWORDFERN (PPO)	40,500	3,100		23,200	66,800
SALAL (PG)	5,900	1,500		12,500	19,900
WESTERN HEMLOCK					
SALMONBERRY (TRU)	19,100	43,000	23,200	20,400	105,700
SALMONBERRY-SALAL (TRG)	900	1,100	400	1,300	3,700
SWORDFERN (TPO)	16,900	61,300	38,200	25,300	141,700
SALAL (TGA)	14,200	31,200	38,500	25,000	108,900
RHODODENDRON (TRH)		37,000	1,200	500	38,700

SOURCE 1986 Vegetation Resource Inventory Oregon Dunes NRA data not available, does not include non-forested lands

The forested lands shown in Table III-4 include about 800 acres of noble fir stands on Marys Peak These are stands of medium and large diameter trees at high elevation (above 3000 feet). In addition to the forested lands shown in the above tables, there are 38,300 acres of non-forest land that include lakes, streams and wetlands; meadows; sand dunes, and shore pine (lodgepole, *Pinus contorta*) on old dunes. All of the non-forest lands provide an important element of diversity in the Forest. A survey of vegetation on the Oregon Dunes National Recreation Area is being completed in 1989 Campgrounds, roads, and other administrative sites, occupying 11,500 acres of the Forest, provide little diversity

Table III-6. Acres of Existing "Non-forest" Habitats

Water	Permanent Meadows	Sand Dunes	Shore Pine
4,700	1,300	30,300	2,000

Historic Trends

Fire has been the dominant disturbance factor Historical records note the widespread destruction of old-growth forests by wildfires. Burned areas were replaced by new forests that were predominantly Douglas-fir. Where hardwoods did occur after the fires they have been gradually replaced by mixed conifer/hardwood stands. The trend since the fires was toward older forests until the 1950s when timber harvest began removing the mature stands. Reforestation of harvested areas has increased the proportion of young conifer stands.

Future Trends

All of the **non-forest** habitats shown in Table III-6 are in areas that would not be harvested under existing plans Table III-7 shows **forested** lands in Wildernesses and other non suitable lands that would not be harvested. Among the lands not to be harvested, there is a higher proportion of mixed conifer and hardwood stands (DF/RA and RA/DF) than in the areas to be cut These mixed stands would persist on the reserved and non-suitable lands Within 30 to 60 years they would give way to more conifers or be replaced by brushfields (see "Vegetation" in this chapter) Eventually, the non-harvested lands would be occupied by mature and old-growth conifers On lands suitable for timber production, most stands would be replaced by conifers following harvest. These managed stands would not reach old growth conditions before being harvested.

Plant associations will continue to persist as displayed in Table III-5 since they represent potential vegetation on a site Depending on natural and human caused disturbance the age classes of vegetation occupying a site will vary Species composition in early seral stages may vary widely, especially following a severe disturbance. Eventually species composition will tend toward what is typical for the given plant association (See "Vegetation" in this chapter and especially Hemstrom and Logan, 1986)

Table III-7. Cover Type, Age Group and Suitability of Forested Lands

	WILDERNESS (Acres)				NON-WILDERNESS (Acres)							
					Not Suitable for Timber Production				Suitable for Timber Production			
AGE GROUP	*DF*	*DF/RA*	*RA/DF*	*RA*	*DF*	*DF/RA*	*RA/DF*	*RA*	*DF*	*DF/RA*	*RA/DF*	*RA*
10					5,400			900	50,600			
20-50					12,800	1,200			74,000	3,300		1,600
60-70	300				6,600				35,800			
80-120	8,400	4,500	6,000		45,500	20,700	54,000		101,100	40,400	58,100	
130-190												
200+	1,300	700			10,300	8,500			7,700	5,300		

SOURCE FORPLAN data base, updated from 1974 inventory Acreage represents current management objectives

Resource Relationships

Diversity and variety of plant species provides safeguards against pests and pathogens that might eliminate the occurrence of a species in a given area A mix and distribution of species increases the probability of some hosts or targets escaping infection or attack Maintenance of plant diversity assures the continued source of locally adapted reproductive stock that has evolved with the local climatic patterns.

Vegetative diversity and diversity of wildlife habitats are nearly synonymous. Diversity of wildlife species and size and viability of wildlife populations are very much dependent on vegetative diversity. For convenience, the cover type age classes may be grouped by successional stages as in Figure III-8 or in roughly corresponding age groups as in Table III-7 In the wildlife discussions of Chapter III and Chapter IV cover types and age classes are grouped into vegetation groups based on successional stages The existing conditions are shown in Table III-8

Table III-8. Acres of Existing Vegetation Groups

Grass/Forb (Includes Permanent Meadows)	Upland Deciduous Mix	Riparian	Immature Conifer	Mature Conifer	Old Growth Conifer
82,300	58,400	76,600	109,100	220,600	33,800

Additional indications of diversity are the status of threatened, endangered and sensitive species and unique habitats such as dead and defective trees, waterfall splash zones, areas of high water table and rock outcrops. These are discussed in the wildlife sections of Chapter III and Chapter IV.

OLD GROWTH

Overview

Biologically and politically, many people have more interest in old growth than in other successional stages. Old-growth stands on the Forest are a limited component of the existing vegetation as a result of fire history. (See Chapter III, "Vegetation, Natural Disturbance and Succession".) Old growth was harvested in conjunction with adjacent mature stands during the last 50 years. Other small amounts of old growth have been lost to windthrow, insects and disease. Old growth provides wildlife habitat, gene pools for plants and animals, opportunities for research on natural systems, aesthetics, recreation, fish habitat and timber.

Old Growth Definition

Old-growth stands can be defined by age, by stand condition, by diameter, by ecological characteristics, by a combination of some or all of these factors, or by other factors (USDA Forest Service 1981b) In the past, the definition used was often a function of the proposed use for the trees Recently, old growth definitions have focused on the structural components of the stand. Several of the structural components are of key importance in an old-growth stand These are. individual, live, large old-growth trees; large, standing dead trees or snags; large, dead, down logs on the land; large, dead, down logs in streams; and multi-storied canopy of mixed species These structural features are unique to an old-growth forest ecosystem, setting it apart from young growth and, especially from managed stands. Most of the distinctive compositional and functional features of old-growth forests can be related to these structural features These structural components make possible much of the uniqueness of the old-growth forest in terms of flora and fauna (composition) and the way in which energy and nutrients are cycled (function)

Most old-growth on the Siuslaw National Forest is Douglas-fir, found in the western hemlock series. The most complete ecological definition of Douglas-fir old-growth is contained in Franklin et al (1986) and describes stands containing the following characteristics·

- Two or more species with wide range of ages and tree sizes
- Eight or more Douglas-fir per acre that are bigger than 32 inches in diameter or over 200 years old In some environments western redcedar or Sitka spruce are replacements for Douglas-fir
- Twelve or more trees per acre of a shade tolerant species bigger than 16 inches in diameter
- Stands will usually contain a multi-layered canopy.
- Four or more conifer snags per acre that are bigger than 20 inches in diameter and are over 15 feet tall. (Some Coast Range sites exposed to high winds may have fewer than four per acre.)
- Fifteen or more tons per acre of down logs including four pieces per acre that are bigger than 24 inches and 50 feet or longer.

For detailed ecological characteristics of old-growth refer to Franklin et al (1981 and 1986).

Another definition, commonly used, is contained in the Regional Guide for the Pacific Northwest Region It defines Douglas-fir old-growth as any stand of trees 10 acres or greater generally containing the following characteristics:

- Stands contain at least five overmature trees per acre and additional mature trees in the overstory. At least 60% of the canopy is dominated by large individual trees with stem diameters 32 inches or greater.
- Stands usually contain a multi-layered canopy and trees of several age classes; species include shade-tolerant and shade-intolerant species
- An average of two standing dead trees per acre and 30 tons of down logs per acre are present.
- Stands are well into the mature growth stage. Trees have deeply furrowed bark Crown height has slowed, giving the tops a more rounded shape; tops may be broken Limbs are heavy and gnarled, with mosses and lichens present.
- Evidence of human activities may be present, but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

Neither of these definitions was available when the planning process began in 1980 The inventory prepared in 1976 used an "old growth" definition of stands over 10 acres in size containing 4 or more large old trees and a younger understory. Of the area identified in 1976, approximately 33,800 acres are remaining after updates for harvest and natural losses since that time; this is the amount of old growth shown in the Forest Plan data base

Because of the older, less specific definition used in the 1976 inventory, the 33,800 acres includes some stands that lack certain structural and functional features now believed necessary in old-growth stands and ecosystems In addition, the Forest Plan data does not include information on distribution, fragmentation or linkages among old-growth stands. These are more recent concepts that will be addressed in future inventories. Old growth distribution among plant associations will also be available in the future

In 1986 a vegetation resource inventory was initiated on the Forest It consisted of 3 separate surveys

1. The Vegetation Resource Survey (VRS) which targeted natural stands.
2. The Managed Stand Survey (MSS) which was designed for managed stands or plantations
3. The Mature and Over-mature Survey (MOMS) which was designed to collect information about older stands

The VRS and MSS were completed in 1986 and 1987 The MOMS was comprised of two steps:

1. Mapping of large sawtimber stands with multiple crown layers.
2. Installing permanent inventory plots to sample these stands.

The first step was completed in 1988 The second step has been delayed while the Region acquires more accurate and consistent vegetation information using a process based on satellite imagery When completed, the MOMS will provide general information about the amount and distribution of old-growth on the Forest It will not, however, provide enough site-specific information about understory and dead and down logs to allow a direct translation into the definition from the Regional Guide or from Franklin et al (1986) The exact amount and location of old-growth will be known only after each potential old-growth stand identified by the MOMS is visited and examined more closely.

None of the old growth inventories to date have addressed minimum stand size necessary for old-growth ecosystems. The distinction between stands that provide limited function or meet limited objectives and stands that are large enough to be considered old-growth ecosystems is not defined well yet This is a topic for further research.

Current Situation

Old-growth stands are scattered across the forest. The Forest Plan data base from the 1976 inventory shows about 3,200 acres on the Hebo Ranger District; 6,100 acres on Waldport Ranger District; 4,200 acres on Alsea Ranger District; and, about 20,300 acres on Mapleton Ranger District. These stands amount to approximately 5% of the Forest, or 33,800 acres. Thirty-eight percent of these old growth stands are on acres suited for timber management under current plans. The remaining 62% (20,800 acres) is in reserved lands and other areas that would not be harvested (Table III-7). An additional 30,100 acres are covered by large mature trees (120 year age class), 5,600 acres of which would not be cut under current plans and would qualify as old growth in about 60 to 80 years.

Historic Trends

Most mature trees found today started growing after widespread fires of the mid-1800s (see Chapter III, "Vegetation, Natural Disturbance and Succession") Today, most of the scattered stands of old growth are about 200 years old, although a few are about 350 and 500 years old (unpublished plot data for plant association inventory). This indicates that the pattern, at least in the last 500 years, has been periodic partial destruction and gradual replenishment as younger stands attained old-growth characteristics.

Future Trends

Mature stands begin to exhibit old-growth characteristics of the Regional Guide or Franklin definitions at about 175 years if they are protected from fire or other disturbance. Old-growth Douglas-fir stands, if undisturbed, may persist 500 years or more in the Coast Range and would eventually deteriorate and be replaced by climax vegetation, dominated by western hemlock and western redcedar. Older stands in Wildernesses and other "no cut" management areas are likely to become and remain old growth during the next 100 years (see Table III-7). Harvest or other disturbance would cause the old-growth stands to be replaced by younger stands Under existing plans most of the old growth occurring outside of reserved lands would be harvested in the next 4 decades FEIS, Chapter IV has additional estimates of future amount and condition of old-growth stands as it would vary by alternative

Resource Relationships

Large organic debris from old-growth forests has a major influence on the physical characteristics of the small stream (Class IV) systems. Large accumulations of woody debris result in complex aquatic environments of riffles, pools, runs, glides and side channels The debris adds stability to stream channels and reduces the rate of downstream flow

In Class III streams large woody debris is common and may cover from less than 25% up to 50% of the channel area. The canopy in the undisturbed state provides continuous shading Energy of water flowing in the channel is continually dissipated by woody material and vegetation, reducing erosion and leading to deposition of organic and inorganic material As streams get larger, there is less direct influence of old-growth

Mature and old-growth stands, along with most other seral stages, assist in the enrichment of forest soils by recycling plant nutrients through litterfall and root sloughing. Forest cover, including old growth, reduces soil erosion by intercepting rainfall and by binding the soil with a mat of roots and associated fungi Beginning with early seral stages, as stands grow older more carbon is stored as tree biomass.

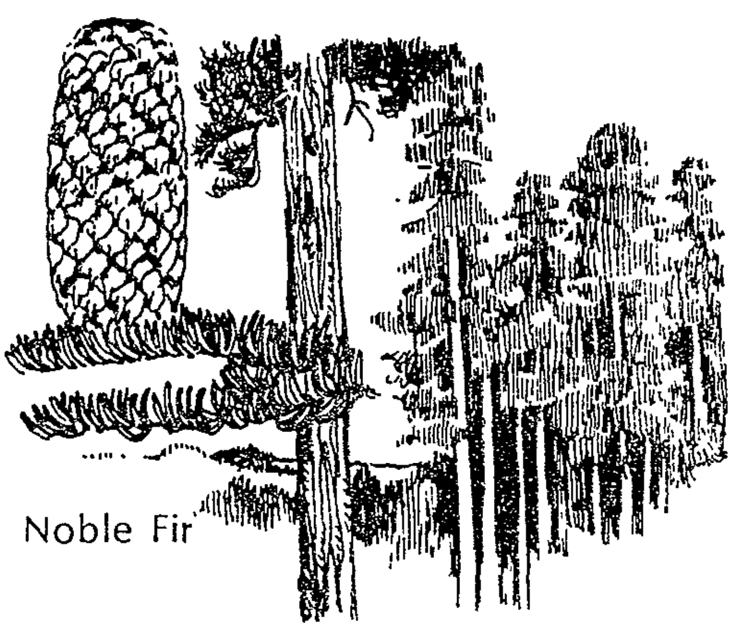
As with most seral stages, old-growth ecosystems include fungi, algae and bacteria that fix and recycle plant nutrients and form symbiotic associations with shrubs and trees. These associations enhance the water and nutrient uptake of the shrubs and trees Undisturbed mature and old-growth stands are rich in these organisms and provide innoculum that can reinvade adjacent harvested areas.

Mature and old-growth stands, along with later seral stages, provide sources of seed and other regenerative material for higher plants. Because the older stands have regenerated naturally without much, if any, culturing by humans, the genetic diversity in these stands is thought to be much broader than in artificially regenerated stands These stands are also valuable for conducting research on the undisturbed organisms and processes of the forest ecosystem.

To provide desirable wildlife habitat, old-growth stands must have large Douglas-fir mixed with western hemlock. The old-growth Douglas-fir has crown and bark characteristics quite different from western hemlock These features of Douglas-fir are highly significant as habitat for certain wildlife species such as bats and the western red-backed vole

Harvesting of old-growth stands has been of major importance to the timber industry in the Pacific Northwest for several decades The challenge of yarding these large logs over steep, mountainous terrain while protecting the other resources like soil and water, has resulted in technological advances such as long span skyline, balloon and helicopter logging systems The high value of the old-growth wood makes it feasible to use these expensive systems

Recreation users of the Forest enjoy old-growth stands of trees for many different reasons The old trees are aesthetically pleasing and provide a living connection with the past and a visual reference to the natural successional processes of the forest environment Many people feel that the massive, towering trees in some old-growth stands have a cathedral quality and are spiritually uplifting and inspirational These stands provide a feeling of solitude and escape from the evidence of human presence



TIMBER

Overview

The Forest lies in the heart of the most productive lands for conifers in the country (Waring and Franklin 1979). Natural regeneration following widespread fires in the 1800s resulted in the second-growth Douglas-fir (80 to 120 years old) that is common on the Forest today. Timber harvesting was minimal before World War II After the war, harvesting increased rapidly as improved access and yarding technology, and increased demand for wood products made National Forest timber a desirable commodity.

Intensive timber management is practiced on the Forest today Clearcutting is the most common silvicultural harvest method in the Coast Range (see FEIS, Appendix G). After harvesting, most sites are specially prepared for planting In the past, many areas were treated with herbicides, burned, planted, and treated again to destroy competing vegetation. Today, in accordance with the 1988 Record of Decision issued with the Regional Environmental Impact Statement for Managing Competing and Unwanted Vegetation, herbicides are used only when non-chemical methods are ineffective or would increase costs unreasonably. In lieu of herbicides, vegetation is being cut manually. Similarly, in compliance with the Smoke Management Plan, less slash is being burned than a decade ago. If needed, young plantations are precommercially thinned around age 10 Some 35-to-40 year old plantations have been commercially thinned. Fertilizer will be applied to timber stands in the future

Current Situation

Much of the Siuslaw looks like a managed forest About one-fifth of its 631,000 acres are plantations of young conifers A mosaic of age classes is being created Of the 538,000 acres identified as tentatively suitable for timber management. 5% have characteristics of old-growth stands, 57% are mature stands (70 to 120 years old); 10% are immature stands (40 to 60 years old); and 28% are plantations less than 30 years old

The objectives of the current timber management program on the Forest are:

1. To grow the optimum amount of timber per acre
2. To sell that volume to available markets

The first objective is achieved by harvesting stands when they reach the culmination of mean annual increment (CMAI). CMAI is the point in the life of a timber stand when the growth rate stops increasing. To provide operational flexibility, Forest Service policy allows timber harvesting when stands reach 95% of CMAI, (FSH 2409 13-32 1) On the Forest, CMAI occurs when stands reach 70 to 100 years depending on the site quality and the management practices used Ninety-five percent of CMAI can be reached as early as 60 years of age on the Forest The latter objective is achieved through silvicultural practices designed to assure that all trees harvested are large enough to be marketable (at least 8" in diameter)

Biologically and economically, Douglas-fir is the dominant conifer on the Forest (Daniel et al. 1979, Smith 1962, Williamson and Twombly 1983) Stands of Douglas-fir, which naturally regenerated in the late 1800s following large fires in the Coast Range, still dominate the landscape even though plantations now break the once uniform pattern. The climax tree species on the Forest in most situations is western hemlock, but succession from Douglas-fir to western hemlock has rarely occurred. The many fires precluded succession to old-growth stands over most of the Forest (Hemstrom and Logan

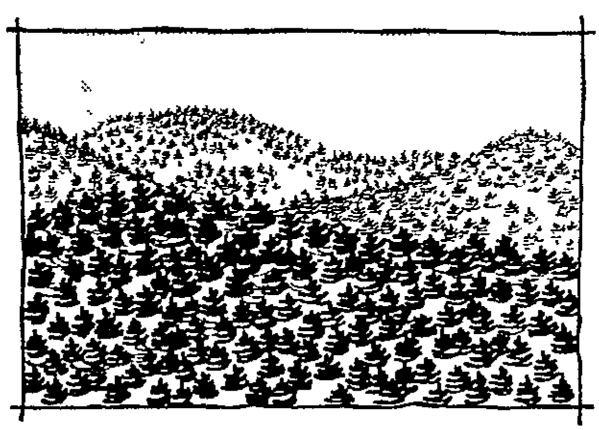
1986) Douglas-fir accounts for about 80% of the conifer volume harvested. Other conifer species harvested and planted on the Forest include western hemlock, Sitka spruce, and western redcedar.

Biologically and economically, red alder is the dominant hardwood on the Forest (Poppino and Gedney 1984) occurring in pure stands and mixed with conifer. Alder grows along streams and rivers. It also grows in areas more suitable to conifers where the most recent establishment conditions favored alder Alder plays a special ecological role by increasing the nitrogen content of the soil (DeBell and Turpin 1983). Although red alder is not as commercially valuable as conifers, some local industries depend on its continued availability.

Timber stands are stratified into the following types: 1) conifer (90% or more of the canopy cover is conifer, the rest hardwoods); 2) mixed conifer and hardwood (50 to 89% of the canopy cover is conifer, the rest hardwoods); and 3) mixed hardwood and conifer (less than 50% of the canopy cover is conifer, the rest hardwoods).

Of the mature timber stands on the Forest, about 47% are the conifer type; 21% are the mixed conifer and hardwood type; and 32% are the mixed hardwood and conifer type This is not an ecological description of what **could** grow on these sites, but rather what is growing on these sites Most forested acres outside the riparian zone can grow stands of pure conifers, pure hardwoods, or any mixture of trees

Each forested acre on the Forest is assigned to one of three productivity groups based on the capability of landtype associations (see glossary) to grow trees About 19% of the forest was assigned to the highest group (average 50 year site index of 130), about 14% was assigned to the lowest group (average 50 year sited index 108). The remaining 67% fell in the moderate productivity group, 50 year site index 119



Land Suitable for Timber Production

Table III-9 outlines the land tentatively suitable for timber production on the Forest.

Table III-9. Lands Tentatively Suitable for Timber Management

	ACRES	
	UNSUITABLE	TOTAL
Siuslaw National Forest Ownership		**631,361**
Water (streams, lakes, estuaries)	4,685	
Lands Not Forested (e g, sand dunes)	33,640	
Lands Developed for Purposes Other Than Timber Production (e g ,campground)	11,521	
Subtotal of Non-Forested Land	**49,846**	
Forested Land		**581,515**
Withdrawn From Scheduled Timber Production		
Wilderness		
Rock Creek	6,720	
Drift Creek	5,635	
Cummins Creek	8,781	
Established Research Natural Areas		
Flynn Creek	688	
Neskowin Crest (in Cascade Head Scenic-Research Area)		
Cascade Head Experimental Forest	7,200	
Cascade Head Scenic-Research Area	4,125	
Oregon Dunes National Recreation Area	359	
Subtotal of Lands Withdrawn	**33,508**	
Inadequate Response Information		
(Land incapable of producing industrial wood, e g, shore pine)	2,015	
Irreversible Damage (Landslides would threaten human life)	8,246	
Regeneration Difficulty	0	
Tentatively Suitable Forest Land		**537,746**

Management Practices

The silvicultural practices commonly used on the Forest include:

1. Site preparation
2. Planting genetically improved seedlings
3. Protection from animal damage
4. Release from competing vegetation
5. Precommercial thinning
6. Commercial thinning
7. Regeneration harvest

Silviculturists select stand establishment practices from among the systems and techniques available as prescriptions are written for each stand. At present, the majority of acres on which timber is harvested are clearcut, burned, and planted.

The practice of fertilization had not been used on the Forest until 1989, when about 1,000 acres of selected stands were fertilized. Research plots were installed in the early 1970s to test the response of various timber stand conditions and soil types to fertilization. Preliminary results from these plots indicate varied but positive response on the majority of soil types on the Forest. Other research indicates that most Douglas-fir stands and soil types respond positively to applications of fertilizer (Gessel et al. 1979). Predicted timber yields for the Forest are based on the assumption that fertilization will be used in the future

Not all the silvicultural practices listed above are used on every acre Estimates of the frequency of reforestation practices used on each acre harvested are:

• Site preparation by prescribed burning	90%
• Site preparation needed in addition to burning	30%
• Planting	100%
• Planting with genetically improved seedlings	30%
• Replanting	10%
• Protection from animal damage	60%
• Release from salmonberry competition	10%
• Release from alder competition	40%
• Precommercial thinning	50%

Plantations are candidates for commercial thinning when the trees to be removed average at least 12 inches in diameter Most existing plantations are not yet old enough to be commercially thinned; however, 30,000 to 40,000 acres will become available in the next 10 to 20 years

The regeneration harvest method for most timber stands on the Forest is a clearcut harvest, removing all the trees from the site at once (FEIS, Appendix G) Clearcut harvesting is prescribed when one of the following conditions exist (Daniel et al 1979, DeBell and Turpin 1983, Harris and Johnson 1983, Ruth and Harris 1979, Stewart 1978, Smith 1962, Williamson and Twombly 1983):

- The species to be regenerated develop best in full sunlight; e g , red alder, Douglas-fir, and Sitka spruce;
- The area to be harvested is exposed to strong coastal winds making the risk of blowdown in partially-cut stands too high,
- The understory vegetation is so dense that it will delay stand reestablishment;
- Fuel levels (natural or created) are so high that there is a fire hazard without slash treatment;
- Control of insects or diseases is required;
- Healthy trees are not present to provide a seed source for natural regeneration; or
- There is a desire to alter stand composition, i e , to convert stands from hardwoods to conifers or to introduce genetically superior trees

Most areas are planted after harvest to control species composition and to introduce seedlings with better genetic characteristics. Planted trees can be more uniformly spaced, reducing (but not eliminating) the need for precommercial thinning Rotation time is shortened. Planted seedlings have a better chance than natural ones of outgrowing the brush competitors, reducing the need for release treatments (Cleary et al 1978, Daniel et al 1979, Smith 1962, Wright 1976)

Success of plantations can be jeopardized both by animals that browse or clip seedlings, and by other vegetation competing for water, light, and nutrients. Elk, deer, mountain beaver, rabbits and hares cause most of the damage to plantations on the Forest This damage usually occurs in the first 3 or 4 years of plantation growth Protection of seedlings from animal damage can take many forms including barriers around trees, animal repellent mixtures, trapping, and substituting more palatable forage The Forest is also experimenting with planting trees that may be less palatable to animals

The competing vegetation includes salmonberry, thimbleberry, vine maple and red alder. These species either retard growth or kill the seedlings (Perry et al. 1985). Burning, herbicides, and manual cutting are practices commonly used to reduce competing vegetation Under the Record of Decision for Managing Competing and Unwanted Vegetation, herbicides will be used only when other methods are ineffective or will increase project cost unreasonably.

Historic Trends

Area on Which Timber Can Be Harvested

A significant change in the last 10 years has been a reduction in the number of acres on which timber can be harvested. About 110,000 fewer acres are available for timber harvesting than was assumed in the 1979 Timber Resource Plan. This difference is primarily a result of the 1984 Oregon Wilderness Act, better site-specific information on location of high-risk soils and number of streams, and more habitat protection for spotted owls

Timber Sold and Harvested

Essentially all of the timber which has been offered for sale on the Forest has been sold. Table III-10 displays the amount of timber sold and timber harvested since 1973 During the 10-year period 1979-1988, the volume actually harvested has been only 86% of the volume sold During this period, the volume sold (including non-chargeable material) averaged 350 MMBF/year and the volume harvested averaged 302 MMBF/year This difference resulted in an accumulation of uncut volume under contract, particularly during the period between 1980 and 1983 (Figure III-11) The uncut volume under contract increased from 1.0 billion BF at the end of 1979 (3.3 times the 10-year average harvest) to 1.6 billion BF at the end of 1985 (5.3 times the 10-year average harvest).

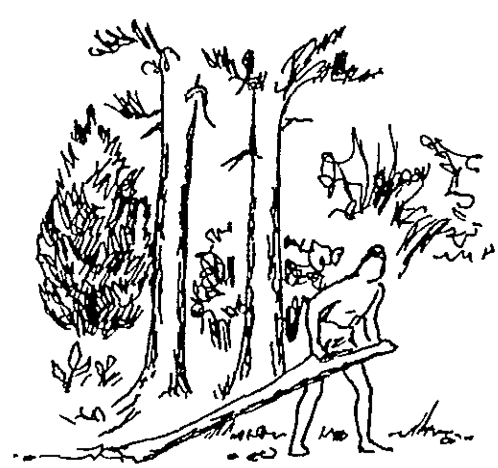
Much of the uncut volume was purchased during a period of speculative bidding in 1979 and 1980 which was immediately followed by a severe economic recession when wood prices plummeted. In 1979 and 1980, the average price bid on the Forest for timber to be cut in the future was $470/MBF while the average price actually paid for timber harvested was $180/MBF By 1981, many federal timber purchasers could not afford to harvest the previously high-bid federal timber they had under contract and used lower priced wood purchased on the current market or harvested on their own lands to sustain their operations (Peinicke 1986). In 1985, 900 MMBF of the high-bid uncut timber under contract was returned to the Forest under the regulations of the 1984 Federal Timber Contract Payment Modification Act and 200 MMBF was returned from defaulted contracts Most of this returned volume was resold by the end of 1988.

As the timber market improved during 1986 and 1987, and harvest increased above the amount of timber sold in 1988, volume under contract began to decrease

Table III-10. Timber Sold and Harvested 1973 - 1988

YEAR	TIMBER SOLD (1) MMBF	TIMBER HARVESTED (1) MMBF
1973	369	420
1974	306	366
1975	296	232
1976	352 (2)	365 (2)
1977	300	332
1978	373	315
1979	350	374
1980	385	267
1981	407	247
1982	367	142
1983	370	243
1984	290	339
1985	278	305
1986	346	312
1987	365	362
1988	342	424
AVERAGE		
1973-1988 (3)	338	310
1979-1988 (4)	350	302

(1) Includes sawtimber and all wood products (chargeable and nonchargeable to ASQ)
(2) 1976 includes an extra three months due to change in fiscal year end
(3) Annual average for 16 25 years
(4) Chargeable volume sold, 1979-1988, was 338 MMBF/year, chargeable volume harvested, 1979-1988 was 290 MMBF/year



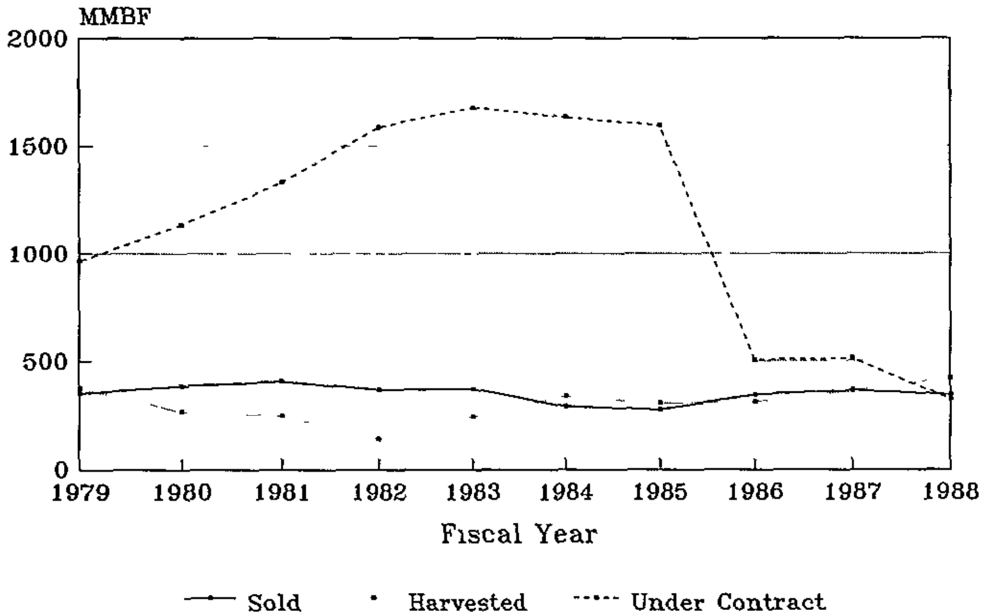


FIGURE III-11. TIMBER SOLD, HARVESTED AND REMAINING UNDER CONTRACT 1979-1988

Timber Receipts and Costs

Between 1979 and 1985, an average $2.30 has been collected as receipts from the harvest of wood products on the Forest for every $1.00 spent on timber management and roads. During the 7-year period, gross timber receipts averaged $40 million/year, costs (including the cost of timber roads) averaged $17 million/year, and net cash flows averaged $23 million/year.

Net cash flows decreased from $44 million in 1979 to -$1 million in 1982, and back up to $23 million in 1984 Cash flows fluctuated primarily with the amount of gross receipts rather than with the cost of timber and road management The amount of gross receipts varied significantly during the last 7 years, not only because the amount of timber harvest fluctuated but also because the price paid for that timber varied For example, gross receipts dropped 70% between 1981 and 1982 (from $50 million to $15 million) when the amount of volume harvest on the Forest decreased 55% (from 250 MMBF to 112 MMBF) and the average price paid for timber decreased 30% (from $200/MBF to $140/MBF) These trends in harvest levels and in timber prices reflect economic trends in the lumber and wood products industries.

During 1979-1985, the cost associated with timber management did not fluctuate as much as timber receipts because timber and road management activities are more directly tied to the long-range timber management program than the harvest level in an individual year For example, timber sale preparation and road construction activities prepare and access areas which may not be harvested for several years and reforestation and other silvicultural activities are performed in areas already harvested. Timber management cost include sale preparation and administration, stand examinations, reforestation, and precommercial thinning. Road costs associated with the timber management program include engineering, construction, reconstruction and maintenance

Below-Cost Sales

Below-cost sales are timber sales which cost more to prepare, access and reforest than the Forest Service receives from the timber purchaser. On the Forest, timber sales usually generate more revenue than costs because the sale program has focused on harvest of mature stands which have a high monetary value. As discussed above, an average $2.30 has been collected as receipts from the harvest of wood products on the Forest for every $1 00 spent on timber management and roads between 1979 and 1985

In a few instances, individual sales or individual units within a sale cost more than the timber values. These cases are usually either 1) when the cost of building a road to provide access to a large area is charged against the first sale in the area, or 2) in a hardwood sale or unit where the timber values are low. Below-cost sales are expected to continue to be rare in the future because of the projected increase in demand for smaller logs which will increase timber receipts and because of the completion of the road system which will decrease the management costs

Unit of Measure

Traditionally, timber has been inventoried, sold, and purchased using the board foot measure. Timber outputs in the FEIS and the Forest Plan will generally be presented in millions of cubic feet (MMCF) Board feet will be displayed where necessary to compare with past output levels and allow transition to cubic foot measure

A board foot is equivalent to a 1-foot square that is 1-inch thick (12"x12"x1") Board foot measure is an estimate of the lumber that can be sawn from a log It is net of the edgings, kerf, and waste due to log taper, and thus, for a given log can vary depending on the lumber dimensions being produced and the state of technology of the sawmill where the log is cut More advanced sawmills can produce substantially higher amounts of board feet from a log than less modernized mills. Measuring timber in board feet also ignores sawdust and chips which are produced during milling and are in high demand for manufacture of products other than lumber.

A cubic foot is equivalent to a cube of wood with 1-foot sides (12"x12"x12") Cubic feet are calculated in any geometric shape, including cylinders as well as cubes The cubic foot volumes used in this FEIS and Plan are a measure of the total sound wood in a tree and are a more accurate depiction of wood volume Using cubic feet as the measure of timber also allows the flexibility to convert to other product measures, such as board feet, or cubic volume of chips and sawdust

The two measures are not easily converted back and forth Board foot equivalents are only estimates, because the number of board feet produced from a cubic foot is not uniform. The board foot-to-cubic foot ratio is proportional to the size of the tree harvested· the larger the tree, the higher the ratio Estimates of the board foot equivalents are shown in FEIS, Appendix B, "Development of Yield Coefficients".

Future Trends

The following two sections summarize the projections used to guide the development and evaluation of long-range plans and programs for the National Forests in the Forest and Rangeland Renewable Resources Planning Act (RPA) Assessment (USDA Forest Service 1984g) These projections focus on the national situation for the next 50 years and not on short-term local and fluctuations

National and Regional Supply Trends

At the national level, the current balance between the growth of wood and its removal show that hardwood forests and eastern softwood forests can support additional timber harvesting. This balance will change, particularly after the year 2000 If owners of commercial timberland respond to changes in the amount and price of available wood, timber harvesting could increase substantially in most regions during the next few decades. The largest hardwood increases will be in the south, where harvest is expected to increase from 3.4 billion cubic feet in 1980 to 9 4 billion cubic feet in 2030

Total projected U S. softwood harvests are expected to rise 24% from 9.6 billion cubic feet in 1980 to 11 9 billion cubic feet in 2030. Though the outlook is for increased softwood harvests nationally, there are important differences among the major softwood timber producing regions

In the Douglas-fir subregion, projected annual harvest from 1980 to 1990 is about 2 3 billion cubic feet. It then declines slightly to about 2 billion cubic feet per year This level is maintained through the rest of the 50-year projection period

The other major source of softwood timber harvest is in the South, which is projected to rise from about 4 1 billion cubic feet in 1980 to 7.3 billion in 2030. However, most recent forecasts are now showing that the South could be expected to be shifting to a slower rate of increase above present levels, until the year 2030. Much of the current expansion in the South with softwoods, as well as hardwoods, is due to the fact that its wood products production has become more diversified as compared to other regions of the country.

Currently, part of the timber formerly supplied by the Pacific Northwest region is now being supplied by the South and Canada It is expected that competition from Canadian imports will accelerate as lumber import tariffs are relaxed over the next decade. However, the situation with Canada can be expected to change as there are indications that the economic supply may begin dropping off within 15 years. The projected change indicates a potential drop in supply capability of 30 to 50% from the current relatively high levels.

At about the same time this drop in supply capability begins to occur for the other sources, the growth of wood fiber on private lands in the Pacific Northwest will again be reaching its capability. The private lands in the Pacific Northwest could then become a major source of supply for softwoods to meet national and international demand During the period before the private lands in the region regain their full supply potential, the public forests would be looked upon as a major source for a relatively stable supply of wood fiber (Schallau 1985).

National and Regional Demand Trends

Recent information indicates that the demand for timber is moderately high after the slowdown that occurred in the early 1980's The interaction of the projected strong housing demand with the growing popularity of construction methods that use less wood and availability of wood substitutes will determine long-term demand demand for timber The ability to accommodate this increase on a long-run basis is critically linked to production costs. Wood supply will be highly dependent on the ability of producers to lower costs to be competitive with wood substitutes

Over the next 10 years, total timber demand from the Pacific Northwest will grow slowly. Although there is a backlog of unfulfilled housing demand, the future will depend primarily on the continuing strength in personal income and the availability of affordable housing and financing. In addition, projections of exports to the Pacific Rim countries show a continuing slow growth The analysis acknowledges there will be a declining trend in the construction sector. Structure replacement, rather than new construction will characterize the market

A key factor in determining the level of demand for logs in future will be the outcome of pending legislation pertaining to log exports Current Administration proposals to lift the twenty-year old ban on export of logs from from Federal lands are being countered by proposed legislation ranging from a ban on all log exports to banning exports of logs from state owned lands Supporters of log exports cite market stabilization effects and higher state and federal revenues in their campaigns for liberalization of export policies Those opposed to log exports believe expanded exports will lead to mill closures, job losses and higher domestic wood product prices.

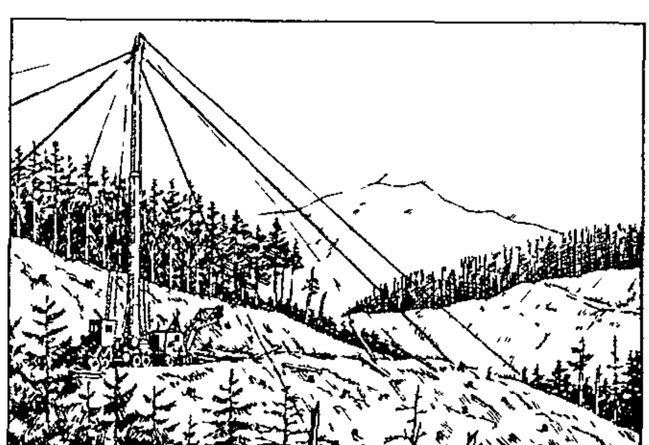
World paper products use has been projected to increase over 30% by the year 2000. It is reasonable to expect that several paper mills will be built in the Pacific Northwest by the year 2000 Currently, in Oregon, there are several companies looking for paper or pulp mill sites. Areas with economical access to markets will enjoy more full utilization in the future as chip demand strengthens (Blaydon 1988)

Local Supply and Demand

The Siuslaw National Forest is divided into two geographically separate areas Each portion lies in a distinct economic community The northern portion, the Hebo Ranger District, is confined to Polk, Tillamook and Yamhill Counties and the area referred to as the Northwest Oregon Resource Area for purposes of reporting statistical information on timber production and supply. Salem is the nearest metropolitan area to the northern portion

The southern portion of the Forest lies in the counties of Benton, Coos, Douglas, Lane and Lincoln. Douglas and Lane are the two largest timber producing counties in Oregon The southern portion lies in the West Central Oregon and the Southwest Oregon Resource Areas Eugene-Springfield and Corvallis provide regional trade centers in the southern portion

The significance of the impacts of changes in timber supply from the Siuslaw depends on the assumptions about both future demand for timber and the future supply from other national forests and other ownerships in the market area Ownership of timberland in the eight-county study area is portrayed in Figure III-12 (Gedney 1982). National Forest System land includes the Siuslaw, portions of the Mt Hood, Willamette, and Umpqua National Forests.



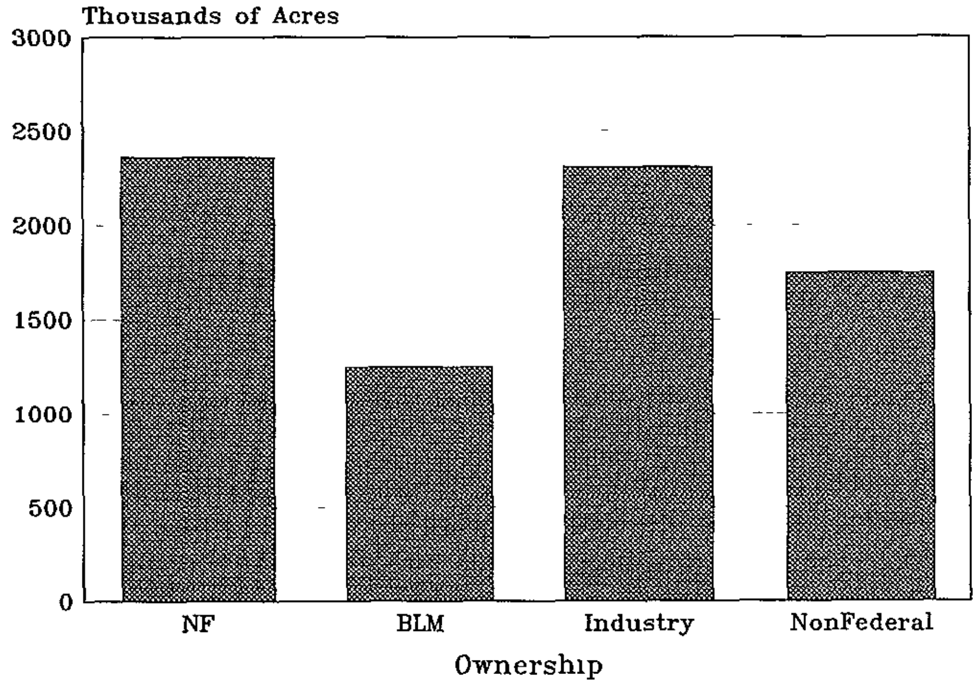


FIGURE III-12. OWNERSHIP OF TIMBERLAND IN EIGHT-COUNTY AREA

Land management objectives differ among ownerships and supply potentials reflect the differing objectives Among the most influential distinctions among federal and non-federal owners is sensitivity to market conditions. While **harvest** from national forest lands may be responsive to market conditions, sale programs are less responsive to short-term variations in product prices. The price sensitivity of harvest from national forest lands has been reduced by the shortening of contract terms, and other measures implemented in the last few years to discourage price speculation in federal timber.

Figure III-13 displays growing stock in the impact area by ownership It is interesting to note that while National Forest System land accounts for 31% of commercial timberland, it contains 47% of existing inventory. Private industrial lands, on the other hand, account for 30% of the commercial timber land base but hold 21% of the existing inventory. Reflecting their management objectives, national forests have liquidated their inventories more slowly than have industrial owners As shown in Figure III-14 this has led to an average growing stock per acre on national forest land twice that of industrial lands.

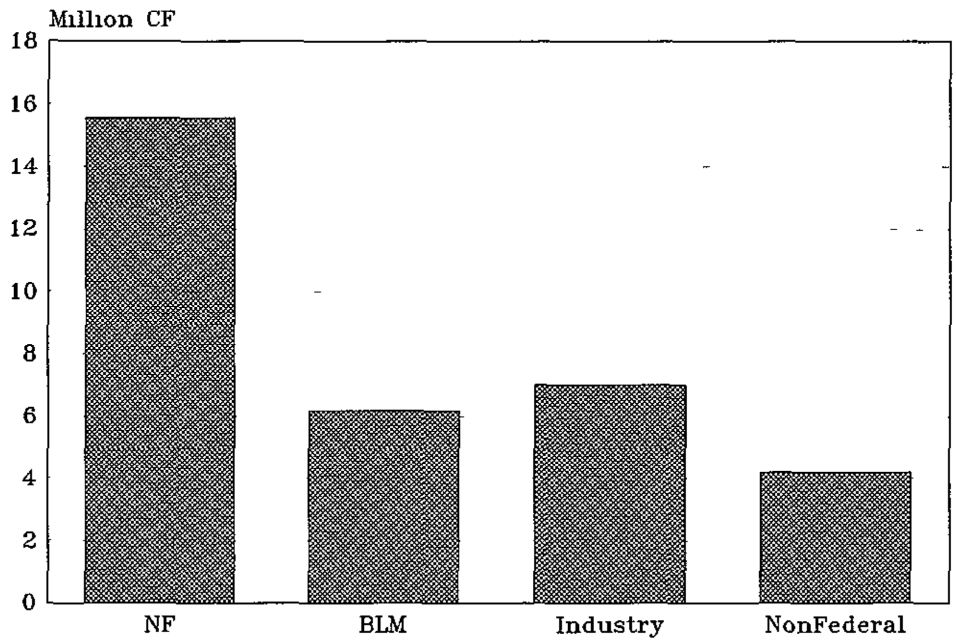


FIGURE III-13 GROWING STOCK BY OWNERSHIP CATEGORY

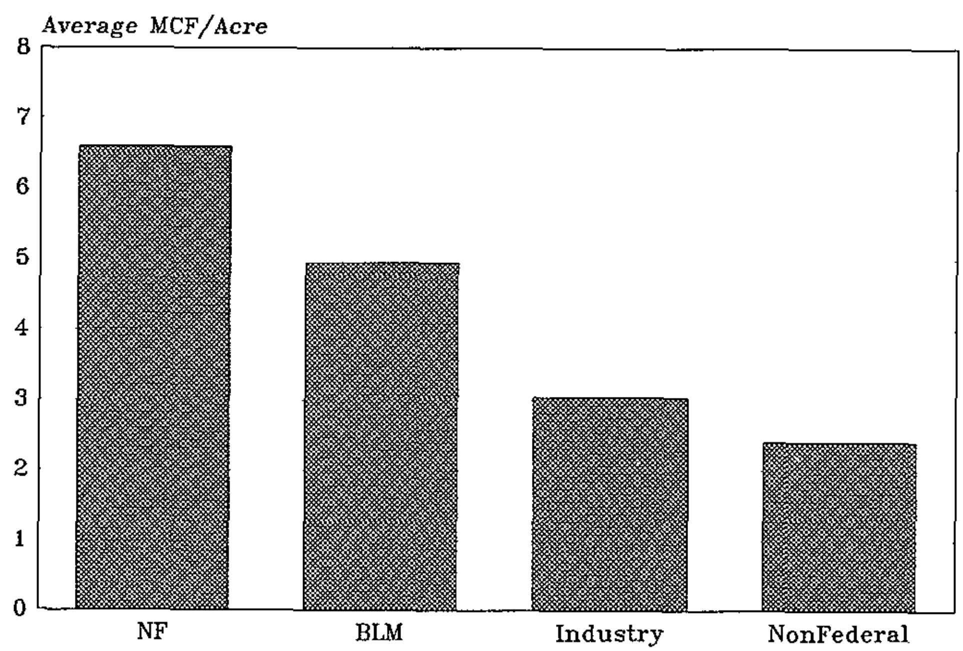


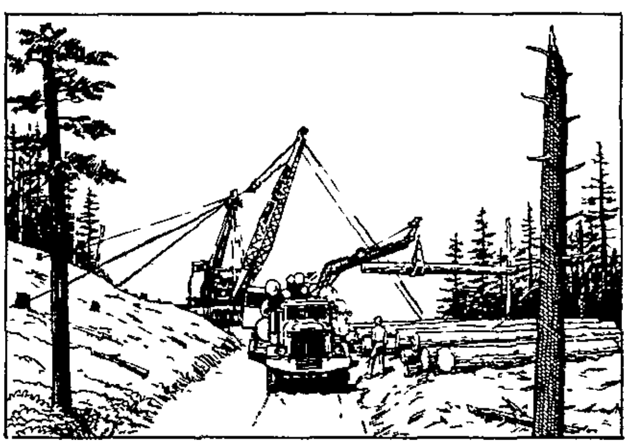
FIGURE III-14 AVERAGE TIMBERLAND VOLUME/ACRE BY OWNERSHIP

Siuslaw National Forest Supply - The amount of timber produced on the Siuslaw National Forest is an important component of the timber supply in the Pacific Northwest. The Forest share of the timber supply of the 1980 Resources Planning Act program, as distributed in the Pacific Northwest Region was 80 MMCF/year (USDA Forest Service 1984a) This projection includes conifer and hardwood species.

The level of timber which the Forest can produce was analyzed during the Analysis of the Management Situation (USDA Forest Service 1985b) Assuming nondeclining flow harvests (which can increase each decade, but never decrease) and the use of NFMA Management Requirements, the Forest could supply up to 71 7 MMCF per year, depending on other resource objectives. Thus, the timber potential is considerably less than the 1980 RPA assignment. Only by departing from a nondeclining flow could the Forest temporarily increase timber supplies at levels approaching the RPA projections. Such increase would be offset by decreases in the future.

Key influences on the level of supply capability of the Forest include the amount of land available for timber production, the intensity with which that land is managed, and the harvest flow schedule. The amount of land available for timber management is the most significant of the three influences. Refer to FEIS, Chapter III, "Land Suitability" for an explanation of suitability determination. Intensive management practices influence timber supply by affecting the growth rate of trees Practices such as thinning, fertilization and use of genetically improved stock are examples of practices which contribute to increasing the supply from the available landbase. See FEIS, Chapter III, "Timber, Management Practices" for more information about intensive timber management practices. The management intensity may be reduced from that which provides the largest contribution to timber yield or PNV to provide other resource benefits. Management intensity is reduced by extending rotations, as to provide mature conifer wildlife habitat, or by providing for a mix of conifer and hardwood species as in prescriptions intended to maintain visual quality.

Supply from Ownerships - Timber industry lands comprise the largest non-federal ownership in the impact area Industrial owners are distinguished by their responsiveness to market forces Harvest from industrial lands is influenced by the value of logs in local and export markets, the cost of extraction and the returns from alternative investments. Industrial lands are generally more productive than other ownerships and are managed with greater intensity As shown in Figure III-15, the majority of forest industry timberlands is less than 50 years old; nearly two-thirds is less than 40 years old. Less than 20% is greater than 50 years old (Lettman 1989)



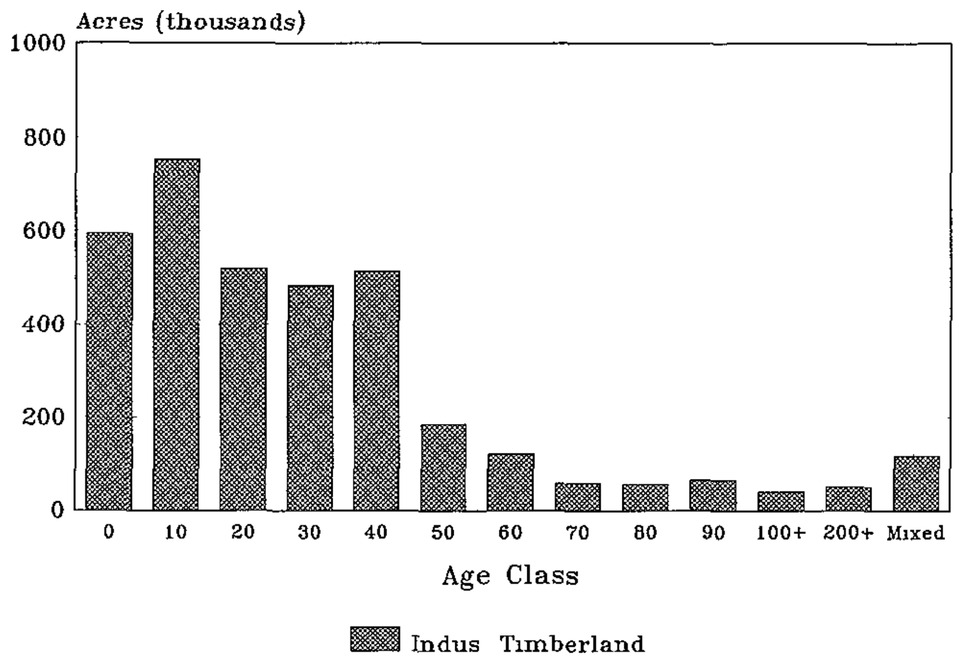


FIGURE III-15 WESTERN OREGON INDUSTRIAL TIMBERLAND

The gap in the age class structure on industry lands was brought to public attention by the Beuter Report in 1976 and has since been a source of concern and speculation as to its effect on timber supply between 1990 and 2020. Many believe it is incumbent upon the national forests to accelerate harvest during this period to offset shortages of merchantable timber from private supplies.

An examination of actual harvest levels shows that, harvest from industry lands has consistently exceeded that of national forests. The disparity between national forest and industrial land harvest has lessened since the 1981 recession Figure III-16, from an Oregon Department of Forestry news release, shows that most of the increase in harvest since 1982 has come from national forest land During the recession, when product prices declined, industry substituted harvest from industry owned lands for highly bid national forest stumpage.

The effects of proposed Forest Service management on the aggregate timber supply are discussed in FEIS, Chapter IV, "Cumulative Effects on Communities."

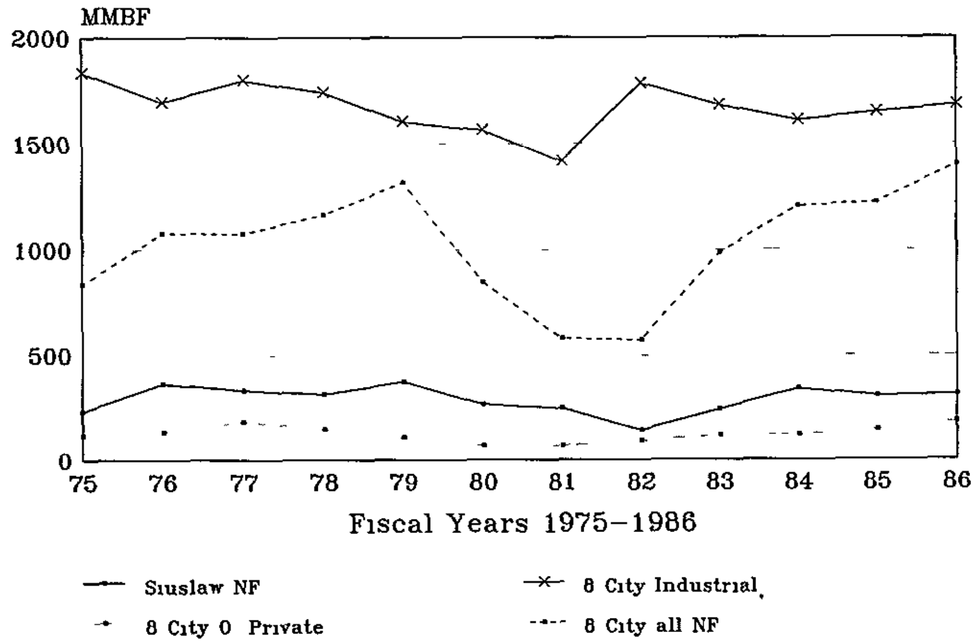


FIGURE III-16. SIUSLAW ZONE OF INFLUENCE HARVEST

Local Demand - As shown in Figure III-17 demand for logs from the Siuslaw is widely distributed among mills in western Oregon. Polk County was the destination of just over a quarter of the harvested volume in 1985.

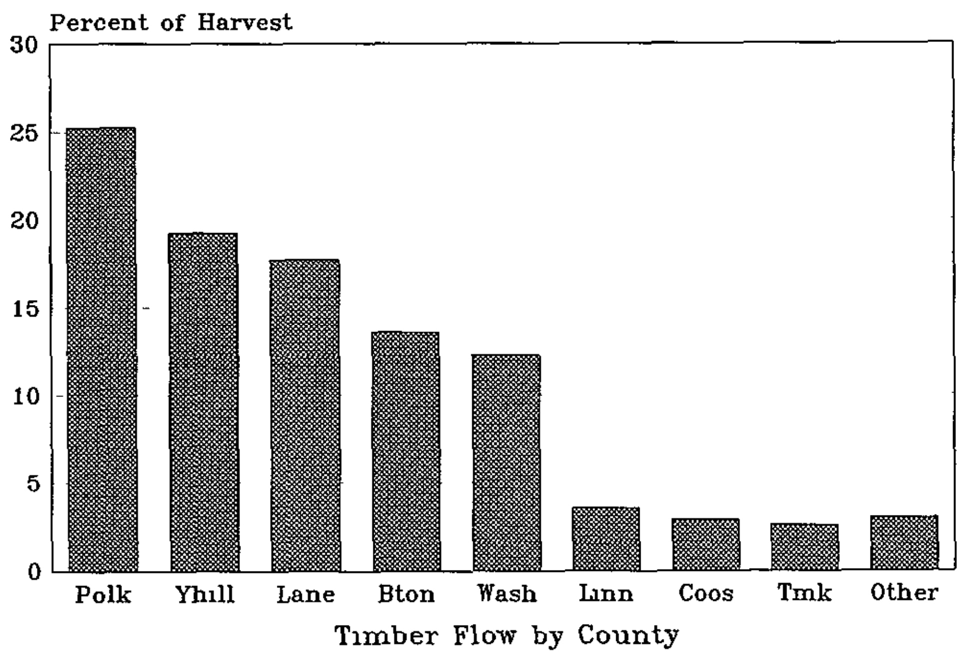


FIGURE III-17. 1985 FLOW OF SIUSLAW TIMBER BY COUNTY DESTINATION

As shown in Figure III-18 the Siuslaw does not dominate the log supply in the impact area. In 1985 the Siuslaw provided *the largest share of total mill consumption in Yamhill County where it accounted* for over one-third of the total milled volume.

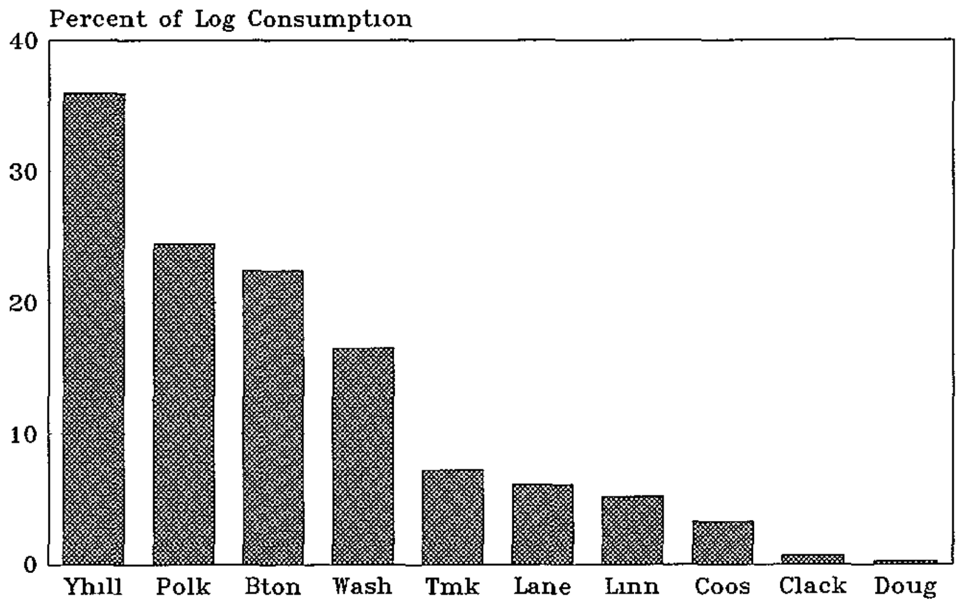


FIGURE III-18 SIUSLAW TIMBER AS PERCENT OF TOTAL SAWMILL CONSUMPTION

Local sawmill capacity is one indicator of potential local demand for timber. Three factors have contributed to mill closures in western Oregon:

1 A smaller supply of private harvestable timber
2. A declining average diameter of harvested timber
3. Obsolescent, uncompetitive mills with high costs per unit of output

As shown in Table III-11, the number of mills and capacity in the impact area declined substantially between 1976 and 1982, it stabilized between 1982 and 1985, and total capacity increased slightly. Capacity is in MBF per 8-hour shift

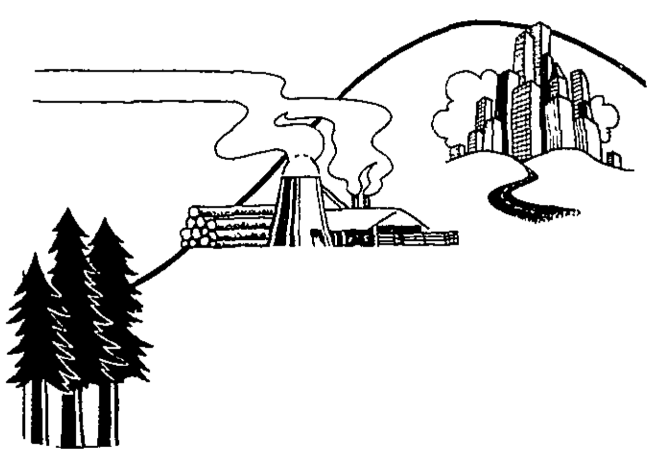
In general, demand for Siuslaw timber follows the national level of business activity The most significant influence is the level of home construction Roughly 40% of lumber, plywood and other panel products produced in the U S are used in the construction of new homes Another important source of demand is the market for wood chips derived from the market for paper products Demand related factors have been primarily responsible for the fluctuations which have occurred in the harvest of timber from national forest land Harvest of timber on the Siuslaw has ranged from 142 to 424 MMBF over the years 1979 to 1988 Harvest averaged 302 MMBF per year over the same interval From 1985 through 1987, harvest on the Siuslaw averaged 351 MMBF per year

Table III-11. Number of Mills and Capacity in Impact Area

County	1976# Mills	1976 Capacity	1982# Mills	1982 Capacity	1985 # Mills	1985 Capacity
Polk	8	805	6	612	5	710
Tillamook	6	376	3	265	4	334
Yamhill	7	557	4	640	5	651
Benton	10	905	6	470	6	595
Lane	38	5,176	22	3,767	22	3,326
Lincoln	6	465	2	223	1	150
Coos	12	1,524	8	860	9	828
Douglas	23	2,390	16	2,740	15	3,243
Total	110	12,198	67	9,577	67	9,837

The "inventory" represented by Siuslaw NF timber under contract, has exceeded harvest by a wide margin until recent years (Figure III-11). The tightness of the "inventory" of Siuslaw timber available for harvest has been attributed to the "buyback" of 900 MMBF of timber under contract in 1984 and a combination of a buoyant demand for construction lumber, concern about future log availability, and export of logs from other ownerships Recent changes in timber sale bidding procedures since the buy-back, including requiring a significant percentage of the total bid value in a down payment on the contract and allowing reduced stumpage price when timber is promptly harvested, have removed incentives to hold timber for speculation

Exports - While export of national forest timber is generally prohibited, mills must compete with export markets for logs from non-federal ownerships Exports have long played an important role in determining log demand. Figures III-19 and III-20, adopted from Warren (1988), show the average value and volume of Douglas-fir exports in the Columbia-Snake District (The Columbia-Snake District includes the ports in Oregon and southwest Washington.) Recent years have seen a rebound in export prices and accompanying export volume Log exports has been the topic of much controversy in recent years. Banning all log exports has been suggested as a means of maintaining wood-product employment in the face of declining timber availability and shifts to less labor intensive milling technology. Lifting the ban on exports of federal logs has been suggested as a measure to contribute to reduction of the federal budget deficit



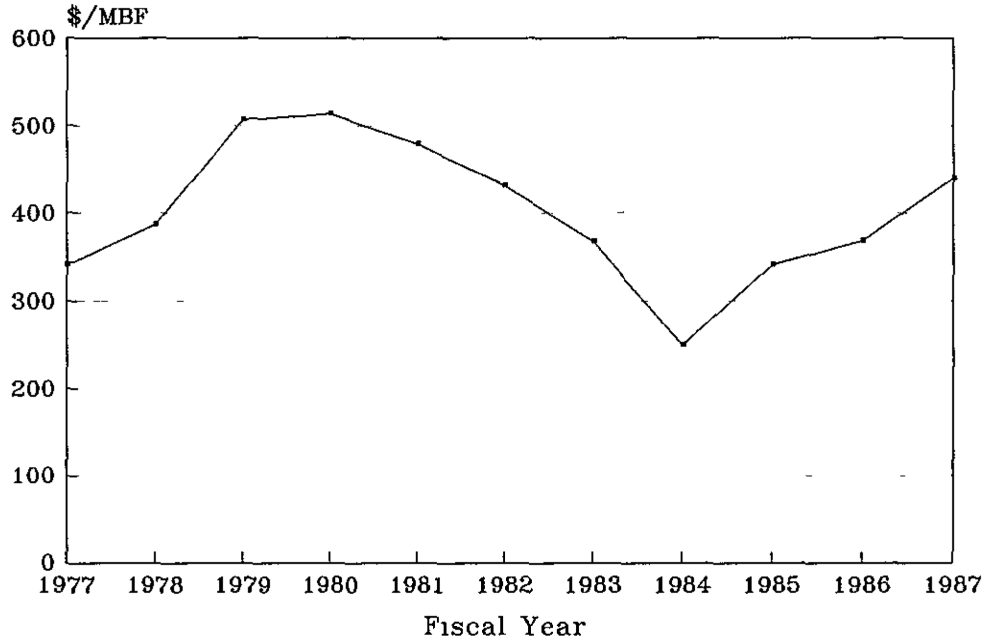


FIGURE III-19. AVERAGE VALUE OF DOUGLAS-FIR LOG EXPORTS

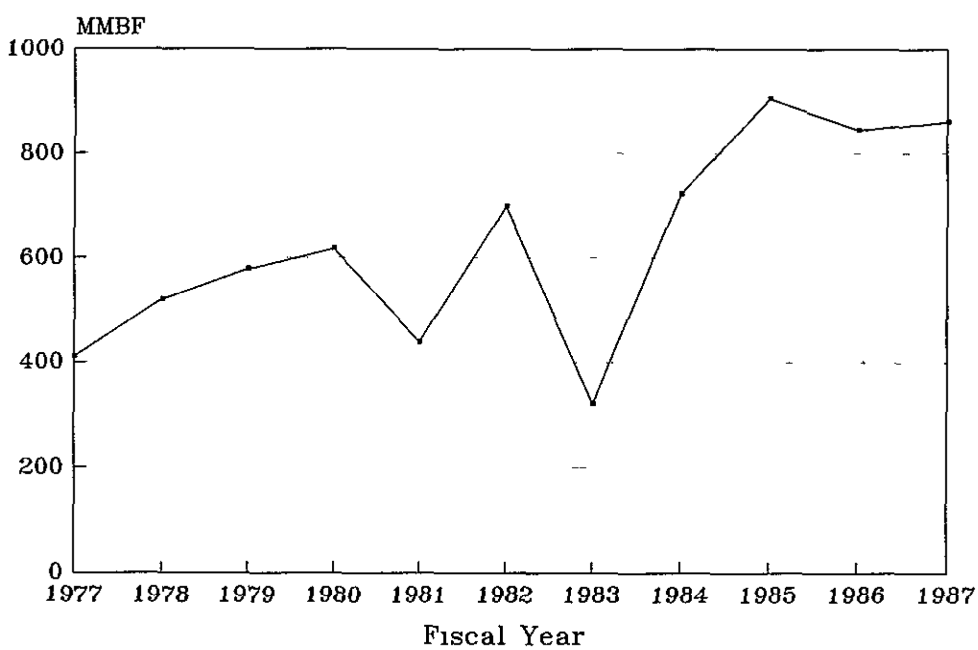


FIGURE III-20. AVERAGE VOLUME OF DOUGLAS-FIR LOG EXPORTS

WATERSHEDS

Overview and Current Situation

A watershed is a land basin bounded by a system of ridges from which all surface water drains to a single point. The major components of watersheds are: 1) slope shape, length, and steepness, 2) soils, 3) vegetation, especially in riparian (streamside) areas where vegetation and the stream interact closely, and 4) stream channel structure. Each component is dependent upon the others, and changes in a component may have significant effects on the stability and productivity of the watershed. The effects of nature or of management activities within watersheds are generally confined to their own boundaries Many small watersheds combine to make larger watersheds, such as the Siuslaw River Basin.

Watersheds are dynamic systems. They respond to natural and human influences through changes in the characteristics of stream channels, vegetation, and rates of soil erosion Landslides and surface soil erosion are natural processes that shape the lands in the Coast Range. These processes are a direct result of the very high rainfall, steep slopes, and unstable soils Landslides are rapid, downslope movements of soil, rock and organic debris that usually occur in association with high intensity rainfall. Surface soil erosion is the displacement of surface soil from slopes as a result of dry ravel and rainfall runoff Vegetation plays a key role in controlling the rates of these erosional processes by adding strength to the soil through extensive, intertwined root systems, and incorporated organic matter. Therefore, the rates of natural erosional processes can be easily altered by changes in vegetation (Burroughs and Thomas 1977; Swanston and Dyrness 1973); Bennett 1982)

Five million acre feet of precipitation falls on the Forest each year Of this, 4 million acre feet flow into 5,000 miles of intermittent (dry during the latter part of the summer) streams, and 3,200 miles of perennial streams. These streams are further divided into Class I, II, III and IV depending upon their importance to fish habitat or human consumption. Class I streams are a direct source of water for domestic use, or are used by large numbers of fish for spawning, rearing or migration, or flow enough water to be a major contributor to the quantity of water in another Class I stream. Class II streams are used by moderate though significant numbers of fish for spawning, rearing or migration, or flow enough water to be a moderate contributor to the quantity of water in a Class I stream, or a major contributor to a Class II stream Class III streams are all other perennial streams, and Class IV streams are all other intermittent streams There are 1,200 miles of Class I and II streams and 2,000 miles of Class III streams, and 5,000 miles of Class IV streams The state of Oregon stream classification system includes Forest Service Class I and II as their Class I, and Forest Service Class III and IV as their Class II.

The steepness of the stream channels and the frequent high flows result in a tremendous amount of energy that is very effective in transporting sediment and nutrients into and through the stream channels This energy also creates fish habitat by depositing gravel and carving pools where fallen logs or other features impede streamflow. Conversely, it can scour away fish spawning gravel and fill pools where the flow is unimpeded Sediment can smother eggs and recently-hatched fish in the spawning beds. It may increase the cost of treating water, and it makes streams less attractive when it occurs in heavy concentrations Sediment is a result of landslides, surface erosion, and stream channel erosion

In addition to its direct relationship with fish habitat, stream structure in specific segments plays a significant role in the stability of the stream It also influences the timing of flows in downstream segments and the stability of the watershed itself. (The relationship between riparian vegetation and woody material, and the frequency of its occurrence in Forest streams, is discussed in FEIS, Chapter IV, "Fish Effects".)

Large pieces of stable woody material create small "steps" in the stream channel which maintain stream velocity and erosive energy at a level which is in equilibrium with the stability of the channel (Heede 1975). When these "steps" are removed either by salvaging logs, cleaning the channel for esthetic purposes, scouring by debris torrents, or natural decomposition, the velocity and erosive energy increase. When erosive energy increases, the bed and banks of the stream erode until enough large material (usually trees) falls into the stream to slow the velocity to approximately its orignal state. When bed and bank erosion occurs at the bottom of steep slopes, it can also trigger slope failures When velocity increases in several tributaries of a single stream, abnormally high flows during storms (stormflows) can occur Such changes in flow patterns can accelerate channel erosion.

Water from the Forest provides aquatic habitat for fish and other creatures. Domestic and industrial consumption are also important. These beneficial uses depend on water of high quality There have not been any surface water shortages to date, even in low flow periods in late summer and early fall.

Water quality becomes an issue when beneficial uses of streams are affected The primary beneficial uses of Forest streams are domestic use and production of native anadromous fish on National Forest lands, and in major rivers, estuaries and fish hatcheries downstream from the Forest. A secondary beneficial use of Forest streams is the esthetic value of the generally crystal clear water. All of these uses are affected by increases in sediment in the streams Fish production and domestic use are also affected by water temperature increases and when water is contaminated with toxic materials. Domestic use is affected when water is contaminated with disease organisms

With an average stream density of 9 miles of stream for every square mile of land, nearly every Forest project is affected by its proximity to riparian areas This underlines the importance of watersheds in Forest management.

Landtype Associations

Watersheds vary significantly in their physical and biological characteristics, and correspondingly in their response to management activities that can degrade stability of watersheds (Swanston and Dyrness 1973; Barnett 1984). The variation within and between watersheds is controlled by the physical characteristics of each watershed

Few watersheds have homogeneous physical parameters To reduce heterogeneity as much as possible, the Forest's watersheds have been aggregated into 14 areas (Berry and Maxwell 1981) each of which has its own distinct physical characteristics Each area is a special combination of landtypes; each composed of specific rock types, landforms, and soils (Badura et al 1974) Each area has different potentials for soil erosion and stream channel alteration, and different fish and wildlife habitat characteristics These 14 areas, called landtype associations (LTAs), are the basic Forest land units used to model the effects of management activities on watershed resources such as soils, water, and fish They generally contain all or parts of several watersheds

Figure III-21 identifies the location of LTAs on the Forest. A brief description of each follows

LTAs: D, N, Q, R, and T - These LTAs consist of gentler and more stable slopes than on much of the rest of the Forest About 22% of these LTAs have steep, unstable slopes with a high risk for management-associated landslides Soil slumps along roads, and on slopes adjacent to streams, are common Approximately 36% of the Forest consists of these LTAs

LTAs: A, B, C, E, and P - Unstable areas are found on many steep, moderately dissected slopes in these LTAs. About 34% of these LTAs consist of landtypes with a high risk for management-associated landslides. Debris avalanches and dry ravel surface erosion are common on the unstable areas when vegetation and soil are disturbed. Approximately 36% of the Forest lies in these LTAs.

LTAs: F,G, and M - Extensive areas of very steep, highly dissected, and exceptionally unstable slopes are found here. About 80% of these LTAs consist of landtypes with a high risk for management-associated landslides Disturbance of vegetation and organic matter can greatly increase rates of landslides and cause surface erosion. The incidence of small and large landslides is high. Approximately 23% of the Forest lies in these LTAs Most is on Mapleton Ranger District.

LTA: X - This LTA encompasses the Oregon Dunes National Recreation Area (5% of the Forest). It is open and vegetated sand dunes

Management Practices

Watersheds on the Forest are managed for several uses while maintaining water quality and fish and wildlife habitat As discussed in more detail in the "Historic Trends" section below, these management practices include methods to maintain stability on steep slopes, to maintain stream temperature, to design roads to prevent landslides, and methods to maintain fish spawning and rearing habitats

Resource Use

In addition to providing habitat for fish and other wildlife species (see the "Fish" and "Wildlife" sections of this chapter), the Forest watersheds provide domestic use water for 57 municipal or public water systems and approximately 2000 private water systems which withdraw water from streams on, or within 1/2 mile downstream from, National Forest land (Figure III-22) Two municipalities (Corvallis and Toledo) have long-standing agreements with the Secretary of Agriculture to manage activities within the watersheds to ensure the protection of water quality. Approximately 4 to 5 million gallons of groundwater are drawn each day from the aquifer in the Oregon Dunes area north of Coos Bay to supply industry in that area (Kantrowitz undated)

Other uses of surface water from the Forest include recreation and the operation of several fish hatcheries. One hydroelectric power project has been proposed on Clarence Creek, a tributary of the Nestucca River (FERC project #6583-000). Over 300 miles of major streams and seven large estuaries depend on the quantity and quality of water they receive from Forest watersheds to support highly productive fish and shellfish habitat.

Historic Trends

Fires

Watersheds on the Forest have been affected by wildfire. See Chapter III, "Vegetation, Natural Disturbance and Succession" for a discussion of the Forest's fire history The existence of only a few small pockets of old growth trees today indicates that watersheds were essentially denuded after many of these fires Slope failures, resulting from loss of root strength where tree roots died after the fires, probably had a significant effect on fish habitat. The fires resulted in accelerating landslide rates and surface erosion, silting of fish spawning gravel, filling of fish rearing pools, and blockages of fish migration routes. Based on observations of fish habitat after more recent disturbances, recovery from these events is assumed to have been fairly rapid (within 20 years after each fire) Intense storms periodically flushed sediment from the stream systems and brought new gravel and debris into the scoured stream reaches to restore fish habitat

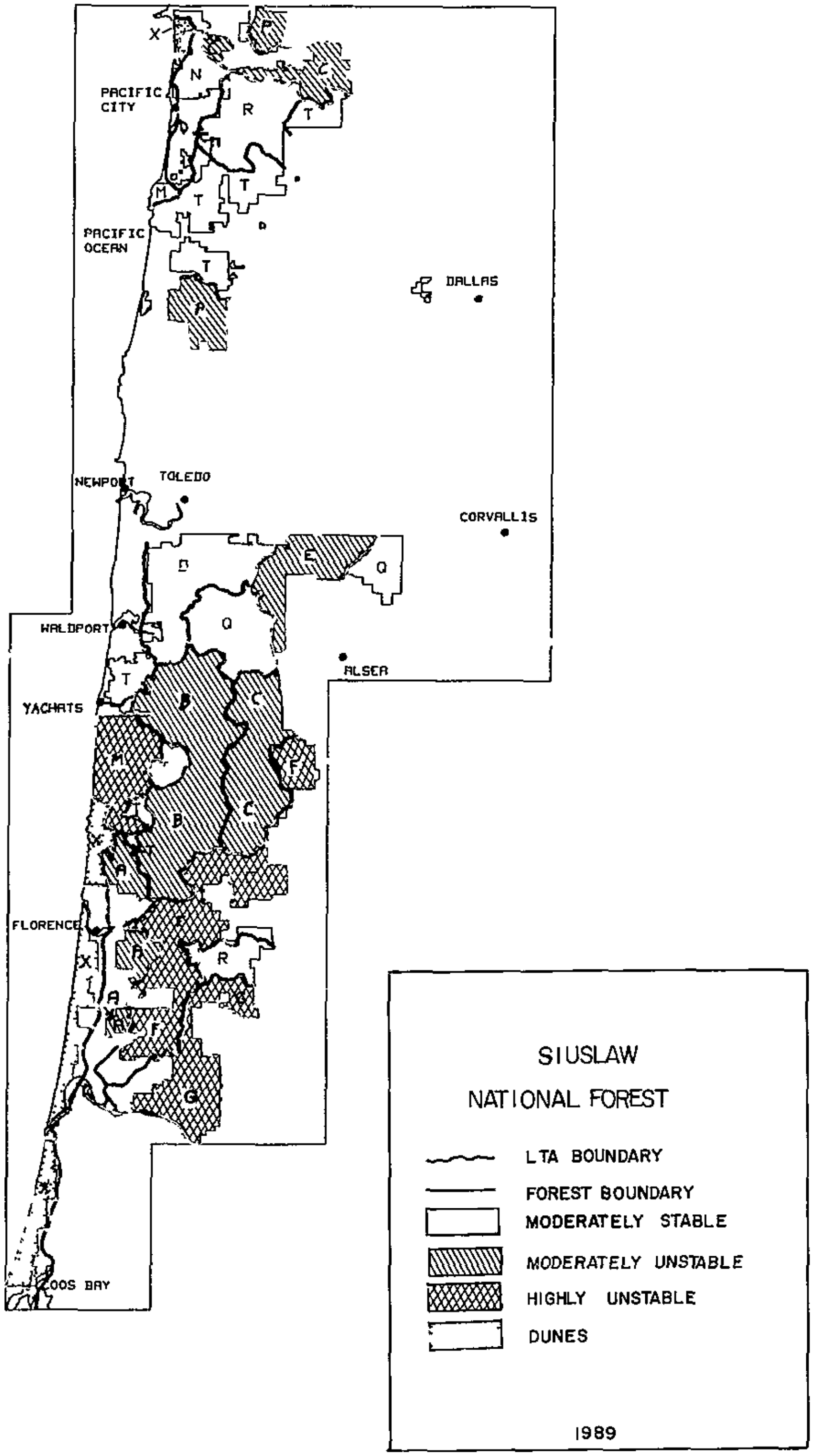


FIGURE III-21. LANDTYPE ASSOCIATIONS ON THE SIUSLAW NATIONAL FOREST

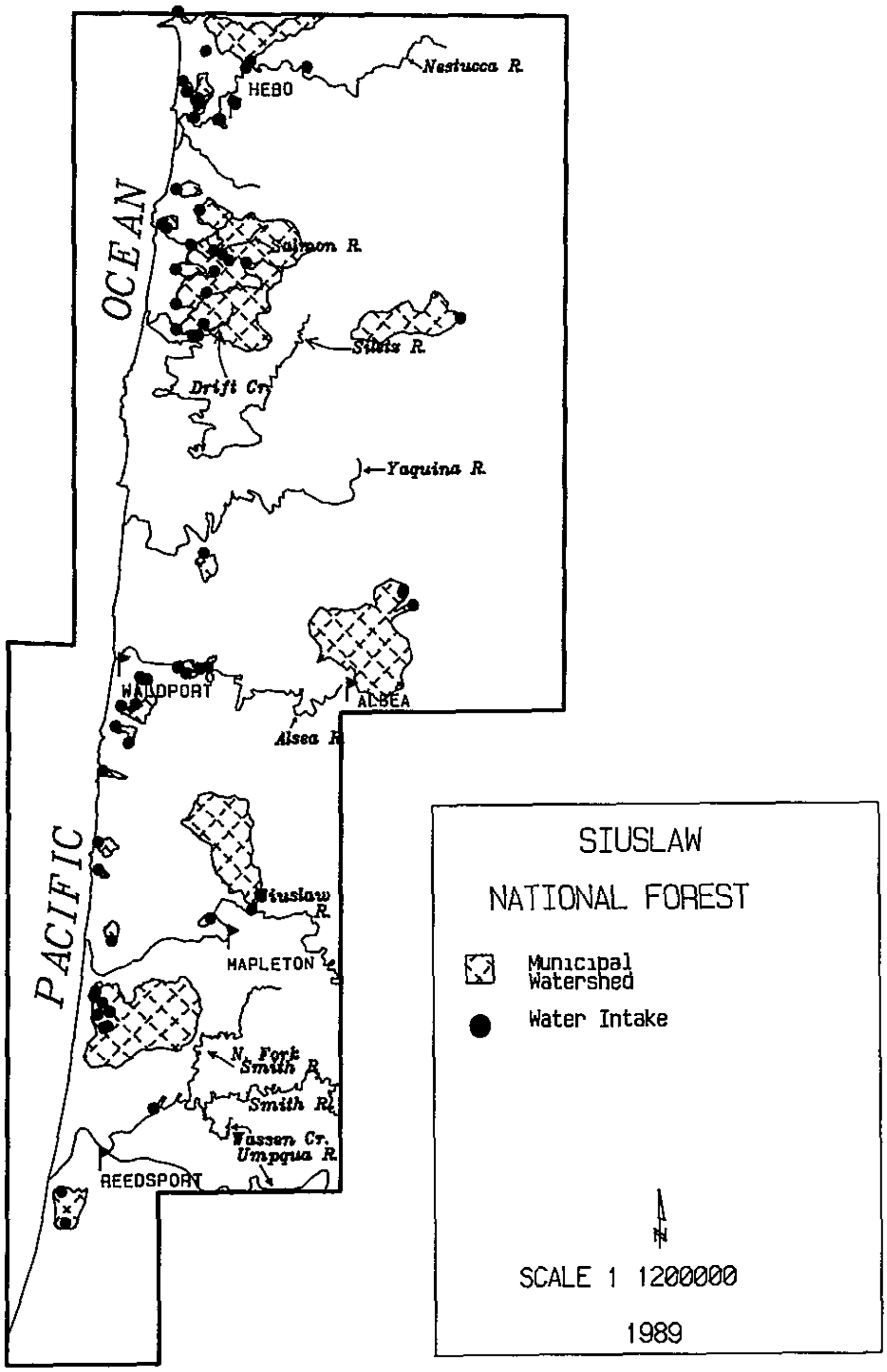


FIGURE III-22. PUBLIC WATER SYSTEMS ON THE SIUSLAW NATIONAL FOREST

Timber Harvesting

Rates of timber harvesting accelerated on the Forest in the 1950s Despite efforts to mitigate potentially adverse effects, logging and associated roadbuilding tended to destabilize watersheds (Ketcheson and Froehlich 1977, Swanson and Swanson 1977; Greswell et al 1979, Barnett 1982; Bennett 1982). Removal of trees from many unstable slopes destroyed root systems, often resulting in slope failures adjacent to and in the headwalls of streams (Burroughs and Thomas 1977) Some road building resulted in undercutting or oversteepening of unstable slopes and increased landslides. Fish migration routes were blocked by impassable culverts at a few stream crossings, and the increased sediment to streams from surface erosion sometimes filled pools and smothered spawning gravel Removal of debris from in and along stream channels often degraded the fish habitat by removing logs essential to fish rearing pools In some cases, excessively "hot" slash burning resulted in soil damage such as surface erosion and reduction of nutrients (Gillmor 1969, Bennett 1982; Barnett 1984).

Management practices have changed in response to current conditions and knowledge By the end of the 1970s, the Forest was routinely using the following practices.

- Leaving vegetation intact on unstable slopes;
- Designing stable roads and locating them on stable slopes;
- Leaving logs and large pieces of debris in the streams to maintain fish rearing habitat,
- Leaving vegetation intact within buffer strips along important stream reaches,
- Burning slash under conditions likely to result in a less damage to the soil; and
- Maintaining road drainage culverts during the rainy season.

The effectiveness of these practices has not been fully established As ordered by the U.S District Court in the Amended Judgement of August 6, 1984, for National Wildlife v Block, research is under way on the effectiveness of retaining vegetation on unstable slopes (Swanson et al 1985) Initial findings indicate that identification of unstable slopes and the retention of the desired vegetation around them have been successful in more than 90% of the cases Ultimate success in preventing acceleration of landslides is still in question

The failure rate on roads constructed since 1975 is negligible. Fewer than 10 landslides have resulted from roads constructed since 1975 on the Mapleton Ranger District (personal communication with Duane Dipert, former soil scientist on the District) Similar decreases in road associated landslides have been noted on the other Ranger Districts Proof of the effectiveness of these practices will be demonstrated by improved fish habitat conditions (see discussion in Appendix B for more information).

More recently the Forest has been installing various stabilizing structures in the streams to improve fish habitat, managing riparian areas to improve fish and wildlife habitat, and restoring steep road fill slopes to a stable condition.

The effect of these practices on watersheds is illustrated in Figure III-23, which was developed using a sediment model developed on the Forest. The model was based on landslide occurrence from the mid-1970s through the early 1980s, and on a surface erosion study done during the late 1970s (Bush 1982, Bennett 1982)

Timber harvesting on land of other owners began earlier than on National Forest land It was generally conducted at a faster rate. Consequences of current harvesting on other lands is assumed to be similar to that which occurred following harvest on the Forest in the 1960s

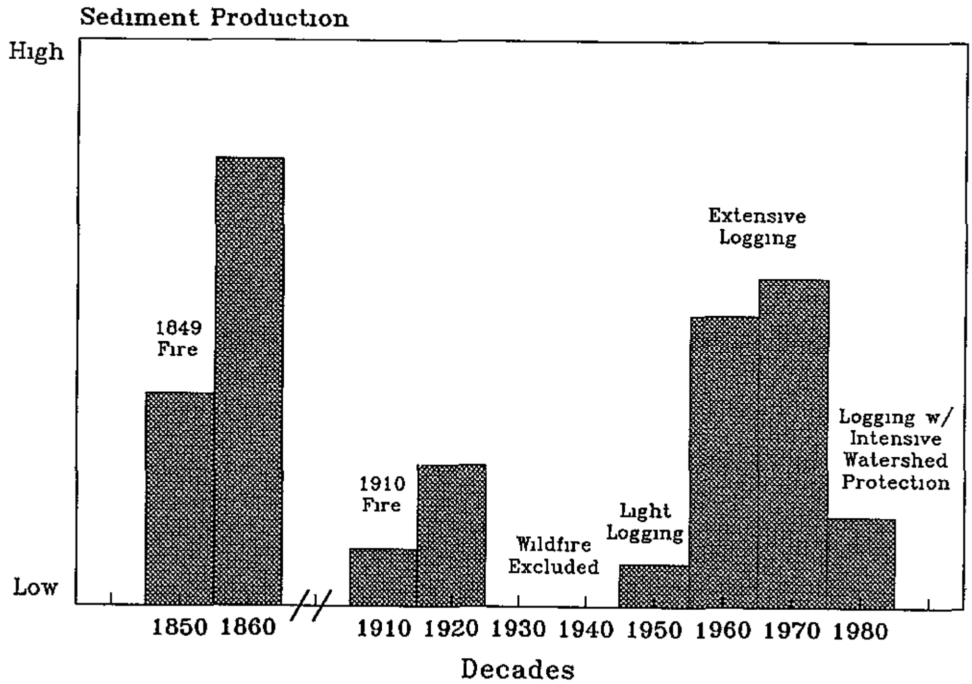


FIGURE III-23 RELATIVE FLUCTUATIONS OF SEDIMENT PRODUCTION

There has been improvement in the practices on lands of other owners Bureau of Land Management watershed practices are similar to those of the Forest Service. The State of Oregon has a Forest Practices Act administered by the Oregon Department of Forestry which has gradually changed the practices on private land. Improvement of road construction on steep slopes was given increased emphasis in 1983. However, only minimal streamside buffers are left along major perennial streams and are generally not left at all on small perennial streams or on intermittent streams. Impacts to fish habitat from timber harvest on private lands are now lower than they were in the 1960s, but much higher than current impacts on National Forest lands

Future Trends

Watershed conditions should remain similar to current or show some improvement as a result of changes in management practices since the 1970s Inventories of unstable sites should be more accurate and damage from past practices should recover naturally Loss of large organic debris in the perennial streams logged prior to the late 1970's will continue to reduce productive potential of those streams for several decades

Resource Relationships

Watershed and fish habitat conditions are inextricably linked From the ridge top to the estuary, natural forces are at work rearranging the rocks, slopes, soils, stream courses, and fish and animal communities. The purpose of watershed management is to allow natural processes, as much as possible, to shape and control stream systems. Such management can have pronounced effects on Forest outputs.

Influencing the amount, timing, and location of changes in natural processes requires recognizing when and where to alter management activities to produce the highest level of a desired effect, or the lowest level of an undesirable effect Altering vegetation, road construction, applying fertilizers, and burning of organic matter are activities most closely linked with changes in watersheds and fish habitat.

Altering the Vegetation

Killing Vegetation - This includes harvesting trees, burning brush or trees, and applying herbicides, if available (see discussion on herbicides in Chapter I) Harvesting trees, burning logging slash and brush, or applying herbicides to reduce the amount of brush and undesirable trees that compete with planted species for growing sites results in the destruction of root systems When the roots are destroyed on very steep slopes that are prone to periodic high ground water levels, the strength of the soil alone is insufficient to deter landslides. Subsequent acceleration of landslide rates increases sediment in streams, blockages to anadromous fish travel, and channel scour High landslide rates generally lower water quality and the diversity, quantity, and quality of fish habitat.

Changing Tree Stand Composition - Changing Forest stands from conifer to alder adds nitrogen to the soil and improves productivity. Changes in species composition, or total organic matter may significantly alter productivity after one or more harvest rotations Changes in tree species composition and logging also affect the amount of large organic debris available for channel structure and fish habitat Large conifer logs and root wads must be continuously introduced to stream channels to control rapid changes in the shape and behavior of steep stream systems As more conifers are removed from streamside areas, the channels become more unstable and fish habitat becomes less diverse.

Constructing Roads

Altering of Surface and Ground Water - Cutting into, and filling over natural slopes during road construction can increase surface erosion and frequency of landslides. The degree varies depending on location, design and maintenance of the roads. Highly unstable areas are easily destabilized by changes in groundwater

Altering Slopes - Cutting into and filling over the natural slope disturbs the balance of internal soil and rock strength and can lead to failure of the road and the slopes above and below it. Failures of roads and slopes accelerate the natural landslide rate. This increases sediment in streams, and channel scour, it generally lowers water quality and the diversity, quantity, and quality of fish habitat

Applying Fertilizers

Increasing Growth of Vegetation - Addition of nitrogen fertilizer to the soil benefits vegetation by boosting the nutrient most limiting plant growth in the Coast Ranges. The addition of nitrogen fertilizer to timbered areas increases timber volume It improves the health and vigor of the vegetation and it also promotes stronger root systems on unstable sites, and rapid regrowth where vegetation has been killed

Reducing Water Quality - Aerial application of chemicals could contaminate stream systems. Water contaminated by fertilizers encourages the growth of algae, and other types of aquatic plants, that may upset the food chain There is also the danger of the chemical fertilizer entering domestic and municipal water supplies

Burning of Organic Matter

Reducing Surface Soil Structural Strength - Dry ravel will accelerate where slopes exceed 60%, and where very hot burns are used either to control competing vegetation or reduce fuel levels, because the strength of the surface soil is lost. Acceleration of the natural surface erosion increases sediment in streams and generally decreases water quality and fish habitat

Reducing Nitrogen - High soil temperatures in the surface soils during burning result in volatilization of nitrogen Losses of nitrogen may decrease site productivity for several rotations. Losses may be significant when surface temperatures reach levels that destroy the fine, undecomposed organic materials (such as conifer needles) on the surface.

Increasing Tree Growth - Where brush competition is great, controlled burning of the brush prior to planting trees allows the tree species to grow faster, occupy the site sooner, and more quickly produce root systems that are better able to prevent accelerated landslides.

Reducing Fire Hazard - Reduction of fuels decreases the potential for catastrophic wildfire. As discussed earlier, wildfire can cause sudden and severe changes in watersheds and fish habitat

Other Resource Interactions

The correlation between watershed condition and fish habitat has already been discussed. Not harvesting timber on areas with high risk of landslides precludes timber production These areas provide habitat for some wildlife species Other areas where timber harvest is not allowed, such as Wildernesses and Research Natural Areas, protect watersheds.

FISH

Overview

Fish habitat is a function of stream channels, volume and velocity of flows, and physical and chemical elements that influence aquatic organisms A combination of heavy rainfall, high stream density, mild climate, and other favorable environmental conditions on the Forest results in highly productive fish habitat (Kunkel and Janik 1976). The forest is one of the few places in the contiguous United States where National Forest land fronts the sea, and 1,200 of the 3,200 miles of year-round streams are accessible to anadromous salmon and trout. These species spend several years feeding in the ocean. Ultimately, they ascend their native streams to spawn and deposit eggs in gravel beds. After several months of development in the gravel, offspring rear for several months to 2 years in deeper pools During their freshwater residence, fish continue to rely on shallower water for feeding sites. These areas also produce invertebrates for food A small percentage of the young originally hatched finally migrate to the ocean Of this, 5-10% survive to adulthood.

Heavy rainfall and steep slopes increase the probability of damage to stream habitat (Everest and Meehan 1981) Loosened sediment can smother gravel in stream beds (Hall and Lantz 1969) Also, large logs falling into streams create pools for fish and traps where sediment and small organic matter are broken down into nutrients (Swanson and Lienkaemper 1978) Logjams can impede the movement of fish, but too few logs result in alteration of streamflow and food chains and loss of pools Spawning habitat (access to clean gravel) and rearing habitat (cover and pools) are necessary for fish populations Rearing habitat appears to be in shorter supply than spawning habitat in most streams on the Forest (Haugen 1981, Sedell and Luchessa 1982; F. Everest, personal communication with M Clady)

The riparian area lies along perennial streams where vegetation is influenced by water in the channel and saturation of the soil Vegetation in this area has a major influence on fish habitat It supplies logs and small pieces of organic material to the stream channel, shades the water surface, and filters out surface erosion before it reaches the stream.

Estuaries, the downstream portions of river systems, widen under the influence of tidal action. They are transition zones between fresh and salt waters. Physical, chemical, and hydrologic conditions vary quickly and greatly. This diversity results in high biological productivity. Estuaries are particularly important because sensitive young stages of many aquatic organisms often concentrate there Chronic changes in streamflow and sediment delivery in the contributing watersheds can significantly alter plant and animal communities in estuaries.

Current Situation

Five of the seven main coastal river systems in Oregon that provide the largest annual sport catches of steelhead and salmon (Alsea, Nestucca, Siletz, Siuslaw, and Umpqua rivers) partially flow within the Forest (Kunkel and Janik 1976) Forest practices affect water quality, angler success, and survival of fish including those produced in hatcheries, (Heller et al 1983). A number of smaller streams, draining directly into the Pacific Ocean, produce wild anadromous fish.

The cutthroat trout, consisting of both anadromous (searun) and freshwater resident forms, is widespread in Forest streams but little is known about the species except for some long-term responses of populations to logging (Moring and Lantz 1975) Chinook salmon and steelhead are also abundant. The coho salmon is highly prized for both commercial and sport fishing Much of the freshwater habitat on the Forest appears to be most suitable for rearing coho salmon Because coho salmon are sensitive to environmental change and because of the extent of suitable habitat on the Forest, coho salmon is used as an indicator of the effects of management activities on fish habitat. See FEIS, Chapter IV, "Fish" .

Salmon habitat occurs extensively in landtype associations (LTAs) A, B, C, and D (see FEIS, Chapter III, "Watershed"), which include most of the southcentral part of the Forest between the short coastal drainages and the steeper mountains Streams in these LTAs have relatively moderate gradients and large amounts of pool habitat that are prime areas for rearing young salmon. Important salmon streams include Five Rivers and Lobster, Drift and Canal creeks of the Alsea River system; the North Fork and Deadwood Creek portions of the Siuslaw River; and tributaries of the large freshwater lakes south of Florence (see Figure III-2) Other major rivers on the Forest and their surrounding LTAs are. Nestucca River - R and T; Siletz River and Bay - P and T; Marys River - Q; Yaquina River - D and E; Smith River - F and R; and Umpqua River - G. The model used to estimate environmental consequences of forest management on fish habitat is based on LTAs rather than river drainages (See FEIS, Chapter IV, "Fish")

About 17 million pounds of salmon were caught commercially in Oregon in 1987, valued at over $27 million (ODFW 1988). Of the total salmon harvest, from two-thirds to three-fourths is caught by commercial operators in the ocean, and the remainder by sport fishermen (King 1984, Kunkel and Janik 1976). Table III-12 shows the annual contribution to existing sport and commercial fisheries from fish produced on the Siuslaw National Forest from 1976 to 1985 About 80% of the sport catch of salmon in Oregon is made in the ocean (Kunkel and Janik 1976), but all searun cutthroat and steelhead trout are caught in rivers and estuaries Over 80% of the coho salmon and 50% of the steelhead that attain full size in the ocean are caught before they have a chance to spawn (King 1984)

Because of the high value of anadromous salmon and trout (the sport fishery alone for all kinds of fish in Oregon was recently estimated at $428-$573 million/year, Sport Fishing Institute 1988, U S Fish and Wildlife Service 1988), much more is known about them than the other 200 or so species of fish and shellfish living on the Forest during part of or all their lives. Lesser-known species include sculpins and resident cutthroat trout in streams; and bluegill, largemouth bass, and stocked trout in approximately 30 lakes on the Oregon Dunes National Recreation Area. Crabs, clams, mussels, shrimp, and fish such as starry flounder, surfperch and rockfish are abundant in major estuaries.

Table III-12. Annual Contribution to Sport and Commercial Fisheries

Species	Sport Fishery (WFUDs) (1)	Commercial Fishery (lbs)
Coho salmon	7,300	199,700
Chinook salmon	1,300	58,200
Steelhead	27,300	0
Cutthroat Trout	1,800	0
TOTAL	**37,700**	**257,900**

(1) WFUDs are Wildlife-Fish User Days, an index of hunting and fishing activity

Management Practices

Two types of practices are used to manage fish habitat on the Forest The most important is to **protect** fish habitat. Techniques include leaving vegetation intact on unstable slopes and along streams Vegetation on unstable slopes maintains slope strength via a healthy mat of roots which bind the soil together. Vegetation along a stream provides a source of nutrients, shades the stream, prevents surface erosion adjacent to the stream, and provides a continuing source of logs which maintain stream structure

Logging operations are conducted in a way to protect streamside areas. This requires use of sophisticated logging devices and carefully designed roads be used Another common practice is scheduling and dispersion of logging to avoid cutting heavily in a watershed.

The above practices help provide diversity and complexity of stream systems that reduce impacts of logging. High winter stream flows can flush out moderate amounts of sediment produced when logging is dispersed over time In addition, channel structure and food chains can be naturally restored if clearcuts are kept relatively small and intermittent along streams

The second management practice is to **improve or restore** habitat (in most cases, this is to correct damage). Habitat improvement consists of building structures to create habitat, modifying blockages to fish passage, and providing resting pools in bedrock streams These projects are often effective, and are generally feasible in streams that are accessible to heavy equipment

Resource Use

Salmon are among the most prized of all fish. Commercial fishing for salmon largely involves trolling artificial baits from small boats in the coastal waters of the Pacific Ocean The industry consists of individuals whose earnings from commercial fishing differ widely Salmon are sold in local and regional markets

Methods used for recreational fishing are varied A large portion of sport fishing is tied to guide or charter boat services Catching a large salmon or steelhead has a certain mystique in our culture Salmon, searun cutthroat trout and steelhead are all highly prized for sport and food Although most fishing is by Oregon residents, people travel from throughout the United States to fish along the Oregon Coast

Economies of many coastal communities are heavily dependent on summer salmon fishing as is clearly demonstrated by hardships created in recent years from reduced salmon runs and fishing seasons River systems that at least partially drain the Forest produce most of the anadromous salmon and trout produced in Oregon's coastal tributaries, many of which are spawned and reared on the Forest

Historic Trends

Stream systems are naturally dynamic Channel characteristics are constantly adapting to streamflows, resulting in moderate seasonal changes in fish habitat. However, major events such as fires, floods, and landslides can cause more pronounced changes

Relatively short-lived but acute losses of spawning habitat have occurred in the past on the Forest They resulted from increases of sediment and stream blockages from natural wildfires and timber harvest (see FEIS, Chapter III, "Watershed") In the last 100 years, however, removal of logs in and along streams by logging and stream cleanout have probably inflicted even more widespread and long-lasting impacts on rearing habitat (Bisson and Sedell in press, Bryant 1983, Maser and Trappe 1984, Sedell and Luchessa 1982, Sedell et al. 1974, Swanson et al 1982, Triska et al 1982, and others)

Streamside deforestation causes a gradual decline in habitat as logs in the stream slowly decay. If these logs are removed, the instream habitat levels immediately drop In both cases, recovery is impossible as long as frequent timber harvests along streams prevent conifers from becoming large enough to provide adequate rearing habitat

Channel morphology, structure, timing of flow, nutrient cycles, and other key aspects of habitat have been markedly altered by past management activities Because of the widespread and long-lasting nature of the changes, rearing habitat in most portions of Forest streams remains somewhere below levels that followed floods and wildfires of the past. Streams in areas where downed trees and channel debris were removed contain only 5 to 20% as many large logs as do undisturbed streams (Sedell et al. 1984)

Future Trends

Freshwater sport fishing and nonconsumptive use of fish for viewing and photography have been growing in popularity and are expected to continue to do so, particularly in the West (USDA Forest Service 1980d) The Statewide Comprehensive Plan for Fish and Wildlife (USDA Forest Service and ODFW 1979) projected that demand for sport and commercial fishing would increase by 22% before the year 2000. Demand for fish and fishing is clearly affected by factors such as recreation and economic conditions, although how these interact is not yet clear. It is assumed that demand for commercially caught fish will exceed supply, and that fishing will expand to catch any additional supply On the other hand, if an unlimited supply of fish is available for recreational fishing, the fish may not all be utilized because of limits on access to fishing areas and the amount of crowding that anglers will tolerate

It is difficult to assess future supplies of fish on the Forest Improvements in management practices should more or less maintain anadromous fish habitat in streams However, recent years have shown that other factors, such as fish survival in the ocean and excessive fishing, may limit the number of adult fish returning to streams to spawn. Fish populations rearing in streams may not always be large enough to utilize all available habitat Fish production in the foreseeable future will probably remain somewhere below the historic levels because of loss of structure and habitat complexity in larger rivers (Sedell and Luchessa 1982) and smaller streams (Bryant 1983) due to human activities that will take a long time to reverse The Comprehensive Plan for Coho Salmon (ODFW 1982b) established targets for this species High production from readily accessible habitat, such as that on the Forest, will hinge on setting targets to meet present and future demands

Resource Relationships

Correlations among timber harvest, sediment, and stream conditions are relatively well understood but not easily measured in detail (see FEIS, Chapter IV, "Watershed") In general, given consistent practices, amounts of sediment, stream blockages, stream scour, and their subsequent effects on spawning habitat are directly related to the number of acres clearcut Furthermore, chronic destabilization of watersheds from extensive, extended road building and timber harvest has channelized many mountain streams (Triska et al 1982) and generally disrupted structural and biological components of rearing habitat (Angermeier and Karr 1984). As a result, stability and diversity of fish communities may be reduced (Karr 1981)

Wildlife management can affect fish habitat Managing riparian areas for wildlife dependent on dead and defective trees will increase the number of standing dead trees, which decay fast when they fall into the stream. From a fisheries standpoint, it is desirable that these trees fall into the stream while still alive; the logs are then more resistant to decay and provide fish habitat for a longer time.

WILDLIFE

Overview

The moderate climate, relatively low elevation, varied geology, and proximity to the Pacific Ocean all combine to create diverse wildlife habitats on the Forest, ranging from estuaries and sandy beaches to old-growth Douglas-fir stands Steep topography and heavy rainfall generate an abundance of riparian habitat along the many headwaters, streams, and rivers

Current Situation

Approximately 330 species of wildlife may be found on the Forest, including 235 birds, 69 mammals, 14 amphibians, and 12 reptiles (USDA Forest Service 1981, 1982)

At least 50 native species of birds and mammals found on the Forest are classified as "game" or "furbearers" by the Oregon Department of Fish and Wildlife (Mills et al 1980). Hunters and trappers seek these species and their harvest is regulated by special seasons Game species include deer, elk, grouse, quail, geese, duck, bear, and cougar, furbearers include beaver, mink, nutria, muskrat, marten, and raccoon

Special habitats such as lakes and ponds, meadows, freshwater marshes, rocky ocean beaches, talus slopes, and colony nesting sites are uncommon but occur throughout the Forest (USDA Forest Service 1983a) These habitats are important because of the unique wildlife using them Special habitats are protected and managed on a site specific basis

Threatened, Endangered and Sensitive Species

There are 17 species of animals classified as either threatened or endangered by the U S Fish and Wildlife Service (USFWS) or as sensitive by the Regional Forester (Table III-13) Sixteen of these are documented as occurring on the Forest, the other is suspected because of suitable habitat.

Twenty-three plant species are included on the Regional Forester's list of sensitive plants for the Siuslaw National Forest Of these, six are Federal candidate (Category 2) species, nine are documented on the Forest, and 14 are suspected to occur on the Forest (Table III-14)

The Siuslaw National Forest consults with the U.S Fish and Wildlife Service when any proposed management activity may adversely affect any species listed as threatened or endangered Listed species and sensitive species are given special consideration to assure that any proposed management activity would not jeopardize their existence The objective of sensitve species management is to make management activities compatible with habitat requirements of these species and to actively manage to prevent a species from being listed as threatened or endangered.

Table III-13. Threatened, Endangered and Sensitive Animals

Common Name	Species	Designation	Occurrence
Alsea micro caddisfly	*Ochrotrichia alsea*	Federal candidate C2, R-6 sensitive	Small streams, springs and seeps Documented on the Forest
Aleutian Canada goose	*Branta canadensis leucopareia*	Federal endangered, R-6 sensitive	Winter migrant along coast in estuaries and wetlands
American peregrine falcon	*Falco peregrinus anatum*	Federal endangered; R-6 sensitive	No known nest sites, potential nesting habitat exists Several sightings on Forest
American white pelican	*Pelecanus erythorhynchos*	R-6 sensitive	Coastal shores and off-shore islands Documented on the Forest
Brown pelican	*Pelecanus occidentalis*	Federal threatened, R-6 sensitive	Common visitor along coastal shores and off-shore islands, does not nest in Oregon
California mountain kingsnake	*Lampropeltis zonata*	R-6 sensitive	Moist coniferous forests Documented on Forest
California wolverine	*Gulo gulo luteus*	Federal candidate C2, R-6 sensitive	Deciduous and coniferous forested habitats Documented on Forest
Common loon	*Gavia immer*	R-6 sensitive	Coastal lakes, rivers and estuaries Documented on the Forest
Ferruginous hawk	*Buteo regalis*	Federal candidate C2, R-6 sensitive	Open grassland and non-forested areas Documented on Forest
Haddock's caddisfly	*Rhyacophilia haddocki*	Federal candidate C2, R-6 sensitive	Small streams, springs and seeps Documented on the Forest
Long-billed curlew	*Numenius americanus*	Federal candidate C2, R-6 sensitive	Salt marshes, mudflats and beaches Documented on Forest
Marbled murrelet	*Brachyramphus marmoratus*	Federal candidate C2, R-6 sensitive	Mature and old-growth forests Documented on Forest
Northern bald eagle	*Haliaeetus leucocephalus*	Federal threatened, R-6 sensitive	Seven known active nest sites

Table III-13 Cont. Threatened, Endangered and Sensitive Animals

Common Name	Species	Designation	Occurrence
Northern spotted owl	*Strix occidentalis caurina*	Federal proposed, R-6 Sensitive	Nesting, roosting, and foraging sites identified throughout the Forest
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	Federal threatened, R-6 sensitive	Coastal meadows Three known native populations, one introduced population
Pacific western big-eared bat	*Plecotus townsendii townsendii*	Federal candidate C2, R-6 Sensitive	No known roost sites on Forest Suspected on Forest
Red-legged frog	*Rana auroa*	R-6 sensitive	Moist wooded habitats and riparian zones Documented on Forest
Northwestern pond turtle	*Clemmys marmorata marmorata*	Federal candidate C2, R-6 sensitive	Lakes, ponds and sloughs of large rivers Documented on Forest
Western snowy plover	*Charadrius alexandrinus nivosus*	Federal candidate C2, R-6 sensitive	Nests in sandy spits associated with estuaries Five primary nesting locations, only 4 are currently suitable
White-footed vole	*Arborimus albipes*	Federal candidate C2, R-6 sensitive	Woodland species in coniferous forests Documented on Forest

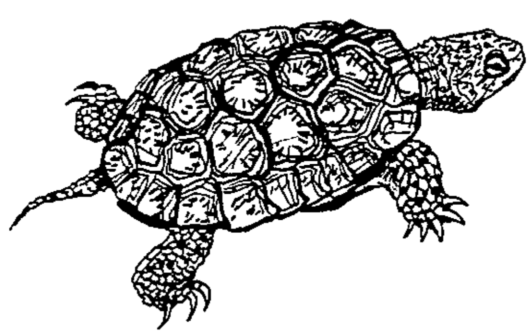


Table III-14. Threatened, Endangered and Sensitive Plants

Species	Common Name	Designation	Occurrence
Abronia umbellata breviflora	Pink sandverbena	Federal candidate C2; R-6 sensitive	Documented
Anemone oregana felix	Oregon anemone	R-6 sensitive	Suspected
Cardamine pattersonii	Saddle mountain bittercress	Federal candidate C2, R-6 sensitive	Documented
Cordylanthus maritimus palustris	Birdbeak	Federal candidate C2, R-6 sensitive	Suspected
Cyperus rivularis	Shining flatsedge	R-6 sensitive	Suspected
Erigeron peregrinus peregrinus	Subalpine daisy	R-6 sensitive	Suspected
Erythronium elegans	Glacier lily	Federal candidate C2, R-6 sensitive	Documented
Filipendula occidentalis	Queen-of-the-forest	R-6 sensitive	Documented
Geum triflorum campanulatum	Prairie smoke	R-6 sensitive	Suspected
Hydrocotyle verticillata	Water pennywort	R-6 sensitive	Suspected
Lewisia columbiana rupicola	Columbia lewisia	R-6 sensitive	Suspected
Limbella fryei	Frye's moss	R-6 sensitive	Suspected
Lycopodium inundatum	Bog clubmoss	R-6 sensitive	Documented
Montia diffusa	Branching montia	R-6 sensitive	Suspected
Ophioglossum vulgatum	Adder's-tongue	R-6 sensitive	Documented
Pholia sphagnicola	Moss	R-6 sensitive	Suspected
Plantago macrocarpa	Alas plantain	R-6 sensitive	Suspected
Poa kelloggii	Kellog's bluegrass	R-6 sensitive	Suspected
Poa laxiflora	Loose-flowered bluegrass	R-6 sensitive	Documented
Saxifraga hitchcockiana	Hitchcock's saxifrage	Federal candidate C2, R-6 sensitive	Suspected
Senecio flettii	Flett's groundsel	R-6 sensitive	Suspected
Sidalcea hirtipes	Hairy-stemed checker-mallow	R-6 sensitive	Documented
Silene douglassii orania	Douglas's silene	Federal candidate C2, R-6 sensitive	Suspected

Management Indicator Species

To estimate the effects of each alternative on fish and wildlife resources, certain species were identified as "management indicator species " Management indicator species were selected because a change in their population, in response to management activities, is believed to represent changes in a larger group of species Selection of management indicator species was based on the following categories as specified in 36 CFR 219 19:

1. Endangered and threatened plant and animal species identified on state and federal lists for the planning area.
2. Species with special habitat requirements that may be influenced significantly by planned management programs.
3. Species commonly hunted, fished, or trapped
4. Non-game species of special interest
5. Additional species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality

Ten species have been selected as management indicator species for the Suislaw National Forest. Table III-15 lists these species and reasons for their selection

Mink, mountain quail and species associated with mature deciduous mix habitat were included as management indicator species in the DEIS The are not included as management indicator speceis in the FEIS The mature deciduous mix species included sharp-shinned hawk, western grey squirrel and several species of warbler.

Mink was an indicator of riparian habitat Although the species resides primarily in riparian environments, the habitat features used by mink include a wide array of vegetative types and successional stages (Brown 1985) Since this species is not clearly keyed to specific habitat characteristics that would be influenced by planned management programs, it was removed from the list of management indicator species

Mountain quail was an indicator of grass-forb habitats. Mountain quail are closely tied to grass-forb habitats, but show no specific tie to any one vegetative community type Mountain quail habitat (early successional stages of a wide variety of plant communities) will be supplied in many areas over the planning period through Forest Plan implementation Since grass-forb habitat will continually be produced following timber harvest, there is no predicted shortage of such habitat Consequently, mountain quail is no longer considered a management indicator species. The best index to mountain quail habitat capacity is simply the acres of grass-forb

Mature deciduous mix habitat was assigned management indicator species to represent changes in such habitat over time These species were the sharp-shinned hawk, western grey squirrel, and a few species of warblers Brown (1985) does not list any of theses species as having specific habitat requirements found only in mature deciduous mix Instead, the sharp-shinned hawk and western grey squirrel have moderate to very high versatility indices, indicative of species that use many vegetative communities and successional stages. They both use mature deciduous mix habitat to some degree, but are not representative of other species that depend on such habitat Therefore the sharp-shinned hawk and the western grey squirrel are no longer considered management indicator species

Warblers are no longer considered management indicator species because their major habitat orientation in western Oregon is in forest edge environments and riparian shrub communities (Brown 1985) This characteristic, in addition to warblers being extremely migratory, makes them poor indicators of other species that depend on mature deciduous mix habitat that may be directly affected by planned management actions.

The National Forest Management Act of 1976 requires that all management prescriptions provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species (36 CFR 219.27). Specific "Management Requirements" were developed for species whose viability would be at risk if no management actions were taken to protect their habitats. (See FEIS Chapter II, "Management Requirements") Management Requirements have been established for all of the management indicator species except Roosevelt elk.

Table III-15. Management Indicator Species

Species	Selection Criteria	Habitat Feature
* Aleutian Canada goose	Federal endangered species	T&E habitat
* Bald eagle	Federal threatened species	T&E habitat
* Brown pelican	Federal threatened species	T&E habitat
Coho salmon	Ecological indicator, fished species	Pools in low gradient streams
* Marten	Special habitat requirements; trapped species, ecological indicator	Mature conifer (down logs)
* Northern spotted owl	Federal proposed, State threatened, non-game special interest, special habitat requirements, ecological indicator	Old growth & mature conifer (large trees, multi-storied, large snags, down logs)
* Oregon silverspot butterfly	Federal threatened species	T&E habitat
* Peregrine falcon	Federal endangered species	T&E habitat
* Pileated woodpecker	Special habitat requirements, ecological indicator	Mature conifer (large snags, down logs)
* Primary cavity excavators	Non-game special interest, special habitat requirements, ecological indicator	Snags
Roosevelt elk	Hunted species, ecological indicator	Mix of forage and cover areas
* Western snowy plover	Special habitat requirements, non-game special interest	Open sand near estuaries

* Species for which Management Requirements have been established

The following discussion provides specific information on each of the Forest's management indicator species:

Northern Spotted Owl - The northern spotted owl is listed as a sensitive species by the Regional Forester and as threatened by the State of Oregon. It is currently proposed for federal listing as a threatened species.

Suitable habitat on the Suislaw National Forest includes mixed old growth and mature stands with a multi-layered canopy with closure of more than 60%. Dominant overstory tree species are Douglas-fir, western hemlock, and western redcedar The dominant trees in nesting habitat exceed 32 inches dbh Feeding habitat may include stands averaging 18 inches or greater if understory structure and dead and down material are present in moderate or high quantities The understory layers include primarily western hemlock, western redcedar, other conifers, and hardwoods. There is an abundance of dead standing and fallen decayed trees as well as large, tall trees suitable for nesting (with broken tops, cavities, mistletoe brooms, and platforms of branches)

Approximately 135,000 acres of old growth and mature stands are currently considered suitable spotted owl habitat Habitat capability of these stands is estimated at 59 pairs of owls according to projections made using procedures developed for the 1988 Supplement to the EIS for an Amendment to the Regional Guide (SEIS) (USDA Forest Service 1988a). Current inventories have located 24 pairs of spotted owls on the Forest

The Forest network for spotted owls conforms to the standards and guidelines established by the December 1988 Record of Decision for the SEIS The SEIS provides direction for the maintenance of habitat needed to assure continued existence of Coast Range spotted owl populations. To meet the Management Requirements, current distribution of owl habitat on lands unsuitable for timber production was determined Spotted Owl Habitat Areas (SOHAs) were then designated on lands suitable for timber production as needed to meet distribution standards (See FEIS, Appendix H and Appendix I, Figure I-1 for a map of these sites.)

Reserved areas (Wildernesses, Cascade Head Scenic Research Area and other areas unsuitable for timber management) provide enough suitable owl habitat to support eight pairs of owls Twenty-two SOHAs are located in areas which would otherwise support some level of programmed harvest Each SOHA includes approximately 2,000 acres of suitable owl habitat within a 1 5 mile radius Although some SOHAs have no verified presence of owls, they are needed to insure adequate distribution of habitat sites Additional habitat exists outside of the reserved areas and the Management Requirement level of SOHAs Table III-16 summarizes this data.

Table III-16. Occupancy(1) by Spotted Owls (Number of pairs)

LOCATION	BREEDING PAIRS	NON-BREEDING PAIRS	PAIR OCCUPANCY UNKNOWN
RESERVED LANDS			
Cummins Cr Wilderness (2 sites)		1	2
Drift Cr Wilderness	1	1	
Rock Cr Wilderness			1
Cascade Head Exp Forest (2 sites)			2
MR Level SOHA NETWORK			
Drift Cr #4 (Hebo)			1
Skunk Cr #5	1		
Cedar Cr #6	1		
E Perkins Cr #7			1
Wassen Cr. #8		1	
W Perkins Cr #9		1	
Peach Cr #10		1	
Middle Fk Smith R #11	1	1	
N Fk Smith R #12	1		
Bailey Ridge #15			1
Minerva #16			1
Cleveland #17		1	
Porter Cr. #18	1		
Misery Cr #19			1
S Deadwood Cr #20		1	
Camp Cr. #21	1		
Stony Point #26			1
Franklin Ridge #27	1		
Chinquapin Point #28	1		
Randall #29			1
Cougar Cr. #32		1	
Prong Cr #37		1	
ADDITIONAL HABITAT			
Arnold Cr #33	1		
Jump #38	1		
Table Mountain #45	1		
Trail (Marys Pk) #46		1	
Crazy Cr			1
Minister		1	
Powder Ridge			1
TOTAL(2)	12	12	14

(1) Occupancy verified during the period 1984-1989
(2) Although there are only 37 sites, the across table total is 38 because Middle Fork Smith River has one breeding pair and one non-breeding pair

Pileated Woodpecker and Marten - Pileated woodpecker and the marten (also known as pine marten) are management indicator species for mature conifer (over 80 years old) The pileated woodpecker requires large standing dead trees and mature/old growth trees for nesting and roosting as well as down logs which support insect populations as a food source

There is no systematic survey data for pileated woodpeckers or marten on the Forest. Most information comes from sightings and trapping records Pileated woodpeckers are commonly seen throughout the Forest, marten are uncommon Existing habitat capability on the Forest is estimated at 508 pileated woodpecker pairs and 266 marten Management Requirements for these species are described in Appendix H

Primary Cavity Excavators - This group includes the species that construct nesting and foraging cavities in snags On the Suislaw National Forest, this includes, among others, the northern flicker, red-breasted sapsucker, downy woodpecker, hairy woodpecker, and red-breasted nuthatch. Pileated woodpecker is also a primary cavity excavator, but its habitat requirements are addressed separately By providing habitat for primary cavity excavators, the requirements of secondary cavity users, those species which use either natural cavities or the cavities constructed by primary cavity excavators, are also met. Existing habitat capability on the Forest is estimated to be 75% of biological potential for cavity users

Cavity user habitat consists of dead and defective trees (snags) that are at least 17 inches dbh and taller than 20 feet This habitat occurs commonly in older forests as a result of decay and natural mortality and in mature stands following fires. Timber harvest has eliminated much of this habitat on portions of the Forest The Management Requirement for cavity user habitat is to ensure viability of dependent species by providing habitat for at least 20% of the potential population. Regional direction is to provide habitat for at least 40% of the potential population in each subbasin

Roosevelt Elk - The Roosevelt elk population has grown for the past 20 years because of increases of forage in clearcuts (ODFW 1983) Maintenance of large populations will require careful scheduling of clearcuts, forage improvement projects, road closures, and special hunts The mild climate in the Coast Range allows an elk herd to stay in the same drainage all year so most of the Forest is winter range (W Castille, ODFW, personal communication). The present habitat capability is approximately 9,960 animals; the current elk population is estimated at 3,400. Not all of the habitat is currently occupied and the habitat that is occupied is not being used to full capacity

Snowy Plover - The snowy plover is listed as a sensitive species by the Regional Forester and as a threatened species by the State of Oregon It is also a federal candidate species (Category 2).

Snowy plover nests, forages, and winters in sandy areas virtually devoid of vegetation, driftwood, and other structure near salt or brackish waters of the ocean and bays On the Forest, these areas are located above high tide on sandy spits associated with small estuaries as streams enter the ocean Five primary nesting areas have been identified on the Forest; only four currently provide suitable habitat at the time (Sutton Creek, Siltcoos River, Tahkenitch Creek, and Tenmile Creek) The beach immediately north of the Umpqua River north jetty historically supported consistent populations of nesting plovers, but is no longer suitable due to erosion caused by wave action and driftwood deposition A total population of 20 to 25 birds has been identified on the Forest (ODFW yearly surveys) Coastal Oregon has about 50 to 75 birds Inland populations in California, Nevada, and eastern Oregon are estimated at about 5,500 birds (C Bruce, ODFW, personal communication). The eastern Oregon population has decreased by 40% since 1980 due to high water levels (ODFW, unpublished data)

The coastal habitat for this species changes from year to year due to altered stream courses, high tides, and wind. Human activity and dune stabilization further affect the plover population on the Coast (Jacobs and Bruce 1983) In addition, predation from crows reduces nesting success (Wilson 1980) Heavy recreational use has resulted in controversy about what types and amounts of recreation are compatible with the species' habitat (U.S. Fish and Wildlife Service 1985). Placement of dredge spoils, control of European beachgrass, and modification of foredunes are possible methods of improving habitat for plovers (U.S Fish and Wildlife Service 1985).

Bald Eagle - The bald eagle is a federally-listed threatened species that is sensitive to management in riparian habitat, estuarine areas, and old-growth stands (USDA Forest Service 1981a). Potential nest sites consist of stands of older mature or old-growth conifer that are close to feeding areas and are relatively free from disturbance. Although the bald eagle population is much less than it was 100 years ago, occupancy has increased slightly on the Forest, from five nest sites in 1980 to seven in 1989. USFWS recovery goal for the Forest is 23 pairs. In addition to protecting the seven existing nest sites, habitat will be provided for 16 potential nest sites as part of implementation of the Pacific Bald Eagle Recovery Plan (USFWS 1986) (Figure III-24)

Oregon Silverspot Butterfly - The Oregon silverspot butterfly is a federally-listed threatened species dependent on coastal meadows in early stages of vegetational succession The area of meadows has been severely reduced by human developments, lack of fire, and other disturbance (Ripley 1983). The insect persists on only a few sites in western Oregon and Washington. Four of these sites are on the Forest: the salt-spray meadows between the mouths of Big Creek and Rock Creek, the coastal headland at Bray Point and the grassy summits of Mt. Hebo and Fairview Mtn (Figure III-25) The species is being managed under provisions approved by the U.S Fish and Wildlife Service (Clady and Parsons 1984).

California Brown Pelican, Aleutian Canada Goose, American Peregrine Falcon - Brown pelican is a federally listed threatened species. Aleutian Canada goose and peregrine falcon are federally listed endangered species All three are management indicator species on the Siuslaw National Forest. Brown pelicans and Aleutian Canada geese do not breed on the Forest, but do seasonally use habitat along the coastal areas Peregrine falcons use coastal cliff habitat which is suitable as nesting habitat Other use of the Forest by peregrine falcon occurs during spring or fall migration.

Management Practices

The Forest Service is responsible for providing habitat for all existing native species and desirable non-native species (36 CFR 219 12g) The state of Oregon is responsible for managing wildlife populations Close coordination between the Siuslaw National Forest and ODFW is required to effectively manage wildlife habitats and populations

Habitat conditions may be altered through management practices to provide food, cover, isolation, or nest sites for a particular species or group of wildlife species. Improvements include seeding and managing of forage for deer and elk, building nest platforms for eagles, killing live trees to provide snags for primary excavators, planting forage and creating potholes for waterfowl, and placing nest boxes for small birds and mammals.

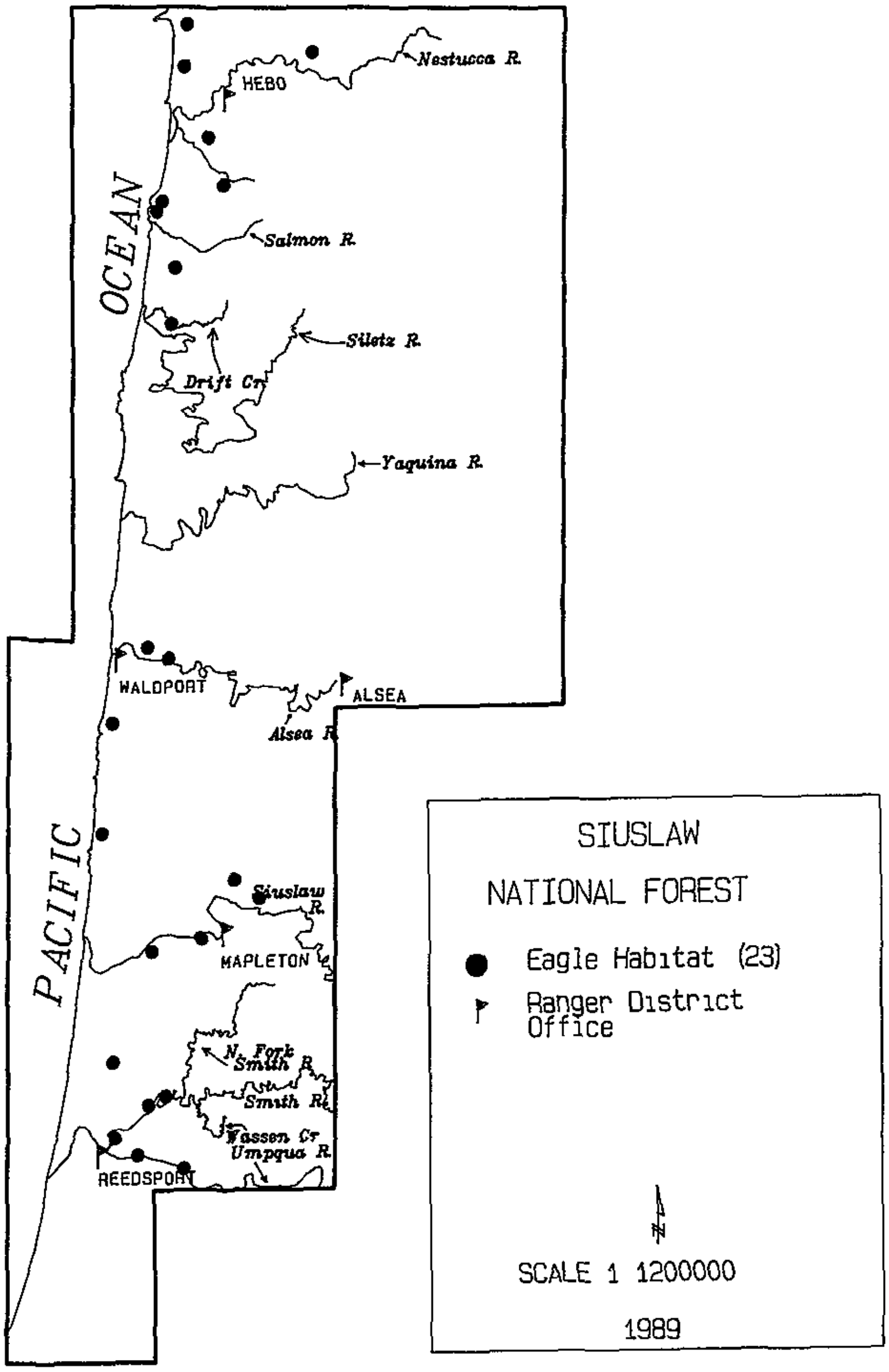


FIGURE III-24 BALD EAGLE NEST SITES

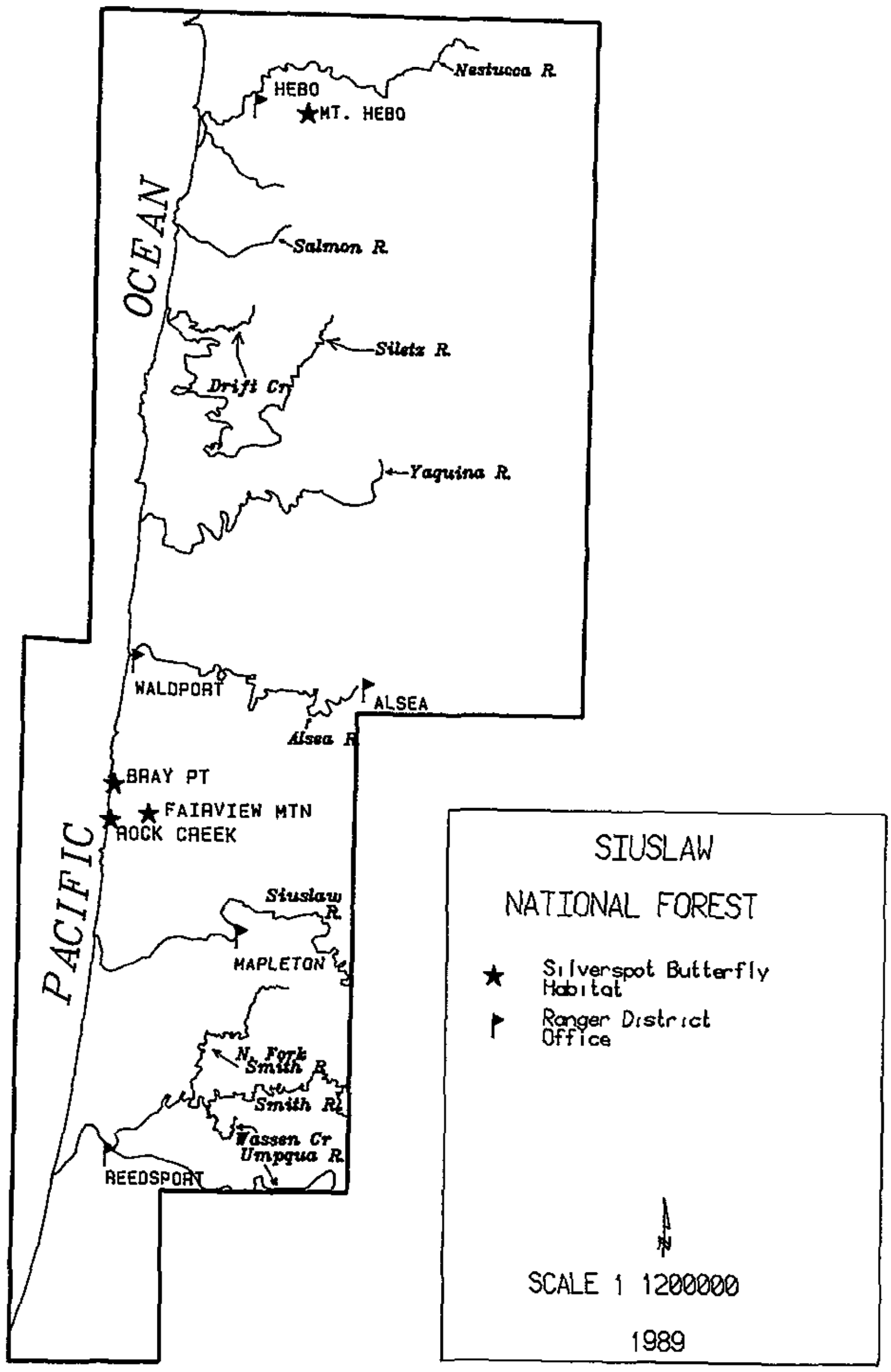


FIGURE III-25. SILVERSPOT BUTTERFLY HABITAT

Resource Use

Protection of wildlife is a national concern. The Endangered Species Act (ESA) and the National Forest Management Act (NFMA) require maintenance of viable populations of wildlife. Wildlife resource management provides wildlife-related recreation and social and economic benefits to Oregon and its human population.

The major wildlife-related recreation on the Forest is big-game hunting The Forest provides habitat to support approximately 34,000 blacktail deer. About 59,500 wildlife/fish user days (WFUDs) are produced in association with deer hunting on the Forest. Elk hunting generates 23,500 WFUDs. (ODFW 1989 Big Game Statistics)

Non-consumptive use of wildlife is another recreational activity. It generated 55,000 WFUDs in 1989, and is concentrated on shorebirds, ducks, bald eagles, hawks, deer, and elk.

Historic Trends

Wildlife habitats are ever changing as a result of naturally occurring events such as fire, disease or wind, activities of humans, or just by the passage of time Major wildfires and timber harvest activities have changed much of the wildlife habitat in the Coast Range in the past 150 years. Natural succession following the fires coupled with human use of timber resources has produced the pattern of habitats that exist today. Wildlife populations have changed in response to changes in the habitats that support them The result has been a decline in mature and older forest habitats and an increase in earlier seral stages. As a result populations of species dependent on older forests have declined; populations of species associated with younger stands have increased

Future Trends

Habitats will change in response to natural events and human activities All wildlife populations will continue to exist, but there will be some changes in relative abundance and species density Management Requirements are designed to assure a diverse and healthy wildlife resource for the future Generally, species such as deer and elk, that are favored by young conifer communities, shrub and grass/forb stages will be more abundant than those requiring mature and old growth habitats

Elk populations are increasing in response to abundant forage As their numbers expand, hunting demand will also increase As human population increases and more leisure time is available, demand for non-consumptive wildlife-related recreation will increase (ODFW 1984)

Resource Relationships

Wildlife use all kinds of habitat When conditions change on an area, the species of wildlife using the area change

On a given area of the Forest, managing timber on short rotations reduces habitat for species dependent upon mature and old-growth conifer habitats. Spotted owls require old growth and mature conifer stands with multi-layered canopy and large snags and down logs Elk prefer open areas such as clearcuts and natural meadows for forage A given area of the Forest will not provide optimum habitat for both of these species. Thus, some areas must be managed differently than others in order to provide habitat for a wide range of species on the Forest

On the other hand, some habitat used by one species can, in some cases, be used by other species. For example, the pileated woodpecker and marten can both use the old-growth habitat of the spotted owl

RECREATION

Overview

The Forest, because of its geographic location at the ocean-forest interface, offers unique recreational and educational opportunities found on no other National Forest in the Pacific Northwest Fifty miles of Pacific Ocean frontage is the most distinctive feature of the Forest and the one that distinguishes it from any other National Forest in the United States outside of Alaska.

The narrow strip of sand dunes about 1-1/2 miles wide and stretching a distance of approximately 40 miles from north of Florence to Coos Bay receives the heaviest recreational use on the Forest. The Oregon Dunes National Recreation Area (NRA), which attracts recreationists from around the nation and the world, is located in this coastal strip. The Forest's Cape Perpetua Visitor Center, Sand Lake Area, Sutton Area, and Tillicum Campground, plus a variety of state and private facilities, also contribute to the popularity of the coastal area for recreationists

Interior portions of the Forest are characterized by steep slopes, dense underbrush, and an almost unbroken forest cover. Most recreational access and use of these areas requires roads, trails, and developed sites. Two small places on the Forest, Marys Peak and Mt. Hebo, are sub-alpine in nature and offer some cross-country type recreational opportunities. Extensive timber harvesting and associated road construction has left the Forest with very little undeveloped area The three small Wildernesses and a few undeveloped areas that exist on the National Forest provide some limited opportunities for semiprimitive nonmotorized (SPNM) recreation in the Oregon Coast Range. The Forest is an important area for fishing and big game hunting

The dunes of the Oregon Dunes NRA and Sand Lake provide semiprimitive motorized opportunities (SPM) and attract off-road vehicle (ORV) users from Oregon, Washington, and California. Eighty-five percent of the total ORV use of coastal dunes in Oregon is on the Siuslaw National Forest About three-quarters of the Forest ORV use is at the Oregon Dunes NRA The remainder is mostly at Sand Lake, with a small amount at Sutton and the Dallas watershed Steep, densely wooded terrain limits motorized recreational use to roads and trails on other areas of the Forest.

Within the Forest's eight-county area, the state has nine campgrounds and 22 day-use sites, the Bureau of Land Management has five sites There are numerous private motels, resorts, cabins, and a few campgrounds Most private campgrounds are co-owned and are not open to the public. Currently there are no known plans for further private development of public campgrounds. State properties in the vicinity of the Forest are almost completely developed and the state is not planning any additional developed sites (personal communication, A Grapel with State Parks Dept. planners) These factors could lead to heavy use of Forest facilities.

Current Situation

Resource Use

The Forest has many recreational resources and is close to population centers According to use reports [unpublished data, Recreation Information Management (RIM) System], recreation use on the Forest in 1984 was mostly camping, auto travel, ORV use, hiking and walking, viewing scenery, fishing, picnicking, and hunting and watching wildlife. Most of this was concentrated along the Coast. The Oregon Dunes NRA hosts about half of the total Forest recreation use (about 1-1/2 million recreation visitor days (RVDs) in 1982 - unpublished data, RIM) This ranks the Forest in the top third in the Pacific Northwest Region with regard to recreation use

Recreational resources on the Forest can be described in a variety of different ways. The following are explanations of three methods that the Forest has used to discuss and analyze recreation resources in the Forest Planning process·

1. Recreational Opportunity Spectrum categories
2. Developed and dispersed recreation categories
3. Specifically designated areas

Recreation Opportunity Spectrum

Recreational opportunities are classified according to where they fit in the Recreation Opportunity Spectrum (ROS) The ROS system describes six categories which, taken together, encompass the range of recreation settings people could experience on the Forest - from an undisturbed, natural environment with little or no contact with other people, to a substantially modified environment with a high number of contacts with others Of the six categories, only four occur on the Forest: semiprimitive nonmotorized, semiprimitive motorized, roaded natural, and rural See the glossary for a brief description of each of the ROS classes The ROS classes as a percent of the forest are shown in Table III-17 (Lilja 1982)

Table III-17 Recreation Opportunity Spectrum Class

ROS Class	Acres	Percent of Forest
Primitive	0	0%
Semiprimitive Nonmotorized	57,000	9%
Semiprimitive Motorized	10,000	2%
Roaded Natural	51,000	8%
Rural (including Roaded Modified)	513,000	81%
Urban	0	0%

Developed and Dispersed Use

Developed Sites - The Forest has campgrounds, picnic grounds, organization sites, observation sites, a visitor center, and three sites on the National Register of Historic Places. The Forest operates 88 such sites with a combined capacity for 9,660 people at one time (PAOT), and a maximum capacity for about 950 thousand recreation visitor days (MRVD) per year. In 1982, use was 859 MRVDs Of the developed sites, 55% are classified as rural and 45% as roaded-natural.

Dispersed Areas - Dispersed areas are comprised of all Forest lands that lie outside of developed sites In 1982 there were 760 MRVDs of dispersed recreational use in the various ROS classes (based on unpublished RIM reports and ROS inventories). Table III-18 shows the distribution of dispersed recreation among ROS classes

Table III-18. ROS Class as Percent of Dispersed Use.

ROS Class	Percent of Total Dispersed Use
Semiprimitive Nonmotorized	1
Semiprimitive Motorized	17
Roaded-Natural	36
Rural (including Roaded-Modified)	46

Management of dispersed recreation on the Siuslaw National Forest focuses on ORV use of the open dunes. Other dispersed uses include automobile travel, hiking, fishing, and hunting. Most is daytime use and since most of the Forest is free from snow, these activities occur year-round. Marys Peak and Mt. Hebo hold some snow and provide limited winter sports opportunities.

In 1984, there were about 80 miles of trails on the Forest Over half are within recreation areas such as the Oregon Dunes NRA and Cape Perpetua Scenic Area, and they receive the bulk of the use Other trails are generally short and remote.

Specifically Designated Recreational Areas

Several areas on the Forest have Congressional designations or special recreational opportunities that could qualify them for special management attention These areas are listed and discussed below.

Congressionally-established Areas - The following areas have been established by the United States Congress:

a. *Oregon Dunes National Recreation Area* (Oregon Dunes NRA) - In 1972, Congress established the Oregon Dunes NRA to "provide for the public outdoor recreation use and enjoyment of certain ocean shorelines and dunes, forested areas, fresh water lakes, and recreational facilities in the State of Oregon by present and future generations and the conservation of scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters." A plan for the management of the Oregon Dunes NRA was approved in 1979. The direction in that plan, which remains unchanged, is summarized in Appendix D (Management Area 10)

b. *Cascade Head Scenic-Research Area* (CHSRA) - In 1974, Congress established the CHSRA to "provide present and future generations with the use and enjoyment of certain ocean headlands, rivers, streams, estuaries, and forested areas; to insure the protection and encourage the study of significant areas for research and scientific purposes, and to promote a more sensitive relationship between man and his adjacent environment... " A plan for the management of the CHSRA was required by the enabling legislation and was approved in 1976. The direction in that plan, which remains unchanged, is summarized in Appendix D (Management Area 6). See FEIS, Chapter III, "Research" for additional information.

c. *Wildernesses* - The Oregon Wilderness Act of 1984 established three Wildernesses on the Forest: Cummins Creek, Drift Creek, and Rock Creek They are the only Wildernesses in the Oregon Coast Range, and total about 22,500 acres They are a key source of semiprimitive nonmotorized recreation (see FEIS, Chapter III, "Wilderness").

Special Interest Areas - Classified by the Regional Forester under the authority of the Code of Federal Regulations (36 CFR 294.1, Special Areas), these areas possess unusual scenic, historic, prehistoric, scientific, natural or other special characteristics They are managed principally for recreation in their natural condition The special characteristics are available for public study, use, and enjoyment The Forest has two existing areas and two potential areas The areas are shown in Figure III-26 and are described as follows:

Existing Special Interest Areas

1 *Cape Perpetua Scenic Area* was classified by the Regional Forester in May, 1967 A 1974 amendment established the size at 990 acres. Since the 1979 Alsea Unit Plan the area has been managed as 2,060 acres This area is located north of Florence, on the basaltic headland known as Cape Perpetua Management concentrates on the spectacular scenery associated with the ocean and headland adjacent to Cape Perpetua Visitor Center There is also a substantial amount of Sitka spruce natural forest, some of it old growth

2 *Marys Peak Scenic-Botanic Area* was classified by the Regional Forester in July 1989 With an elevation of 4,097 feet, Marys Peak is the highest point in the Oregon Coast Range. On clear days, it provides panoramic views of the Pacific Ocean, the Coast Range, the Willamette Valley and the snow-capped peaks of the Cascade Range from Mt Rainier to Mt Thielsen The 924 acres contain a 130-acre meadow, rare plants, and an unusual noble fir community It is one of two areas on the Forest which hold snow for any length of time, thus providing an opportunity for winter sports.

Potential Special Interest Areas

1 *Cape Perpetua Scenic Area* has potential for enlargement to 2,780 acres The additional acreage would provide more logical management boundaries along an existing road on the north and east sides of the existing Scenic Area

2 *Mt Hebo* was given a recreation emphasis in the Hebo Unit Plan It is a long, gentle ridge-top with several points above 3,100 feet elevation, making it the second highest mountain on the Forest Mt Hebo has large, open, subalpine meadows It offers panoramic views, especially of the Pacific Ocean, and opportunities for dispersed winter sports activities. It is one of two areas on the Forest where the threatened Oregon silverspot butterfly lives Several rare plants, including a newly described species of fawn lily, grow here It has the potential for classification as a 1,700-acre Scenic-Biologic Area

3 The *Kentucky Falls* area contains a concentration of waterfalls and other scenic stream features Three waterfalls are more than 60 feet high, the highest is over 100 feet There are also many shorter drops and slides The 100-foot falls (on the North Fork Smith River) and the lower falls of Kentucky Creek (about 90 feet high) are visible simultaneously from the confluence of the two streams Most of the area is undeveloped and heavily timbered It has potential for classification as a Scenic Area of up to 2,900 acres

Roadless Areas - In the 1984 Oregon Wilderness Act, Congress designated the Cummins Creek, Drift Creek, and Rock Creek areas as Wilderness The Act also stated that additional areas need not be considered for Wilderness in the current Forest Plan

Other roadless areas that meet the minimum requirements for Wilderness classification as contained in the Wilderness Act of 1964 and considered for other types of use in this FEIS are: four areas on the Oregon Dunes National Recreation Area (Woahink, Threemile Lake, Umpqua Spit, and Tenmile); several areas adjacent to the Drift Creek Wilderness (Drift Creek Adjacent); an area on the north slopes of Mt. Hebo (Hebo-Nestucca); and the Wassen Creek area (formerly called Smith Umpqua). These areas are described in FEIS, Appendix C and in FEIS, Chapter III, "Undeveloped".

Undeveloped Areas - Roadless areas, listed above, could be reduced in size and still provide SPNM recreation. In addition, some land surrounding the Kentucky Falls area (North Fork Smith River) could be allowed to revert to its natural condition, so that about 5,800 acres could provide SPNM recreation after 50 years. See FEIS, Chapter III, "Undeveloped".

Other areas, although too small to provide the solitude and spaciousness needed for semiprimitive recreation, can still provide a degree of the experience, particularly undisturbed landscapes These should be at least 500 acres Examples include research natural areas and portions of some spotted owl habitat areas.

Potential Wild and Scenic Rivers - Thirteen rivers were inventoried to determine their eligibility for inclusion in the National Wild and Scenic (W&S) Rivers System Seven of these were determined to be eligible for inclusion in the Wild and Scenic Rivers system. See FEIS, Appendix L and FEIS, Chapter III, "Wild and Scenic Rivers."

Other Areas - The **Sand Lake** area contains open sand that receives a considerable amount of developed and dispersed (off-road vehicle) recreation. It was given special management in the Hebo Unit Plan and is covered by a management plan prepared jointly with Tillamook County and the State of Oregon in 1980. Most of the management direction in that plan will be brought forward into the Forest Plan

The **Sutton** area is located on the north end of the Coos Bay Dune Sheet, and is separated from the Oregon Dunes NRA by the Siuslaw River and the city of Florence It contains dunes and related vegetation, lakes, and several estuaries, and harbors sensitive animals (snowy plover) and plants (bog club-moss). Each FEIS alternative incorporates one of six alternatives from the Sutton management planning effort. FEIS, Appendix F describes the Sutton area management alternatives

Management Practices

Developed recreational opportunities are provided by: protecting potential sites, constructing appropriate sites when and where needed; and maintaining sites in a safe, sanitary, and pleasing condition.

Dispersed recreational opportunities are provided by constructing and maintaining facilities (primarily trails and trailheads) and by managing ORV use (law enforcement and visitor contact).

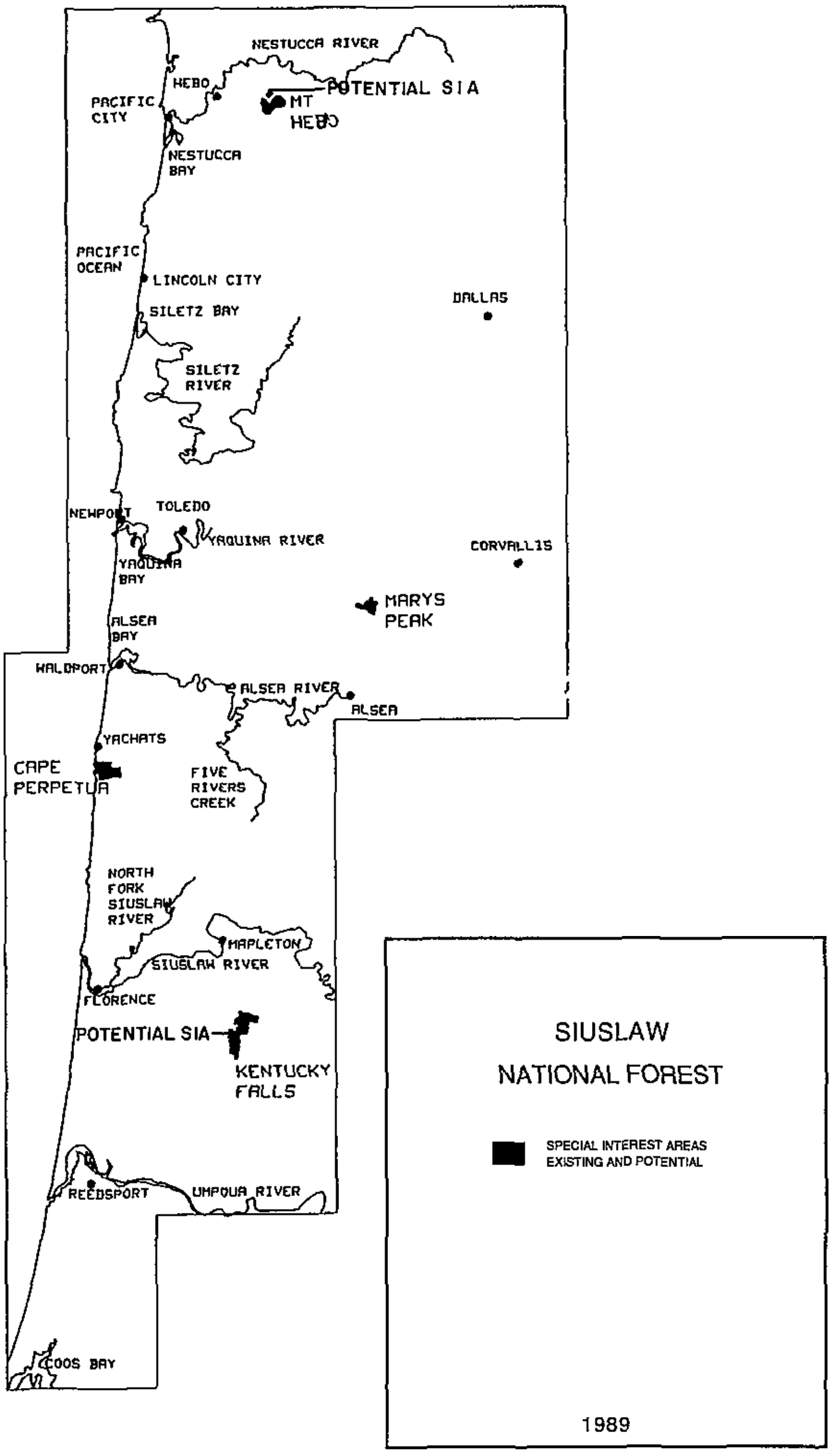


FIGURE III-26 POTENTIAL SPECIAL INTEREST AREAS ON THE SIUSLAW NATIONAL FOREST

Historic Trends

Table III-19 shows the reported recreational use for 1972 and 1982, and the percentage change over those years:

Table III-19 Change in Recreational Use from 1972 to 1982

	1972 (MRVDs)	1982 (MRVDs)	Change
Developed	413	859	+108%
Dispersed	565	760	+35%
Total	**978**	**1,619**	**+66%**

Future Trends

Recreation demand, measured in RVDs, refers to the extent which the public desires a particular recreation activity, experience or setting The demand projections used in this plan are adapted from the Oregon Statewide Comprehensive Outdoor Recreation Plan (Oregon Dept of Transportation 1978) and the Pacific Northwest Regional Guide (1984) on Wilderness and Primitive type recreation demand The extent to which the demand is met depends on the available supply of settings, inventoried here by ROS classes. The Wilderness demand projections from the Pacific Northwest Regional Guide were used to estimate demand for semiprimitive nonmotorized recreation because the 1978 Oregon Statewide Comprehensive Outdoor Recreation Plan did not project demand by ROS categories Since the relationship between supply and demand in recreation is very complex, it is best to focus on trends rather than specific RVDs. Table III-20 displays expected demand by ROS classes.

Table III-20. Trends in Recreation Demand by ROS Classes

ROS Class	Current (1982) Use in MRVD (1)	5th Decade Avg. Annual Demand in MRVD (2)	Avg. % Change per Decade
SPNM	10 0 (3)	122 8	27% (4)
SPN	242 0	482 0	20%
RN+R			
Dispersed	623 2	730 5	3%
Developed	859 0	1,224 0	8%

(1) Based on unpublished RIM reports and ROS inventories
(2) Demand figures are based on Oregon Statewide Comprehensive Outdoor Recreation Plan (Oregon Department of Transportation 1978) projections adjusted for the Siuslaw N F and the Guide on Wilderness Primitive type recreation demand (USDA 1984)
(3) Current use of SPNM areas is much less than potential demand because of the limited supply of SPMN opportunities
(4) Based on Pacific Northwest Region demand projections for SPNM recreation (USDA 1984)

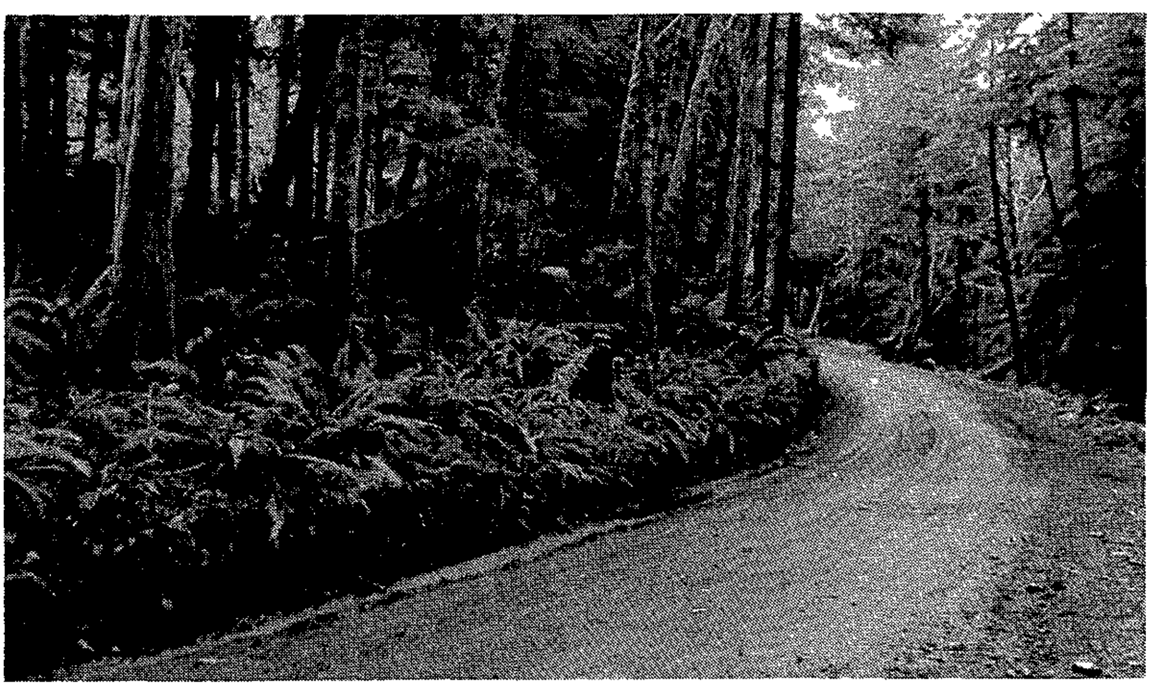
Recreational use is increasing in all ROS classes on the Forest. Projected demand for opportunities in the rural and roaded-natural ROS classes can be met for the next 50 years Based on calculations using data on Wilderness and Primitive type recreation demand contained in the Pacific Northwest Regional Guide, the demand for semiprimitive nonmotorized opportunities is projected to increase significantly over the planning period Because of a deficiency of unroaded, large blocks of land, the Forest will not be able to meet demand for semiprimitive nonmotorized and semiprimitive motorized recreation over the next 50 years

Resource Relationships

Many recreation opportunities depend upon, or are compatible with, other uses Recreational use on most of the Forest depends on the road system built and maintained to facilitate timber harvest Other recreation opportunities are associated with fairly large contiguous areas with natural landscapes that provide users a sense of solitude and remoteness Management for such opportunities is less compatible with timber harvest, roads, and power or electronic facilities, but does provide habitat for wildlife species dependent on mature or old-growth forests and protects soil and scenery

Recreation opportunities and wildlife are closely related, and healthy populations of fish and game are needed for fishing and hunting Recreation use can disturb wildlife, so some activities may be restricted in wildlife habitats that are in short supply.

Semiprimitive nonmotorized recreational opportunities are incompatible with recreation activities involving the use of motor vehicles, including ORVs



WILDERNESS RESOURCE

Overview

The Wilderness Act of 1964 defines Wilderness as a condition where the free play of natural forces and the natural succession of ecosystems are allowed to take place; where humans are temporary visitors.

Current Situation

The Oregon Wilderness Act of 1984 established three Wildernesses on the Forest: Cummins Creek, Drift Creek, and Rock Creek (see Figure III-27). These areas total about 22,500 acres. Each Wilderness was inventoried to determine the existing Wilderness Resource Spectrum (WRS) classification The overall classification for each Wilderness is semiprimitive because of their small size, proximity to roads and sounds of nearby logging activity and vehicle traffic Portions of each Wilderness meet primitive WRS conditions for some criteria used in the evaluation but, in general, Cummins Creek, Drift Creek and Rock Creek are classified as semiprimitve. Because of the steep terrain and heavy understory shrub cover, recreational use of the Wildernesses is limited to existing trails and dispersed campsites.

Cummins Creek Wilderness

This 9,173-acre Wilderness is in Lane County on the Waldport Ranger District The terrain is generally steep and broken, with unstable soils on the steeper slopes The two major streams, Cummins Creek and Bob Creek, drain directly into the Pacific Ocean and have important runs of anadromous fish. This heavily timbered Wilderness is bounded by roads. Its western portion is the only old-growth Sitka spruce forest in the Oregon Wilderness system Coastal stands of large Sitka spruce change gradually to stands of second-growth Douglas-fir, western hemlock and red alder inland Recreational use is very light, consisting mostly of fishing and hunting The only development within the Wilderness is a trail which extends the length of Cummins Ridge The Oregon Coast Trail is proposed to follow the west edge of the Cummins Creek Wilderness.

Drift Creek Wilderness

This 5,798-acre Wilderness is in Lincoln County on the Waldport Ranger District The terrain is broken and uneven with long slopes and unstable soils The Wilderness includes a portion of Drift Creek, which is a tributary of the Alsea River. Drift Creek has runs of chinook and coho salmon and steelhead. Several pairs of spotted owls live in old-growth Douglas-fir stands Blacktail deer and Roosevelt elk are common. Recreational use is fairly light, since developments consist of only the Horse Creek and Harris Ranch trails, a total of about 8-1/2 miles Fishing, hunting and hiking are the most popular recreation activities.

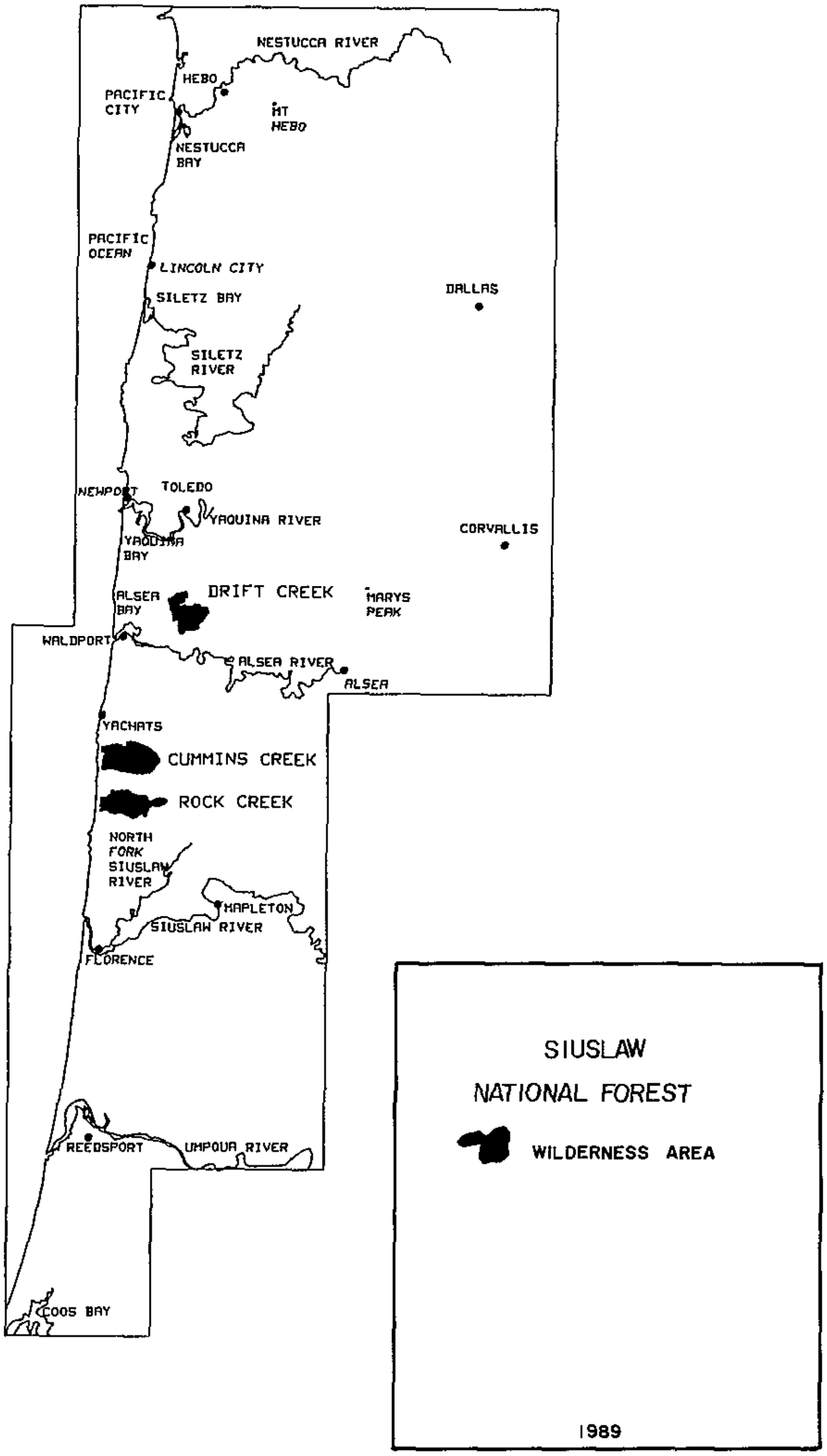


FIGURE III-27 WILDERNESSES ON THE SIUSLAW NATIONAL FOREST

Rock Creek Wilderness

This 7,486-acre Wilderness is in Lane County on the Waldport Ranger District and includes less than 40 acres of private land The generally steep and broken terrain is prone to landslides The Rock Creek drainage is entirely within the Wilderness, as are the headwaters and north slope of Big Creek The streams are separated by a broad ridge topped with a few meadows. Both streams drain into the Pacific Ocean, and are managed for wild runs of anadromous fish by the Oregon Department of Fish and Wildlife. The Wilderness is covered with second-growth conifers and dense ground cover. Roads completely surround it The proposed Oregon Coast Trail would follow the west edge. Recreational use is very light, because there are no developments, and dense brush makes cross-country travel very difficult

Management Practices

Semiprimitive Wilderness areas are managed in such a way that minimum onsite controls and restrictions may be present but are subtle Current practices used in the Wildernesses include: marking of boundaries to discourage intrusions of incompatible activities; prohibition of incompatible management activities; recreational use; construction and maintenance of trails and trailheads; rehabilitation of natural conditions; law enforcement and visitor contacts.

Historic Trends

When settlers began moving into Oregon, the Coast Range were Wilderness The amount of land in Wilderness condition was reduced in the first half of this century by construction of railroads, roads, and residences, and by agriculture and logging Beginning in the 1950s, there was a marked increase in timber harvest and road construction The Oregon Wilderness Act of 1984 preserved 22,500 acres in the three Wildernesses on the Forest.

Future Trends

Except for a few trails and light recreational use, conditions in the three Wildernesses will continue to change primarily as the result of natural processes rather than human activities.

Resource Relationships

Wilderness areas provide wildlife habitat, preserve watersheds, and protect ecological, geological, scientific, historical, educational and scenic amenities. They can provide primitive and semi-primitive recreation opportunities at low use levels.

UNDEVELOPED AREAS

Overview

Some Forest lands have undeveloped characteristics now, or would have in time without further development and if existing development was abandoned Steep slopes and unstable soils have restricted development on portions of the Forest despite extensive timber harvesting nearby These portions are called undeveloped areas.

Current Situation

There are several areas on the Forest which are larger than 2,500 acres and remain essentially undeveloped They include all areas considered for Wilderness in the Roadless Area Review and Evaluation II (RARE II) process and several undeveloped parcels of land adjacent to Wildernesses or roadless areas. The RARE II roadless areas include about 20,000 acres in four areas within the Oregon Dunes National Recreation Area: Woahink (5,060 acres), Threemile Creek (previously Tahkenitch, 4,770 acres), Tenmile (7,800 acres), and Umpqua Spit (2,360 acres). An additional 26,800 acres of roadless areas occur on the north slopes of Mt. Hebo, formerly Hebo 1A, but now called Hebo-Nestucca (13,170 acres), and the Wassen Creek area, formerly Smith-Umpqua (7,760 acres) Several undeveloped parcels (totalling 5,910 acres) lie adjacent to the Drift Creek Wilderness All of these areas total 46,830 acres They are detailed in FEIS, Appendix C

Additionally, some areas adjacent to undeveloped land do not strictly qualify as undeveloped areas because they include some roads and harvest units from previous timber sales However, they could be allowed to revert to a more natural condition, by closing roads and ceasing timber harvest activities for about 50 years, and added to the existing undeveloped areas to create more manageable boundaries

Lands with a reasonable potential for reversion include 2,300 acres adjacent to the Drift Creek Wilderness, 660 acres adjacent to the Hebo-Nestucca undeveloped Area, and 1,440 acres adjacent to the Wassen Creek undeveloped area These potential reversion areas total 4,400 acres In addition, if about 3,000 acres in the North Fork Smith River area adjacent to the potential Kentucky Falls Special Interest Area were preserved, that whole area would be large enough (5,840 acres) to be considered undeveloped See Figure III-28 for the locations of the undeveloped areas.

Historic Trends

Most lands have been developed for timber and roads; about 47,000 of the 631,000 acres on the Forest remain undeveloped Another 10,000 acres have had only minimal development, and presently have potential for reverting to undeveloped condition

Future Trends

If trends continue, most of the 27,000 acres outside the Oregon Dunes NRA that are still undeveloped, but suitable for timber management, would be logged. If trends reverse, most of the 27,000 acres would be left undeveloped; and about 10,000 acres adjacent to undeveloped areas could be allowed to revert and eventually increase the amount of land in an undeveloped condition

Resource Relationships

In order to maintain or create undeveloped conditions, activities such as timber harvest, road construction, and utility development must be avoided.

Undeveloped areas benefit wildlife dependent on old-growth and mature conifers. They are natural appearing, and do not pose the threat of accelerated landslides and their adverse effects on fish habitat and water quality Management of undeveloped areas is compatible with Research Natural Areas and most Special Interest Areas.

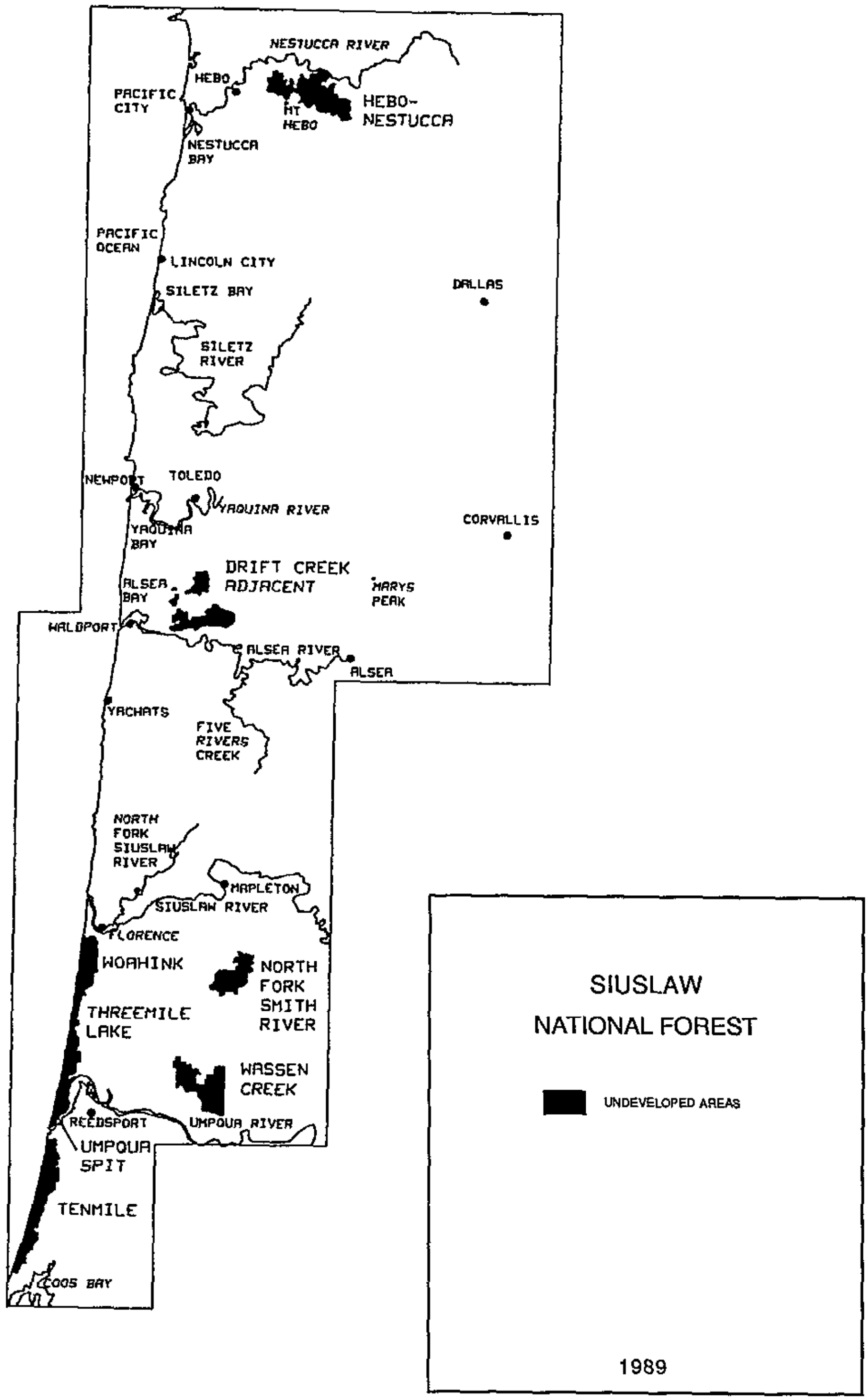


FIGURE III-28 POTENTIAL UNDEVELOPED AREAS ON THE SIUSLAW NATIONAL FOREST

WILD AND SCENIC RIVERS

Thirteen rivers were inventoried to determine their eligibility for inclusion in the National Wild and Scenic (W&S) Rivers System (Figure III-29) Two processes were used to determine eligibility. One was an analysis of information included in the DEIS for the Forest Plan, and the other involved a special team set up as a result of public comments on the DEIS. More information about eligibility studies is in FEIS, Appendix L.

The first process evaluated the four rivers which are on the Nationwide Rivers Inventory. The rivers initially inventoried were: Nestucca (30 miles), Little Nestucca (20 miles), Alsea (11 miles), and Siuslaw (5 miles).

The second process evaluated an additional nine rivers (Three Rivers, Siletz River, Smith River, Lake Creek, Drift Creek (Siletz), Siuslaw River (below Lake Cr), North Fork Smith River, Wassen Creek, and Umpqua River) which were identified in public input to the DEIS. Four of the nine rivers were only partially analyzed, because they have limited frontage (less than 6%) along Forest land.

Rivers Determined to be Not Eligible

The Little Nestucca River and Three Rivers are free-flowing but were judged to possess no outstandingly remarkable values and are not eligible for inclusion in the W&S Rivers System

Rivers Determined to be Eligible

Table III-21 shows seven free flowing rivers judged to possess one or more outstandingly remarkable values and are eligible for inclusion in the W&S Rivers System

Table III-21. Rivers Eligible for the Wild and Scenic Rivers System

River	Miles	Potential Classification	Outstanding Value
Nestucca River	30	Recreational	Fishery, Recreation
Alsea River	11	Recreational	Fishery, Recreation
Siuslaw River	5	Recreational	Fishery, Recreation
Drift Creek (Siletz)	14	Scenic, Recreational	Scenery, Wildlife, Ecological
North Fork Smith River	20	Scenic, Recreational	Scenery, Wildlife
Wassen Creek	12	Wild, Recreational	Scenery, Recreation, Wildlife, Ecological
Umpqua River	23	Recreational	Scenery, Recreation, Geological, Hydrological, Fishery, Wildlife, Historic, Ecological

Rivers Not Fully Evaluated Due to Limited National Forest Land

The Siletz River, Lake Creek, Lower Siuslaw River and the Smith River were not fully evaluated because each had no more than 6% of the river frontage in National Forest ownership The portions of the rivers associated with National Forest land meet the free-flowing criteria and might be eligible for inclusion in the W&S River System when combined with portions flowing outside National Forest Land

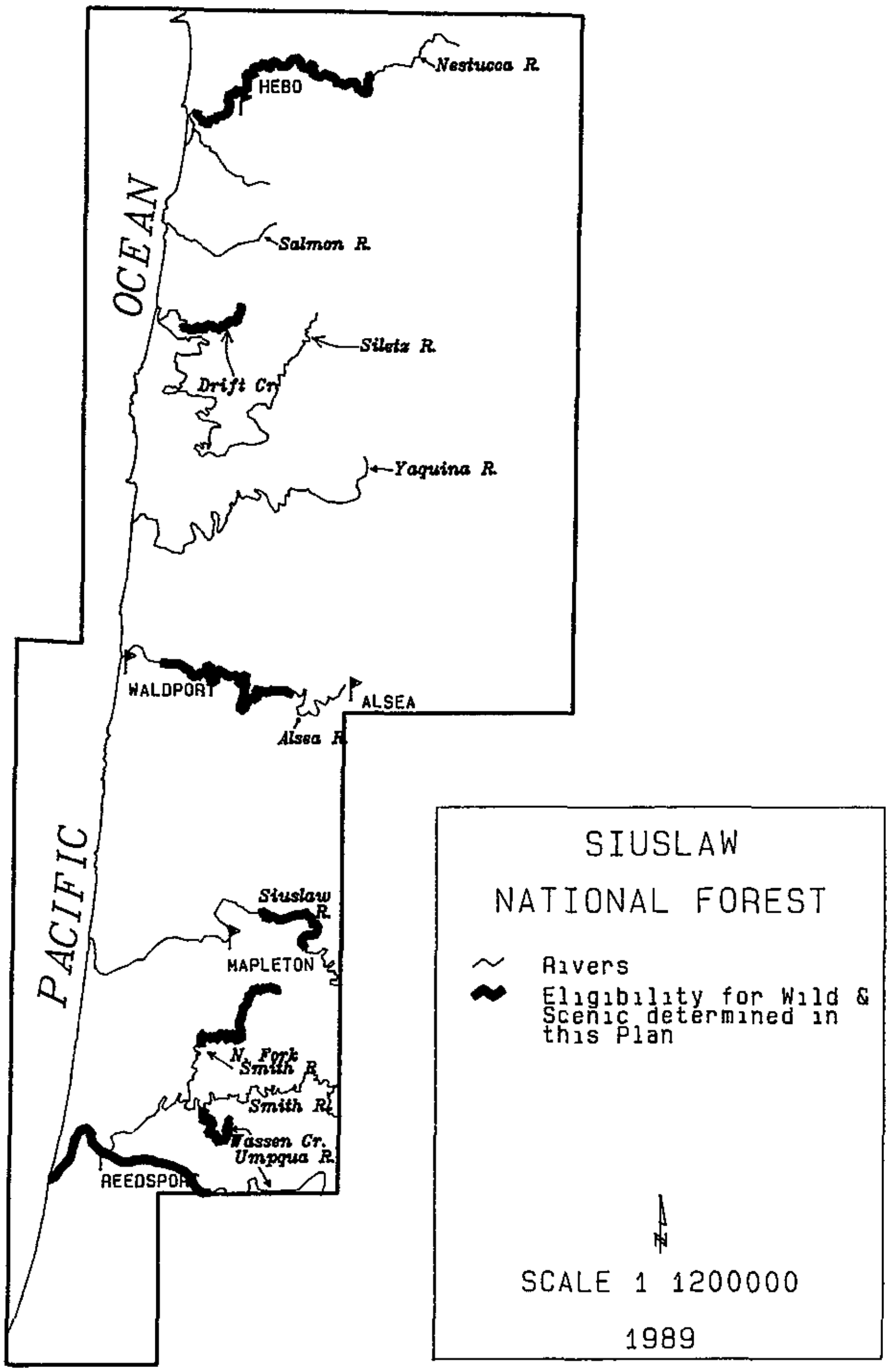


FIGURE III-29 POTENTIAL WILD AND SCENIC RIVERS

SCENERY

Overview

The Forest includes scenery of two distinct visual characters. The coastal margin has bold contrasts in landform, water bodies, and vegetation and is nationally renowned for its visual diversity The inland mountains, on the other hand, are similar throughout Except for rivers, outstanding features are virtually absent. The topography is steep, dissected and rugged, softened only by the continuous forest cover The repetitive nature of the landforms makes for relatively subtle variety

The greatest visual contrasts in the inland mountains result from human activity They are found in open fields of farms and homesites along valley bottoms, and in clearcut patches on public and private lands Although revegetation of clearcut units minimizes contrast after 20 to 30 years, newer units maintain a shifting, but always present patchwork

Current Situation

Viewsheds are the land seen from heavily-used locations such as roads, rivers, or recreation sites. The greater the use an area receives, the greater the visual sensitivity. Thirty-one scenic viewsheds on the Forest have been identified as having moderate to high sensitivity, requiring moderate to high levels of protection. Ten of the viewsheds have been inventoried as Level 1, which requires high protection; the remaining have been inventoried as Level 2, which requires moderate protection The current conditions in the viewsheds vary from a natural appearance to a heavily-altered appearance, as displayed in Table III-22 (See Figure III-30 for the locations of these viewsheds.)

Approximately 81,000 acres of the Forest are within these sensitive viewsheds The Visual Management System inventory recommends that 10,000 acres be managed under a visual quality objective (VQO) of retention, 50,000 acres under a VQO of partial retention, and 21,000 acres under a VQO of modification

Some 57,241 acres in seven areas outside viewsheds will be managed for VQOs of preservation, retention, or partial retention because they are congressionally or administratively established These are the Oregon Dunes National Recreation Area, the Cascade Head Scenic-Research Area, Flynn Creek Research Natural Area, and Cummins Creek, Drift Creek, and Rock Creek Wildernesses Another 33,979 acres in nine other areas might be managed for VQOs of preservation, retention, or partial retention, depending on the alternative. These areas include a potential Research Natural Area, several undeveloped areas, and several potential Special Interest Areas

Most of the sensitive viewing areas on the Forest lie along roads which follow streams, and in areas of gentle topography occupied by many small farms and homesites In many of the viewsheds, over half of the land seen is privately owned. The private forest is owned by timber companies as well as individuals, most of which may be logged, usually clearcut Thus, the Forest Service can not control the appearance of the viewshed, even if National Forest land is fully protected. The quality of the scenery on National Forest land depends, in part, on the management of adjacent lands

Table III-22. Current Condition of Viewsheds (1)

VIEWSHEDS	TOTAL ACRES	CURRENT CONDITION
Sensitivity Level 1 (37,836 acres)		
Highway 101 - Coastal	4,286	Slightly altered
Highway 101 - Hebo	6,294	Moderately altered
Highway 38	2,609	Slightly altered
Highway 34	7,689	Slightly altered
Highway 18	1,836	Slightly altered
Highway 126	1,532	Heavily altered
Three Capes Road	3,154	Heavily altered
Marys Peak Road	6,254	Slightly altered
Mercer Road	54	Slightly altered
Highway 36	4,128	Slightly altered
Sensitivity Level 2 (43,373 acres)		
Highway 22	3,256	Moderately altered
Mt Hebo Road	1,710	Slightly altered
Smith River Road	1,426	Slightly altered
Five Rivers Road	4,261	Moderately altered
Yachats River Road	3,435	Moderately altered
Sand Beach Road	2,413	Moderately altered
Nestucca River Road	2,620	Moderately altered
Little Nestucca River Road	2,913	Slightly altered
North Fork Siuslaw River Road	4,098	Slightly altered
Canal Creek Road and Campground	831	Slightly altered
Harlan Road	1,272	Moderately altered
North Fork Smith River Road	1,847	Slightly altered
Fall Creek Road	566	Slightly altered
Canary-Ada Road	1,235	Slightly altered
Lobster Creek Road	2,698	Moderately altered
Big Elk Creek Road and Campground	1,498	Slightly altered
Deadwood Creek Road	1,293	Moderately altered
Linslaw Road	361	Natural appearing
Highway 229	416	Slightly altered
Indian Creek Road	3,768	Moderately altered
Sweet Creek Road	1,456	Moderately altered

(1) See Figure III-30 for the locations of these viewsheds

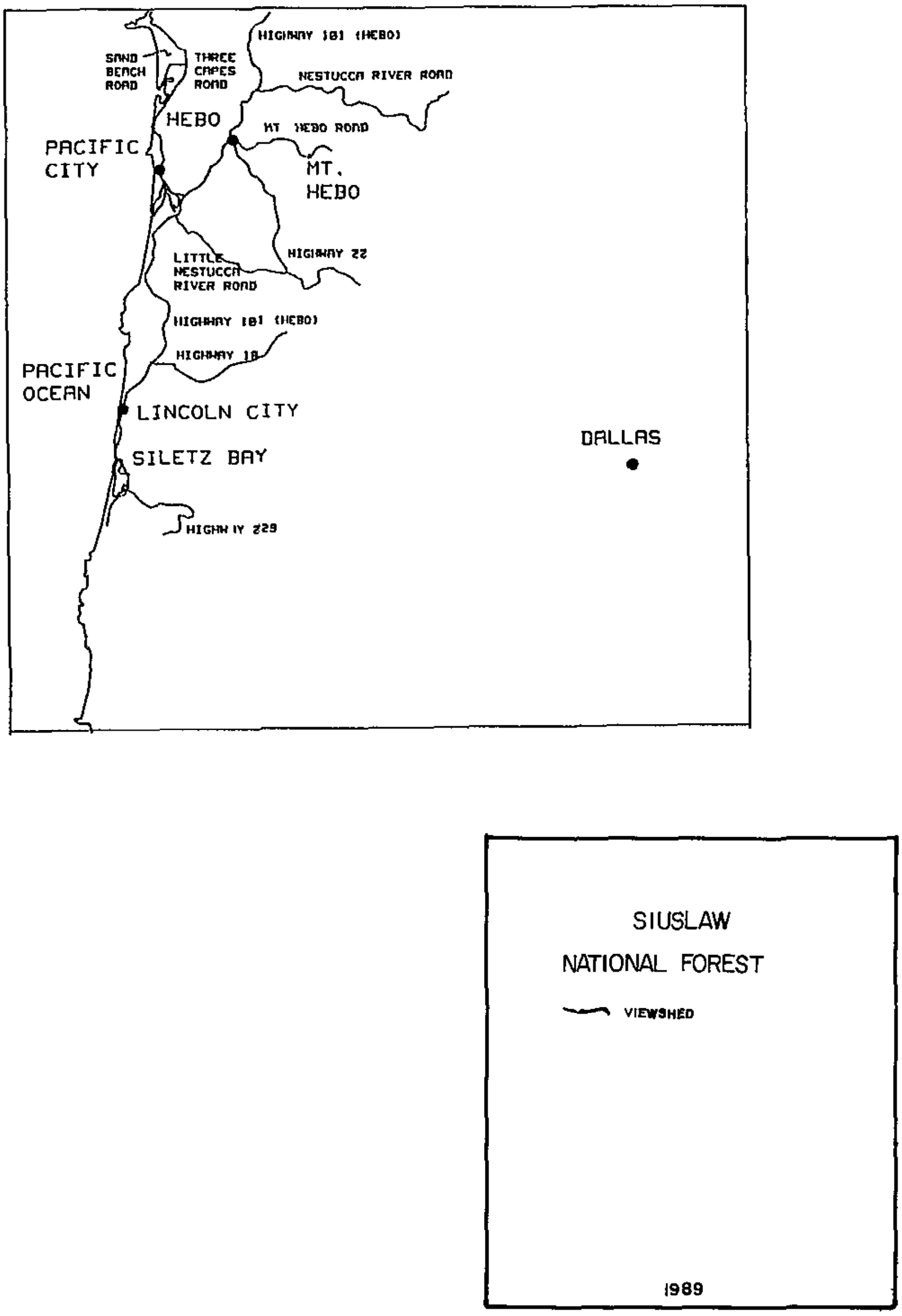


FIGURE III-30. CURRENT VIEWSHEDS (North Half of Forest)

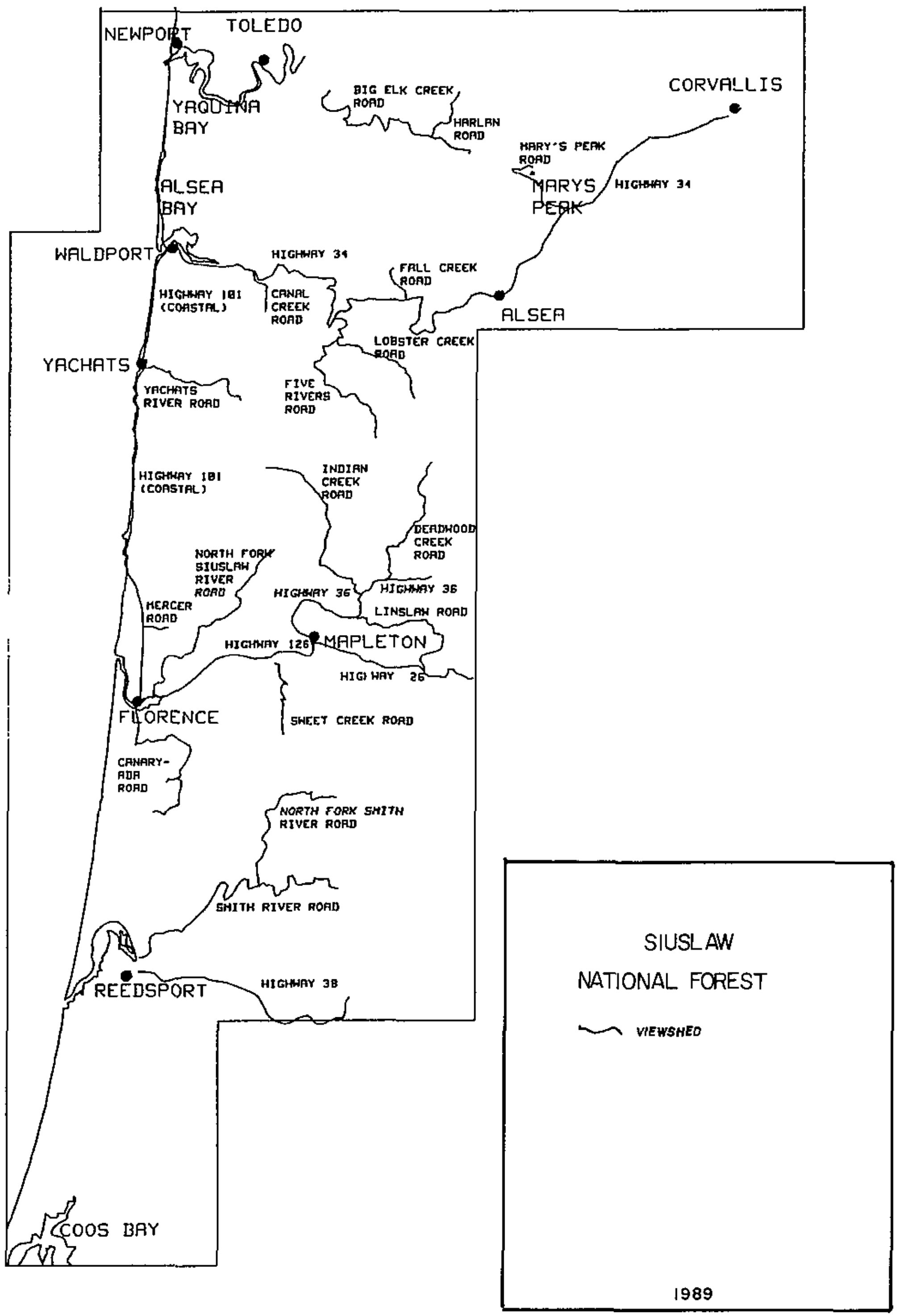


FIGURE III-30 Cont. CURRENT VIEWSHEDS (South Half of Forest)

Management Practices

Visual resources are generally managed in two ways: 1) controlling how the scenery is altered from a natural appearance; and 2) introducing or maintaining variety. Alteration of the scenery is controlled through the design of management practices, such as specifying location, size, shape, and timing of timber harvest units. Occasionally clearcutting must be avoided, if the VQO cannot be met otherwise. Selection and shelterwood harvesting may be effective in protecting viewsheds in a few cases after site specific analysis However, these methods are not common practices on the Forest (See FEIS Appendix G.)

Variety can be provided by planting a variety of trees, allowing large trees (30 inches or greater) to develop, and occasionally clearcutting small areas to open vistas, or provide views of scenic features such as waterfalls, the ocean, or rock outcrops.

Historic Trends

Early information about scenic resources is scarce The Forest probably appeared natural prior to the arrival of Euro-American settlers Even if wildfires were set by the natives, the visual impacts would have followed natural boundaries.

With the arrival of settlers, land was cleared and logged on a small scale, predominantly in the valleys on both sides of the Coast Range The large fires in the middle to late 1800s must have drastically altered the forested landscape

Logging activities increased, spurred by improvements in transportation, markets, and technology, and the two world wars. The increase in timber harvesting begun in the 1950s has converted much of the Forest to a patchwork of clearcut units

Future Trends

If past practices continue, the 27,000 acres of forested undeveloped land outside of Wildernesses will be converted to a patchwork of managed forests This would leave about 5% of the forested land with a natural appearance.

Resource Relationships

Many activities can detract from the natural appearance of the scenery. In order to meet the VQOs of retention and partial retention, it is frequently necessary to control size, shape and location of clearcut units, as well as timing of timber harvest This may reduce outputs and increase costs

Areas allowed to remain in a natural condition, such as Wildernesses, Special Interest Areas, spotted owl habitat areas, and Research Natural Areas safeguard scenery as a side effect. Providing visual variety with hardwoods in plantations helps meet the needs of wildlife for deciduous-mix habitat. Permanent meadows maintained for wildlife add variety to the landscape. Rotation lengths greater than 100 years combined with control of tree spacing allow larger trees to grow This adds variety to foreground landscapes

RESEARCH VALUES

Conditions like location next to the Pacific Ocean, mild climate, and heavy rainfall combine to produce special systems on the Forest that include numerous streams, steep and rugged terrain, and high biological production Research activites are imperative in order to develop an understanding of the resiliency of these systems and their probable responses to human activities The Forest includes two Research Natural Areas dedicated to study of natural systems. However, because the forest landscape and vegetation appear to be so homogeneous (little species or age diversity), there has been limited awareness of the variety of natural ecosystems and little study of them.

Until about 1950, the remote and brushy terrain and inaccessibility discouraged research. Since intensive harvesting of timber and roadbuilding began, research related to altered ecosystems has become important Most of the studies have been carried out by scientists from Oregon State University, the Pacific Northwest Forest and Range Experiment Station, and the Oregon Department of Fish and Wildlife

Forest-wide Research

Many studies are located throughout the Forest, rather than being concentrated in any particular area. What is done and where depends on access, availability of funds, and important issues and concerns In recent years, scientific investigations have focused on five categories:

Methods of growing trees after clearcut harvest

Aspects studied include reducing competition between brush and young trees, controlling harmful insects and diseases, improving genetic traits of trees, and environmental impacts of reforestation

Wildlife populations and their habitats

Most of the effort has been directed at threatened and endangered and sensitive species, big game animals, and species dependent on old-growth and dead and defective trees

Fish populations and stream dynamics

Emphasis has been on the impacts of timber harvest and associated activities on stream habitats

Soil stability and productivity

Studies have concentrated on the effect of timber harvest activities on erosion and the effectiveness of leaving vegetation intact to prevent landslides

Cultural Resources

These studies consist mostly of archeological digs aimed at understanding the culture of the prehistoric inhabitants of the Forest.

Areas With Special Research Values

For various reasons, specific areas have been identified as having significant research values. These areas often have other values and purposes, only research values are discussed here.

Areas for Research Related to Altering of Vegetation

Cascade Head Experimental Forest (CHEF) - Established in 1934, this 11,890-acre area in the Hebo Ranger District has been the center for research related to growing trees in the Sitka spruce-western hemlock forest type. Timber-related research conducted on CHEF has wide applicability because this forest type grows from northern California to Alaska Publications based on work here have aided public and private land managers, as well as increased the scientific data base for this forest type The western third of CHEF (3,932 acres) lies within the boundaries of the Cascade Head Scenic-Research Area (CHSRA). See Figure III-31 for the location of CHEF and CHSRA.

Oregon Silverspot Butterfly Management Area - A total of 1,920 acres will be managed with the objective of removing this insect from the list of threatened and endangered species A number of studies of the butterfly and its habitat have been completed and several more are continuing According to the Forest Implementation Plan (Clady and Parsons 1984), careful research is required prior to improving the butterfly habitat.

Areas for Research on Natural Systems

Research Natural Areas (RNAs) - The proposed RNAs vary by alternative, and therefore are discussed in some detail. Existing RNAs do not vary by alternative RNAs are physical or biological units in which current natural conditions are maintained as much as possible. They are part of a national system of preserved ecosystems created through the cooperation of individuals, private organizations, and federal, state, municipal, and territorial governments. Each RNA contains at least one ecosystem identified as a necessary part of the RNA system

This national system provides sites for valuable research and graduate level training generally not duplicated elsewhere It allows research on plant and animal communities in environments essentially free of human intervention or maintained to preserve natural ecological conditions As control areas, they provide valuable baselines for areas where research is related to altering of the vegetation

The future status of many animal and plant species and their support communities is uncertain RNAs can assist in maintaining threatened and endangered species and their habitats within managed ecosystems, thereby preserving this irreplaceable and valuable genetic pool

The unique utility of RNAs is to serve as standards for comparable ecosystems which have been altered through human activities Development has changed many areas, thus making a nationwide system of RNAs all the more valuable.

a *Existing Research Natural Areas* - There are two classified RNAs on the Forest Flynn Creek RNA, with 688 acres, was established in 1976. It is an undisturbed forested drainage with anadromous fish Neskowin Crest RNA, with 1,190 acres, was established in 1941 as an example of Sitka spruce and western hemlock forest on the ocean front The area was enlarged in 1980 to include two complete stream drainages, a grassy headland community, and more coastline It is within CHSRA (See Figure III-31 for the locations of these areas)

b. *Potential Research Natural Areas* - The areas shown in Table III-23 have ecosystems needed to fill out the RNA system in the Pacific Northwest Region (Figure III-31)

Table III-23. Potential Research Natural Areas.

Potential RNA	Acres	Ecosystem(s) Needed
Cummins/Gwynn Creeks	4,800	Five different terrestrial and aquatic systems
Threemile Creek	1,500	Pond in sand dunes, and shore pine/salal
Tenmile Creek	1,300	Coastal dune mosaic
Sand Lake	241	Parabola dune
Reneke Creek	480	Red alder with stream

Threemile Creek and Tenmile Creek potential RNA's are within the Oregon Dunes National Recreation Area (NRA) Both sites are closed to off-road vehicles so the natural systems of the two Oregon Dunes NRA potential RNAs are relatively secure from human induced change for the time being.

The Cummins Creek area includes ecosystems consisting of anadromous fish streams surrounded by forests with various combinations of Sitka spruce, western hemlock, and Douglas-fir. It is in the Cummins Creek Wilderness (see "Wilderness" for description) The absence of trails has restricted recreational use.

The Gwynn Creek area is adjacent to Cummins Creek, in a portion of the Cape Perpetua Scenic Area (see "Recreation" for description) which is undeveloped, and seldom used. It contains the largest known stand of old-growth Douglas-fir (120 acres) on the west side of the Coast Range The Cummins Creek and Gwynn Creek sites together include five systems consisting of aquatic habitats and several combinations of western hemlock, old-growth Douglas-fir, swordfern and Oregon grape

Sand Lake near Cape Lookout is the best intact example of a parabola dune ecosystem along the Oregon Coast (Wiedemann 1984) It also includes some old-growth trees still growing in the dunes ORV use is intense on areas of the dunes adjacent to the portion considered for RNA status

Reneke Creek is currently managed to protect its potential for RNA classification. The most notable scientific feature of the Reneke Creek area is an ecosystem dominated by red alder that is drained by two matched perennial streams. These streams would be particularly useful for studying nutrient cycling in a deciduous forest. The research values have been protected under administrative status since 1978 as part of the Hebo Planning Unit.

Natural conditions in RNAs are ordinarily achieved by allowing natural physical and biological processes to prevail This means that some developments such as roads and timber harvest must be avoided Other resources such as fish and nongame wildlife habitat are compatible

Although one potential RNA is in the Cummins Creek Wilderness, its existence and associated research activities should have little impact the Wilderness There is some reluctance, however, to designate RNAs in areas classified for other purposes Conflicts between potential RNAs and Special Interest Areas for recreation seem most likely

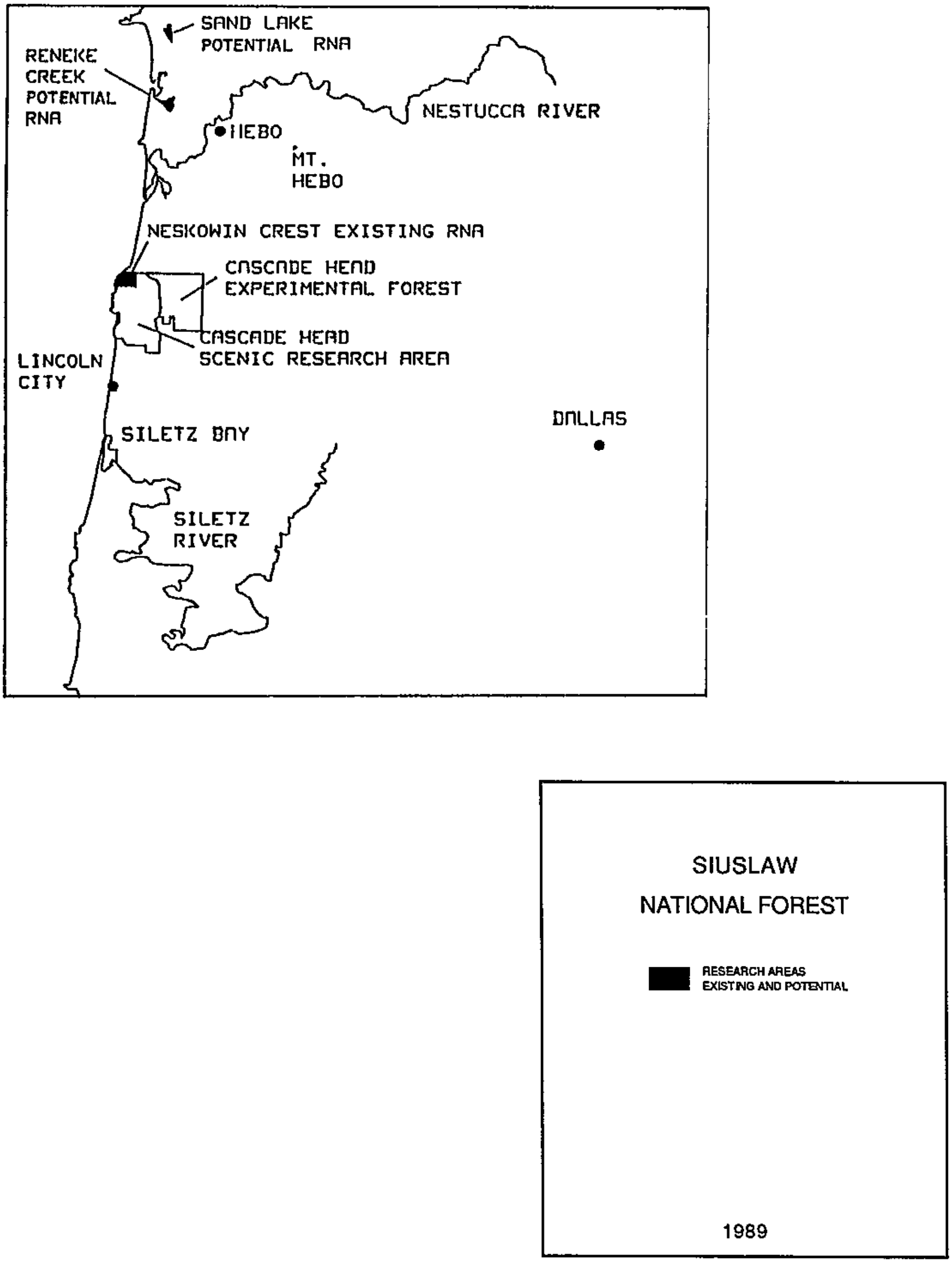


FIGURE III-31. EXISTING AND POTENTIAL RESEARCH AREAS (North Half of Forest)

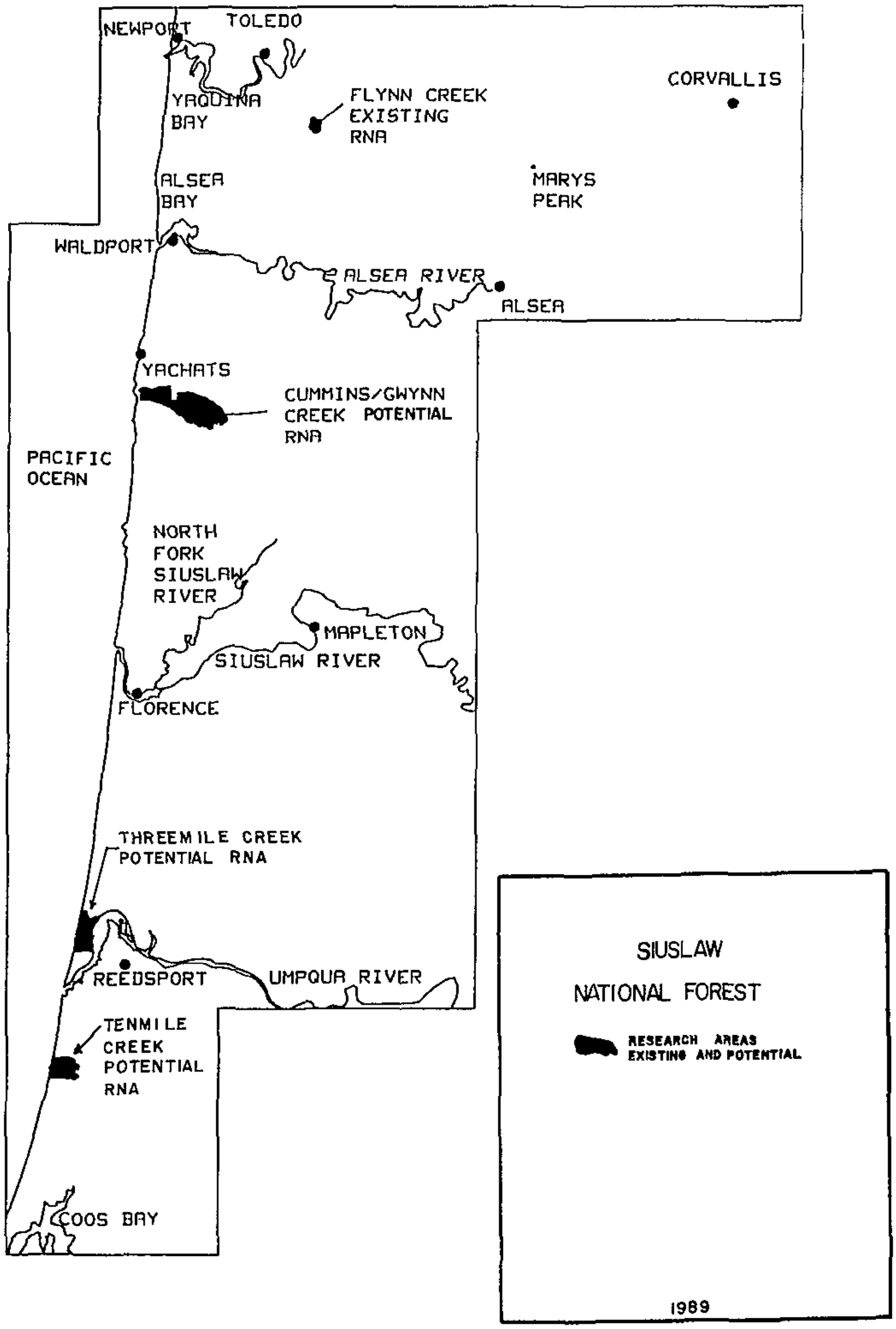


FIGURE III-31 Cont EXISTING AND POTENTIAL RESEARCH AREAS (South Half of Forest)

Oregon Natural Heritage Program - In addition to the RNA system, the Oregon Natural Heritage Plan (ONHP), approved by the 61st Legislature (ORS 273.576), outlines the official state natural areas program and identifies ecosystems which will represent Oregon's natural diversity. Included in that plan are the following:

a *A Portion of the Wassen Creek Drainage* - This fills a need for a waterfall/pool system on basalt/sedimentary rock in the western hemlock zone Wassen Creek is within an area which is still undeveloped, and which is being considered for designation as an undeveloped area (see FEIS, Appendix C for description)

b. *Lily Lake* - This area in the Sutton Recreation Area near Florence is a relatively undamaged, compact example of typical dune wetlands. It was purchased in 1980 with Land and Water Conservation Funds, and is undeveloped. Several groups have recommended it for special protection (letter to Forest Supervisor from National Audubon Society; Feb 12, 1982) Both aquatic and terrestrial systems, as well as wildlife habitats, are involved

c. *Table Mountain* - This mountain between the Alsea and Waldport Ranger districts has an unusual plant community dependent on uncharacteristically dry conditions and an intrusion of nephylene syanite bedrock

d *Euchre Mountain* - This area along Drift Creek on the Hebo Ranger District contains some outstanding examples of old-growth western hemlock, western red cedar, and Douglas-fir. It could fill a high priority need.

The above areas of concern by ONHP were assessed by Forest Service ecologists and RNA specialists, who maintain contact with the ONHP, before making recommendations to the Forest (Memos of Nov. 26, 1984 and July 17, 1986 from S Greene, PNW Station) None of these sites were recommended for RNAs. All RNAs recommended by the specialists, except those in the Oregon Dunes NRA that will be considered later, are proposed in Alternative E(PA). During subsequent planning, the Forest will consider further RNAs recommended by ONHP and Forest Service specialists, and efforts will be made to locate sites to meet other ONHP needs

Wilderness - There are three Wildernesses on the Forest, Drift Creek, Rock Creek, and Cummins Creek (see "Wilderness" section for description). These areas are managed in a manner to preserve them for future use and enjoyment Scientific use is one of the values (along with recreational, scenic, educational, conservational and historical) which should be preserved. The Cummins Creek Wilderness includes most of the potential Cummins Creek/Gwynn Creek RNA

Cascade Head Scenic-Research Area (CHSRA) - The research program at the CHSRA studies the natural organization and behavior of coastal ecosystems, the effect of various human uses and activities on the health of these communities and organisms; and the effect of human activities on the visual resource The designation of the CHSRA and the inclusion of the Salmon River estuarine system increases opportunities for scientific studies.

The 1190-acre Neskowin Crest RNA was established in 1941 prior to designation of the CHSRA. Current management direction is to maintain it in as nearly an undisturbed condition as possible where compatible with objectives of CHEF and CHSRA

The entire CHSRA and CHEF are part of the Coastal Coniferous Forest Biosphere Reserve established by the United Nations. These reserves are regarded as essential for studies of various ecosystems since they represent baselines against which change can be measured and other ecosystems can be compared

Undeveloped areas - Aside from the Oregon Dunes NRA, four major undeveloped areas are of concern on the Forest: Wassen Creek, Drift Creek-Adjacent, North Fork Smith River, and Mt Hebo-Nestucca (see FEIS, Appendix C for description) Undeveloped areas include relatively large blocks of undisturbed land that, if set aside, would be highly suitable for research on natural systems Wassen Creek Undeveloped Area contains part of a potential ONHP cell

Special Interest Areas - This is a heterogeneous group of areas with special potential for recreation (see Recreation Section for description) Location on volcanic headlands and sub-alpine mountains give several of them special research values

Cape Perpetua Scenic Area contains the Gwynn Creek portion of the potential Cummins Creek/Gwynn Creek RNA Management for the two types of use, sightseeing and research, seems reasonably compatible

The meadows in the Scenic-Botanic Area on top of Marys Peak support unique vegetative communities Dispersed, non-intensive recreation compatible with research activities is emphasized

Recreation Areas - Sutton contains a potential ONHP ecosystem (mainly aquatic) and Sand Lake a dune ecosystem recommended as a potential RNA in some alternatives Both areas are used by ORVs Such use, if intensive and concentrated in sensitive ecosystems, could destroy important research values

CULTURAL RESOURCES

Overview

For thousands of years, humans have used the lands and resources now within the Forest boundaries The physical remnants of these activities are called cultural resources Cultural resources can be either archeological (found on or under the forest floor) or buildings or structures. These resources are divided between prehistoric (before the coming of Europeans) and historic (after the arrival of Europeans with a written language to record events and information). Most prehistoric resources have been found along the coast and along rivers The steep terrain and uniformly dense vegetation may have discouraged human use and development of much of the inland area. The vestiges of historic use are generally not well preserved because of the wet, mild climate Historic sites are also more frequent along the coast and in the bottoms of inland valleys.

Current Situation

Historic cultural resources consist mostly of remnants of abandoned homesteads (farmsteads), foot paths, wagon roads, millsites, logging operations, school houses, early Forest Service trails and roads, reforestation projects and covered bridges. The most prevalent historic structures on the forest are the Civilian Conservation Corps (CCC) buildings constructed during the 1930's. The CCC sites are managed and maintained according to a regional Memorandum of Agreement (USDA Forest Service 1984b).

Known prehistoric sites are shell mounds (middens), village sites, and special purpose sites where a particular natural resource was harvested The excavation of one shell midden at Tahkenitch Lake has uncovered cultural material 6,880 years old, making it the oldest known American Indian site on the Oregon Coast (Minor and Toepel 1982)

Altogether, over 150 sites have been catalogued Those currently on the National Register are the lighthouse keepers residence at Heceta Head, the spruce logging railroad in the Blodgett Tract, and the Parapet at Cape Perpetua Other sites will be nominated as the evaluation process continues There are currently plans to nominate a shell midden, several administrative structures constructed by the CCC's, a wagon road and an army fort An interpretive program has been developed for the archeological sites discovered at Tahkenitch Lake and Cape Perpetua, the Heceta Head lighthouse and keepers house, and the CCC era at Cape Perpetua An interpretive trail is being developed along the Blodgett Railroad and up Cape Mountain

Archeological testing has been conducted at about a dozen localities along the central and northern Oregon coast To date, 10 prehistoric archeological sites have been identified on the Forest These are along the coast or on the west face of the coastal mountains The archeological literature for the Forest consists mostly of preliminary reports and only a few final research reports. Two archeological data recovery studies funded by the Forest have resulted in the most definitive analysis to date of coastal Oregon sites (Minor and Toepel 1982; Minor et al 1985).

All potential land disturbing activities on the Forest are preceded by a cultural resource survey, to ensure that activities do not damage a significant site The surveys are designed by archeologists and are reviewed and approved by the Oregon State Historic Preservation Office (SHPO). The survey program is designed to make sure all of the Forest is eventually surveyed for cultural resources No site is disturbed until it has been evaluated for eligibility for the National Register of Historic Places If a site is eligible the project will be redesigned to avoid the site, or a mitigation plan will be prepared to ensure that the information the site can provide is not lost. All mitigation plans must have SHPO concurrence before they are implemented

All field surveys are completed by certified cultural resource technicians and contract archeologists under the direction of the Forest archeologist Reports must be prepared to standards developed by Toepel and Beckham in 1985 The inventory process will continue until all of the forest has been surveyed and all of the sites identified have been recorded

An overview of the forest was completed in 1982 (Beckham et al) The overview discusses the history of the area, including cultural background, settlement patterns, economic trends, and the role of the federal government in development A literature search was directed toward identifying all recorded sites on or within 1 mile of the Siuslaw NF

All management of cultural resources on the Forest is in accordance with US laws and regulations. Specific Memorandums of Agreement have been developed with the Oregon State Historic Preservation Office to govern archeological survey methods, intensity and timing

Future Trends

To date very few cultural resources have been found in steep timbered areas If this trend changes, inventory and protective methods would also change Otherwise, effects on timber and other resources will continue to be low Limits on recreational projects should not change

Resource Relationships

Timber harvest activities are one of the tools used identify cultural resources. They are the largest land disturbing activity on the forest Since planned land alteration activities trigger cultural resource surveys, the rate of discovery for cultural resources is directly related to the rate of timber harvest

FIRE

Overview

Catastrophic fires in the Coast Range have played a major role in determining the vegetative succession and diversity on the Forest Most of the Forest burned during the late 1800s and early 1900s Natural fires have been uncommon recently, but the possibility for catastrophic fires still exists in spite of modern fire prevention practices Recently, most of the fires over 5 acres are the result of slash burning activities.

There are two general climatic zones west on the Forest The western-most zone lies between the Pacific Ocean and the Coast Range crest It experiences fog in summer and is cooler A warmer, drier zone, often characterized as a rainshadow, lies to the east of the mountain crest and extends to the Willamette Valley

Because of the topographic irregularity of the Forest, local amounts of precipitation differ significantly from the yearly averages for the broad climatic zones (see previous section on "Climate") Rainfall intensities during winter storms tend to be highest on the west side of the Coast Range. Potential evapotranspiration exceeds precipitation during the summer months, particularly on south slopes.

East wind episodes commonly occur on the Forest and are important to fire managers from May through October These episodes are characterized by strong easterly winds, low humidities, and relatively high daytime and night-time temperatures Maximum temperatures of 80-85 °F have been observed at several weather stations during such periods Temperatures in excess of 100 °F have also been recorded at mountain sites west of the coastal crest

East winds occur primarily in late summer and fall They also occur less frequently in spring, early summer, and late winter. The major wildfires on the Forest have occurred under east wind conditions.

Current Situation

An average of 28 fires occurs each year on the Forest. Almost all of them are human caused and less than 10 acres in size. The fire protection budget has averaged $515,000 per year recently

Broadcast burning of the slash follows the Oregon State Smoke Management Plan Under the plan there have been an average of 42 days per year when burning was permitted burning during the spring, summer and fall. This does not include the number of days when burning would have been permitted but the slash was either too wet to burn or too dry to burn safely. The actual acres burned and slash consumed during the last five slash burning seasons are shown in Table III-24

Table III-24. Acres Burned and Slash Consumed, 1984-1988

Year	Acres Cut	Acres Burned	Tons of Slash Consumed	Tons of TSP Produced
1984	4934	4785	222,263	3,223
1985	5155	4368	202,894	2,942
1986	5178	3461	160,763	2,331
1987	6530	4164	193,418	2,805
1988	6070	3496	162,389	2,355

TSP is Total Suspended Particulate

Historic Trends

Morris (1934) and Juday (1976) documented much of the fire history on the Siuslaw A summary of major fires appears in the preceding FEIS, Chapter III section on "Vegetation, Natural Disturbances and Succession"

These large, high intensity fires left scattered stands of unburned or partially burned timber along the margin of the main fire. Unburned stands were often located along major rivers or at the confluence of streams. Often a major fire was followed by repeated burns in the same area. Well known examples of these reburns are the Tillamook Burns beginning in the 1930s and the Smith River burn of 1939 followed by the 1951 Vincent Creek burn and the 1966 Oxbow burn (Juday 1976)

Most of these fires were human caused, either accidentally started or escaped from intentional ignitions Burning was practiced by both native inhabitants and settlers to the area Fire prevention and suppression since the 1950s and 1960s has been very aggressive.

Concurrent with the increased prevention and suppression was the increased use of broadcast burning on the forest for slash disposal and site preparation. For example, 89% of all clearcut areas initially planted in 1972-74 were broadcast burned (Turpin et al 1980)

Future Trends

The use of fire as a management technique will decline in order to meet air quality standards The amount of fuel created is expected to remain relatively constant but the amount of particulates that will be allowed in the atmosphere will decline. Reductions in particulate emissions will come from burning less of the created slash and from burning techniques that emit less particulates. Less burning could increase reforestation costs and the risk of wildfire

Resource Relationships

Smoke can lower air quality and the fire itself can damage the site by removing nitrogen and organic materials from the site.

AIR QUALITY

Current Situation

Air circulation along the Pacific Coast and limited industrial development have resulted in only minor air quality problems west of the coastal crest East of the coastal crest, however, high pressure systems and strong surface cooling can create inversion layers, trapping pollutants and causing serious air quality problems in the Willamette Valley This condition occurs most commonly in fall and winter and to a limited degree in early spring The Eugene air quality maintenance area frequently violates federal and state standards for particulates, photochemical oxidants (smog), and carbon monoxide The particulates, in the form of soot, dust, and fumes, are mostly the result of industrial emissions and residential and industrial wood burning Smog and carbon monoxide are produced by automobiles and, to a lesser extent, industries

Of all the management practices on the Forest, prescribed burning has the greatest impact on local air quality The Oregon State Smoke Management Plan sets particulate emissions standards to be met during prescribed burning Total suspended particulate (TSP) emissions from National Forest lands in western Oregon have been used to set baselines for individual Forests. The baseline level for the Siuslaw National Forest is 4,142 tons annually. The baseline value represents the arithmetic average of the annual TSP production for 1976 through 1979 Total suspended particulate production for the last 5 years in displayed in Table III-24, above.

The Forest does not have Federal Class I areas (defined by the Clean Air Act, PL 88-206, as amended) within its boundary. The three Wildernesses are designated as Class II. They are near the coast and tend to be influenced by the cool marine air layer during the summer

Several designated Areas in the Willamette Valley, Tillamook, and Coos Bay, are located close to the Forest boundary The ceiling (maximum vertical boundary) is 2500 feet for the Valley and 2000 feet for the two cities.

Visibility within these areas is usually good, though it may be temporarily impaired by smoke from prescribed burning or pollutants from unknown sources A visibility monitoring station has been proposed for Marys Peak, which is on the western edge of the Willamette Valley Visibility across the southern portions of the Coast Range would be monitored there Also, the site would aid in documenting visibility impairment produced by emissions from the Forest entering the Willamette Valley

Future Trends

The Willamette Valley has potential for air quality problems from industrial development, agricultural field burning, residential woodstove use, automobile emissions and slash burning on forest lands. Because of decreasing use of fire for slash disposal and site preparation the future trend is for less air pollution from the Siuslaw National Forest

RANGE

Overview

Livestock grazing is not a major concern or program on the Forest The steep topography and dense vegetation make it difficult. Forage production surpasses demand.

Current Situation

In 1980 there were 34 small allotments on 16,000 acres, or 3% of the Forest. Most are former homesteads and scattered meadows used by farmers and small ranchers Cattle are the most common grazers with some use by sheep and horses Livestock on the Forest used 2,200 animal unit months (AUMs) of forage in 1980.

Historic and Future Trends

Range has not been important. The number of AUMs has been constant during the past 10 years and traditional use is not expected to change Clearcut units, which are transitory rangeland, provide the major opportunity for increases, primarily with sheep because they are better able to graze on steep slopes. Use of clearcut units could be increased as much as 2000%

Resource Relationships

Sheep grazing can be used to benefit other resources by controlling brush and by removing excess summer growth that reduces the forage available to big game in winter.

MINERALS

Overview

The Forest is underlain either by thick sequences of sandstones and siltstones, or by interbedded volcanic and sedimentary rocks Most of the Forest land is considered prospectively valuable for oil and gas The probability of finding valuable deposits of locatable minerals is considered low. Minerals-related activities on the Forest have included oil and gas leasing, and the production of aggregate, the location of unpatented mining claims and patented silica sand claims

Current Situation

Leasable minerals are mineral commodities that have been specifically excepted from the General Mining Law by Congress, principally through the following acts: the Federal Onshore Oil and Gas Leasing Reform Act of 1987, the Mineral Lands Leasing Act of 1920, the Mineral Leasing Act for Acquired Lands of 1947, the President's Reorganization Plan No 3 of 1946, and the Geothermal Act of 1970 Leasable minerals include oil and gas, geothermal resources, and locatable mineral deposits with acquired status These minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of Interior

The Secretary of Agriculture, through the Forest Service, has consent authority for leasing of geothermal resources and hardrock leasable minerals on all National Forest System land The Federal Onshore Oil and Gas Leasing Reform Act of 1987 contains key provisions altering the Forest Service's authority for the management of leasable minerals

The Secretary of Agriculture now has consent authority for the issuance of oil and gas leases on National Forest System lands In addition, no oil and gas permits to drill may be granted without the analysis and approval of a surface use plan by the Forest Service Regulations implementing these authorities have been published as a proposed regulation in the Federal Register and are being finalized at the National level

The Forest has potential for oil and gas production, but little exploration and no development has taken place As recently as 1987, more than half of the Forest was under lease for oil and gas, generating over $300,000 in receipts each year. Almost all of these leases were relinquished in 1987 No leases were granted in special areas such as Wildernesses or Research Natural Areas Some areas were leased with stipulations to protect surface resources, most were not

Saleable mineral material is extracted from 22 quarries across the Forest Most is used on National Forest System lands, but about 15,000 tons per year (less than 10%) are sold for use elsewhere

The Forest has low potential for locatable minerals (i.e., gold, silver, lead and uranium) There are very few mining claims on the Forest; none are active Approximately 93,000 acres have been withdrawn from mineral entry to protect the surface values

Historic Trends

Interest in oil and gas prospecting on the Forest has been cyclic The discovery of natural gas north of the Forest (near Mist, Oregon) generated the most recent round of leasing activity on the Forest Some seismic exploration has been conducted, but no applications for drilling have been received and no drilling has taken place

A few mining claims were staked in the late 1950s and early 1960s for foundry-grade sand, and for nepheline syenite, a rock with several industrial uses A patent was recently issued by BLM for a 780-acre group of foundry-sand placer claims located in the Oregon Dunes National Recreation Area

Demand for saleable, common variety minerals is largely limited to rock for road surfacing Most of that demand is for Forest road projects, private and commercial requests are occasional and for small volumes Although it had been assumed that rock for road surfacing was relatively scarce, recent exploration has identified a number of potential rock sources Existing and potential sources are not always located where the rock is needed, leading to increased transportation costs. Greater efforts have been made to use less durable rock found on the margins of some existing sources, thus increasing known reserves

Future Trends

Short-term interest in oil and gas leasing depends on the cost of exploration compared to their commodity value. In the future, off-shore oil and gas leasing could renew interest in Forest leases, but, without more substantial discoveries, interest will decline in the long term Because of the low potential for valuable locatable minerals, few additional mining claims are expected. Areas withdrawn from mineral entry will be reviewed and some lands may be reopened Forest demand for road surfacing rock will continue at the current level. A slight increase in sales of rock to the private sector is expected.

Resource Relationships

Leasing of land for oil and gas exploration and development can be restricted by designating land for Wilderness, recreational uses, and for protection of wildlife habitat and other resources

LANDS AND SPECIAL USES

Overview

The lands or real estate management program on the Forest is complex because of the relatively large amount of other land intermingled with National Forest System (NFS) lands. Activities include landline location and maintenance, encroachment and title claim problems, permit issuance to allow use of NFS lands, right-of-way acquisitions for access across the lands of others, and land adjustments and exchanges with adjacent and intermingled owners There are two congressionally designated areas, Cascade Head Scenic-Research Area (CHSRA) and the Oregon Dunes National Recreation Area (NRA), where adjacent lands can be purchased with Land and Water Conservation funds to enhance the values of the areas Three additional areas are also qualified for purchase· Sutton Composite, Yachats Purchase Units, and the Big Creek-Perpetua Composite. All uses of forest lands and resources, except timber harvests, mineral extraction and livestock grazing, are designated "special uses" and require special use permits.

Current Situation

Of the 1,600 miles of boundary line between NFS and other lands, 1,350 miles (or 85% of the total) have been posted As more of the boundary is located and posted, encroachments from other owners and title claims against the Forest Service arise About 90 such cases exist at this time

Land exchanges during the last 5 years transferred 4,300 acres of NFS lands to other owners while 6,900 acres have come into the NFS. About 1,300 acres have been purchased at CHSRA (about 65% of the acquisitions anticipated for the area) At the Oregon Dunes NRA, about 1,200 acres have been acquired

The Forest administers about 400 special use permits for utility lines, roads, electronic sites, and recreational activities In the last 10 years, 10 to 15 permanent rights-of-way and about 30 temporary land use agreements have been acquired each year. Most of the existing utility corridors are on private land, especially the east west routes from the Willamette Valley to the coast Existing utility corridors are shown in Figure III-32 Potential electronic sites have been inventoried (Electronic Site Evaluation Study, Siuslaw National Forest, 1980)

Historic Trends

The landline location program was emphasized in the late 1970s and early 1980s, when more than 75% of the landline on the Forest was re-surveyed. This caused a corresponding upsurge in the discovery of encroachments and title claims. Activities in the special use, right-of-way, land exchange, and purchase programs have remained fairly constant during the last several years.

Future Trends

The landline location program should be completed within 10 years and emphasis will then shift to maintenance of the located lines The encroachment/title claim program will increase until the backlog of cases is resolved The rate of issuance of special use permits is not expected to change at least for the next 10 years Right-of-way activities will decrease slowly as access is gained to isolated areas of the Forest and as the land exchange program eliminates the need for new rights-of-way Land will continue to be available for exchanges and purchases and progress will be contingent on the Forest budget. Most of the remaining purchases in congressionally designated areas could be made in the next 5 years Future utility lines will be located after an interagency environmental analysis that considers existing corridors among the alternatives

Resource Relationships

The timber sale program is dependent on accurate location and posting of landline boundaries adjacent to sale areas, and on access, either through land adjustment or right-of-way acquisition Land adjustments can acquire lands of value for wildlife and fish habitat, recreation, or watershed protection

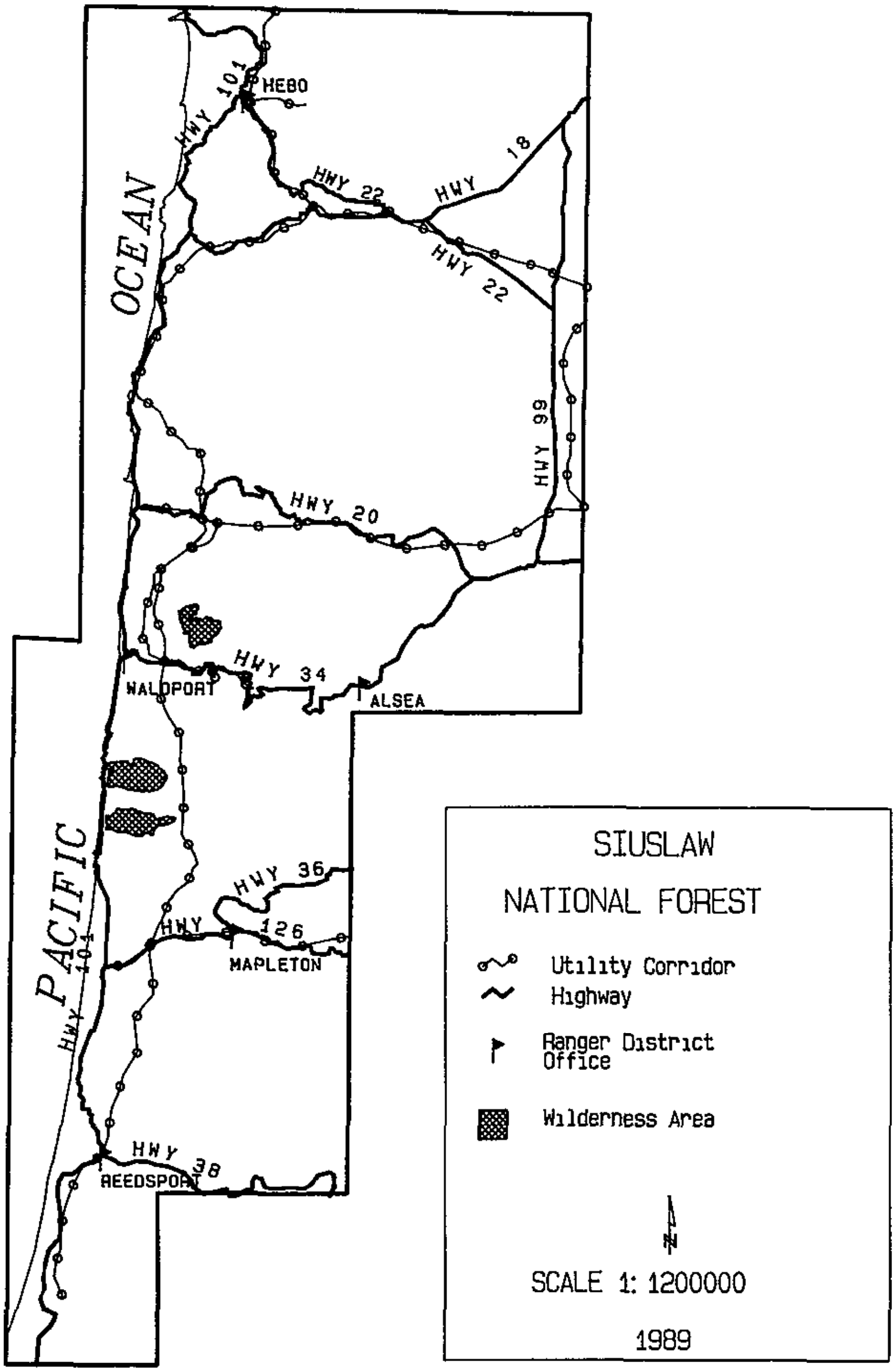


FIGURE III-32 EXISTING UTILITY CORRIDORS

ROADS AND FACILITIES

Overview

Protection and multiple use management of Forest lands and resources depends on a transportation system to provide access for business and pleasure Primary responsibility for development and maintenance of the system rests with the Forest Service, although adjacent land owners and other users help maintain some roads

Other facilities on the Forest include buildings, bridges, water systems, and sanitation systems

Current Situation

Many of the approximately 2,500 miles of roads on the Forest were constructed to provide access to timber stands Of these, 12% are classified as arterials (major forest access routes), 32% as collectors (feed into the arterials, usually single lane); and 55% as local (short spurs off of collectors, single lane) Arterials and collectors are the main access routes to the Forest, tend to connect to county roads or highways and are open all year Local roads are dead end roads that access a specific site. They tend to be on steeper terrain In general, arterials and collectors are maintained for all resources, while local roads are maintained primarily for a single user Local road users include commercial traffic (mostly timber), forest visitors, hunters, and others

Over 37% of the existing road system (900 miles) is maintained for all types of traffic including commercial, recreational and low-clearance passenger vehicles These roads are double lane paved, or single lane with turnouts, with paved or graded aggregate surfaces They conform to rural road safety standards, include traffic and informational signing, hazard identification, and sight distances for speeds of 15 to 30 miles per hour.

Fifty-seven percent (1,400 miles) is maintained only for high-clearance passenger vehicles and commercial traffic The remaining 7% (170 miles) of the system is closed to all traffic for resource protection and user safety Both of these groups of roads are single lane with aggregate or dirt surfacing They are not maintained for passenger car use Directional and traffic control signing is at a minimum Safety hazards are marked Sight distances are designed for speeds of 5 to 15 miles per hour

State, county, and private roads also provide access to the Forest. There are 220 miles of state roads within and adjacent to the Forest boundaries, of which 125 miles are maintained as Forest highways. Two hundred miles of county roads are within or adjacent to the Forest boundaries Most of these roads are under the jurisdiction of five counties In addition, the Forest has a number of agreements with federal, state and county agencies, and private companies (e g , Champion, Georgia Pacific, Willamette Industries) concerning sharing road improvements, operation and maintenance

The Forest owns and maintains 125 buildings, 27 water systems (23 at recreation areas), and three sewage treatment plants (two at recreation sites, one at Angell Job Corp) The Forest leases buildings at the Supervisor's Office, the Mapleton Ranger District, and the Oregon Dunes National Recreation Area The buildings are used for offices and storage

Future Trends

The size of the road system needed to manage Forest resources depends extensively on the amount of timber harvest Access to 80% of the tentatively suitable timber land is already provided by roads. It is estimated that 600 more miles of road are needed to provide access to the remaining 20% If all of the tentatively suitable land is managed for timber production, the roads will be constructed in the first 2 decades Sixty percent of these roads will be maintained only for high-clearance vehicles. The rest will be maintained for all types of traffic Only 45 of the 600 miles will be collectors.

On the other hand, if some of the tentatively suitable timber land which is currently roaded is not assigned for timber production, some of the existing roads will not be needed These roads will be closed in the first 2 decades.

The number of government-owned buildings will decline slightly as existing structures are replaced with leased buildings.

Resource Relationships

The Forest road system provides access for everyone The roads are designed and maintained to meet the changing needs of their users. Many roads are oriented toward timber harvest, and still used for activities such as hauling firewood, hunting, and fishing.

Winter storms are the main threat to construction and maintenance of roads. When the easily eroded soils prevalent on the Forest become saturated by heavy rainfall, slopes may fail. Failing slopes produce material that may plug culverts, cause road slough, or slides that may close roads and trap travellers. This increases the potential for road damage, with subsequent disruption to other resources To respond to this situation the Forest has its Road Maintenance Crews organized under a Flood Emergency Road Maintenance plan for immediate response to potential hazards

HUMAN AND COMMUNITY DEVELOPMENT

The Forest Service has been involved in human resource programs since the formation of the Civilian Conservation Corps in the early 1920s Since then, the Forest has operated various programs that provide employment and training and benefit the participants and the Forest. At present, the Forest is involved with the following programs:

- Senior Community Services Employment Program, with a current enrollment of 18, provides part-time employment to low income senior citizens;
- Job Corps, a residential training and education program for disadvantaged men and women between 16 and 22 years old, has a current capacity of 208 students
- Youth Conservation Corps. In 1989 the enrollment was five youths This program provides temporary and short-term jobs for youths in rural communities
- Working with schools, tribal and community organizations to provide hosted opportunities. Many of these opportunities are made available through the Job Training Partnership Act; the Forest Service provides jobs and supervision and the cooperative organization pays wages for the enrollee These programs focus on placement in jobs that may eventually provide long-term employment.
- Cooperation with State Vocational Rehabilitation program to provide work experience and training for disabled citizens.
- Volunteer programs to provide on the job experience.

Present trends in the economy (particularly unemployment) have substantially increased interest in these programs. The Forest benefits because labor is provided for important but unfunded programs (such as maintenance of facilities, campgrounds, and trails), while the enrollees gain work experience, and are available for regular employment when positions are vacant.

Funding for these programs is decreasing The volunteer programs are not costly and have been used extensively during the last 5 years

AMERICAN INDIAN RELIGIOUS PRACTICES

Overview

Historically, American Indians have used the Forest for traditional religious practices. It is the policy of the United States to protect and preserve their inherent right of freedom to believe, express and exercise their traditional religions (Joint Resolution on American Indian Religious Freedom 1978)

Current Situation

In 1954, the United States ended federal trusteeship of the tribes surrounding the Forest through a process called termination However, several tribes have recently reestablished the trust relationship Today, the area includes three federally- recognized tribes the Confederated Tribes of Siletz (restored in 1978), the Confederated Tribes of the Grande Ronde (restored in 1983); and the Confederated Coos, Lower Umpqua, and Siuslaw Tribes (restored in 1984) The Siletz tribe has a 3,666-acre reservation around the town of Siletz. The 1980 Census identified 6,700 American Indians in the eight counties surrounding the Forest. Seventy percent lived in Coos, Douglas, and Lane counties

In 1982, a study of the traditional practices of the tribes around the Forest found no continuing religious practices (Beckham et al 1982) However, two quarries for paint and two quest areas were identified which were once important to the native inhabitants

Historic Trends

Many tribes of Indians occupied the lands now in and around the Siuslaw National Forest They include the Tillamook, Alsea, Yaquina, Coos, Lower Umpqua, Siuslaw, and Kalapua tribes In the 1770s, their religious practices were focused on unique, individual linkages with the natural world Their primary religious use of the Forest appears to have been sites for spiritual quests and quarries for materials used for facial and body paint In the mid-19th century, the tribes underwent a period of calamitous change, population loss, and uprooting Epidemics from introduced disease, white-Indian warfare, removal by whites to alien lands, reservation life, and Christian missions disrupted their traditional religious practices

Future Trends

The Forest Plan will ensure that the setting and location of sites once important for religious purposes are protected from disturbance and are available for use Forest personnel will continue to cooperate with the Tribes in identifying and maintaining traditional uses on the Forest


C Toombs

CHAPTER IV
Environmental Consequences

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Environmental consequences are the estimated physical, biological, social, and economic effects that would result from implementing each of the alternatives described in Chapter II The analysis of these effects provides a basis for comparing the alternatives

This chapter describes the projected direct, indirect, and cumulative effects of the alternatives and summarizes the planned mitigation measures It also describes conflicts between the effects of the alternatives and other plans and policies Tables, figures, and text often refer to the 1st decade and several subsequent decades. The 1st decade is the period to be covered by the Forest Plan Estimates for subsequent decades represent effects if activities and outputs of the alternatives were continued beyond the 1st decade Comparison of plan alternatives to existing condition refer to the average condition during the period from 1979 to 1988, unless otherwise noted The average annual timber harvest during 1979-1988 was 302 MMBF

The environment (e.g., vegetation) can be directly changed by the activities (e g , timber harvest) promoted by an alternative These changes may trigger indirect effects on other facets of the environment (e g , changing vegetation species composition or age distribution by harvesting timber indirectly alters the conditions in wildlife habitat) Cumulative effects are total actions on Forest lands and neighboring lands for the foreseeable future Mitigation measures are activities planned to prevent, rectify, or reduce projected adverse effects on the environment Some effects are described quantitatively while others are described in qualitative terms

Timber harvesting, regeneration of vegetation after harvest, protection from fire and pests, and development of areas for recreation, wildlife and fish habitat broadly affect the environment Directly or indirectly, changes in vegetation, and construction and maintenance of roads would cause most of the effects described in Chapter IV. All management activities will conform to the standards and guidelines detailed in Forest Plan, Chapter IV.

Treatment of vegetation and construction of access roads most affect the Forest's visual and recreational characteristics; the quantity, quality, and distribution of wildlife and fish habitat, the size, age, health and vigor of the vegetation; the susceptibility of the trees to insects and disease; soil erosion, and the quality of the water flowing from the treated area Other effects on the environment result from constructing facilities such as recreation sites, trails, and in-stream structures for improving fish habitat, law enforcement; and activities of recreationists, permittees, and agents

All activities with an environmental effect can be grouped under one or more of the following construction of roads, trails, and structures (e.g , campsites, leachfields, shelters, fish habitat structures); cutting and transportation of vegetation; burning of vegetation or organic materials, application of chemicals to alter soil productivity, vegetation, or animals (e g , insects); and the planting of vegetation. These activities always create changes in their vicinity and may have effects far from where they occur

The management activities and their associated effects are referred to later in this chapter in discussions of consequences on specific components of the environment These components include vegetation, soil, water, fish, wildlife (including threatened and endangered species and critical habitat), recreation and research opportunities, scenery, Wilderness, undeveloped areas, research opportunities, air, cultural resources, communities, farmland, wetland, floodplains, minerals, range land, consumers, civil rights, and minority groups. Other environmental effects considered include energy requirements and conservation potential of the alternatives and mitigation measures.

Management Activities and Effects

The following is a general description of management activities, and the major effects they have on the environment.

Road and Landing Construction

Road and landing construction require heavy equipment (tractors, trucks, earth movers) to develop stable surfaces capable of supporting log trucks and log yarding equipment across mountain slopes. The construction and maintenance of roads and landings...

... displace, compact, or remove topsoil and vegetation from the roadway
.. may increase the probability of erosion. Surface and ground water flow may be redirected when the subsoil on cutbanks and fill slopes is exposed and these areas are not properly treated
may divide wildlife ranges and degrade or destroy habitats
... provide passage for wildlife or interrupt travel routes
... make remote areas, and their resources (recreation, fish, timber and so forth) accessible to visitors and commercial or non-commercial users

Trail Construction

Trail construction requires light equipment and manual labor to develop stable surfaces (on a small scale) capable of supporting pedestrians, and, where allowed, horses or ORVs, across many terrain types. Trails ..

may increase soil erosion where steep trails aren't designed to prevent interruption or redirection of water flow.
... make remote and scenic areas accessible to hikers.
provide passage for wildlife

Construction of Waste Water Structures

Construction of waste water structures involves the construction of leachfields and vault toilets in the soil Waste water structures .

may increase the risk of contaminating the soil and groundwater in the immediate area of the structure Any contamination noted will be short term No long term degradation of water or soil quality will be allowed.
... reduce contamination from human waste and grey water in heavily used areas.
increase comfort and convenience for Forest visitors.

Construction of Other Recreation Facilities

Construction of recreation facilities such as parking lots, shelters, signs, campgrounds and so forth, involve the construction of various buildings, concrete footings, signposts, or pavement to make the use of recreation areas more pleasurable Recreation facilities...

concentrate people in certain areas. This may result in soil compaction, disturbance to vegetation and wildlife, and an increase in the level of noise.
- allow the Forest Service to make visitors safer and more comfortable.
- reduce the quality of small areas of wildlife habitat.

Construction of Fish Habitat Structures

Construction of fish habitat structures involves blasting bedrock, or placing logs, gabions (cobble-filled wire baskets), concrete, or boulders, in stream channels Fish structures..

- change stream flow and alter the movement and distribution of stream gravel and sediment
- increase the quantity and quality of fish habitat.

Cutting Vegetation

This activity includes cutting down and removing trees and shrubs for a variety of reasons, mostly timber production and wildlife habitat management Cutting vegetation .

- changes species composition of the cutover area and of the basin(s) in which the cutting occurs.
- changes age distribution of the vegetation in the cutover area and in the basin(s) in which the cutting occurs
- changes amount and arrangement of organic debris such as logs, branches, and twigs
- kills roots, temporarily reducing resistance to landslides on unstable slopes
- changes habitats in the cutover area, and changes the distribution of these habitats in the basin(s) in which the cutting occurs
- when done along streams, changes the type and timing of organic debris deposits in stream systems.
- when done along streams, may increase the temperature of streams and lakes
- influences dependence of communities on timber revenues
- in the case of cutting commercial timber, generates revenues locally through returns to the counties, generates jobs and influences local economy.
- increases growth rates of remaining vegetation
- may alter microclimate by increasing daily temperature fluctuations; and increases surface winds
- alters the scenery of the area
- eliminates the natural condition of areas not previously cut

Burning Vegetation or Organic Debris

Burning vegetation and debris involves broadcast burning in cutover areas or in meadows The objective is to. 1) lower the hazard of wildfire by reducing fuel; 2) reduce undesirable competing vegetation to increase sunlight and nutrients for desired trees or forage, 3) facilitate tree planting by reducing low growing vegetation and logging slash Burning vegetation

- alters the soil by changing the amount and availability of certain nutrients (especially Nitrogen), lowers the soil's resistance to erosion, and reduces reservoirs of soil microorganisms and mycorrhizal fungi.
- may reduce the cost of subsequent cultural activities for trees and wildlife habitats
- alters the scenery of the area
- reduces the risk of wildfire and the difficulty of suppressing wildfire
- creates smoke in local airsheds
- alters the microclimate by increasing surface temperatures as long as black color remains

Application of Chemicals

Application of chemicals involves applying fertilizer, pesticides, and other materials The objective is to improve vegetation growth and selectively reduce plants or animals which compete with or damage desired Forest resources Application of chemicals .

... may increase growth of treated species
... may damage or kill treated species
. may contaminate water downstream from application
may damage or kill plants or animals outside target area

Planting Vegetation

Planting vegetation introduces desired species into areas where the vegetation has been cut, or cut and burned. The objective is to enhance economic, ecological, or aesthetic values Planting vegetation

. . may change species composition
alters visual characteristics
increases soil strength and resistance to erosion by promoting root growth, and ground cover
may change forage and habitat for some wildlife
.. initiates future timber crops

Incomplete or Unavailable Information

Some information used to predict environmental effects in this chapter is incomplete, while other information is unavailable at this time Incomplete or unavailable information is noted later in this chapter for each major resource The Forest has used the most current information available and state-of-the-art analytical tools to evaluate activities and to estimate effects

The Council on Environmental Quality's NEPA regulations relating to incomplete or unavailable information have been amended [40 CFR 1502 22, amended at 51 Fed Reg 15618 (April 25, 1986)] The discussion below complies with the amended regulations

In the FEIS and Forest Plan.

- The discussions of the management of resources on the Siuslaw National Forest have involved an evaluation of reasonably foreseeable significant adverse effects on the human environment
- The evaluation of those effects sometimes has been based upon information that is incomplete or is only partially available.
- The incomplete or unavailable information cannot be obtained because the overall time and money costs to obtain the information would be exorbitant, and in some cases the means to obtain the information are not known

Consequently, pursuant to 40 CFR 1502 22(b), as amended, the following discussions of management impacts on vegetation, watersheds, fish, wildlife, recreation, scenery, Wildernesses, undeveloped areas, research, communities and other resources include a description of the incomplete or unavailable information which is relevant to the evaluation of reasonably foreseeable significant adverse impacts associated with the alternatives. In many cases, the incomplete or unavailable information is not necessary for an evaluation of the reasonably foreseeable significant adverse impacts on the human environment

In other cases, notably the effectiveness of the headwall leave area technique in preventing landslides and the habitat requirements for wildlife indicator species, the incomplete or unavailable information is necessary for the evaluation of the reasonably foreseeable significant adverse impacts In these cases, the discussions of the projected impacts in this chapter contain references to existing credible scientific evidence relative to evaluations that have been made. The assumptions used in making predictions are disclosed The evaluation of the impacts are based upon theoretical approaches and research methods generally accepted in the scientific community

Monitoring of adverse effects, the achievement of resource outputs, and implementation of management practices including standards and guidelines will determine the need to change management direction or amend the Forest Plan

CHANGES BETWEEN DRAFT AND FINAL

Changes were made to Chapter IV between the 1986 draft and this final EIS as a result of newer information becoming available and in response to concerns expressed during the public comment period The following are the major changes.

- Added or expanded discussions of plant associations, diversity and old growth Updated the stand ages for all timber stands in the planning model to 1990 Revised inventory data to reflect harvest since the last update (1985) through 1989
- Modified the Fish Habitat Model to limit the influence of upland areas on large woody debris level and to increase the following: existing smolt habitat capability; reliance on habitat quality as determined by large woody debris levels; effectiveness of headwall leave areas in preventing landslides, efficiency of riparian leave areas. These chànges have been incorporated in the analysis of effects on fish habitat
- Incorporated the Bald Eagle Recovery Plan into analysis of effects on that species.
- Updated discussion of timber supply and demand
- Included information from eligibility studies on potential wild and scenic rivers
- Updated discussion of air quality to reflect changes in technology, policy and coordination with the state of Oregon
- Incorporated into the analysis of effects, the Regional FEIS for Managing Competing and Unwanted Vegetation, including reduced emphasis on burning and herbicides
- Added a discussion of Alternative NC (representing the 1979 Timber Resource Plan outputs and effects) relative to each resource, where data was available
- Updated the discussion of spotted owl habitat areas to reflect the July, 1988 Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide

ENVIRONMENTAL CONSEQUENCES ON VEGETATION

Direct Effects on Vegetation

All alternatives will have direct effects on vegetation. The range, timing, and location will vary depending on the alternative The direct effects on vegetation include changes in species composition and distribution, age classes, growth rates, risk of windthrow, susceptibility to risk of pests and fire

Diversity

The effects of the alternatives on plant and habitat diversity would not vary substantially by alternative Allocation of some lands to management areas with no programmed harvest and application of standards and guidelines to areas under active management maintain most of the existing diversity. Monitoring species and habitats throughout the Forest will verify maintenance of diversity or indicate a need for changes in management direction.

Natural processes, when uninterrupted by human activity, generally provide for diversity because they tend toward increasingly complex, late seral conditions. Lands in Management Areas 1 through 13 will be affected primarily by natural processes The diversity on these lands reflects their successional history and age. Repeated disturbances, such as from timber harvesting, reduce ecosystem complexity and diversity by maintaining early seral conditions and suppressing succession. Lands in Management Areas 14 and 15 will be affected by relatively frequent disturbance from management activities. These lands would commonly be invaded by a mixture of early seral plant species and frequented by animals that require open-structured habitat (grass/forb vegetation).

Consumptive management activities reduce the risk of losing diversity if detrimental activities are curbed by effective standards and guidelines Untried management practices included in standards and guidelines have a degree of uncertainty as to their effectiveness Because of this there may be a higher risk to diversity in alternatives with more allocations to consumptive uses.

In cases where the land adjacent the Forest has been managed for consumptive uses, Forest lands managed for non-consumptive uses serve as refuges for species that require later seral stages and undisturbed habitats. In addition, conditions on lands managed for non-consumptive uses tend toward more complexity A mixture of allocations to consumptive and non-consumptive also helps to maintain diversity on the Forest A comparison of the amount of land allocated to non-consumptive uses among alternatives provides one indication of the relative ability of the alternatives to maintain existing diversity Table IV-1 displays the amount of forested land proposed for consumptive and non-consumptive uses by alternative

Table IV-1. Management Intensity by Alternative

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Percent of Forested Land Allocated to Non-consumptive Uses	13	35	31	31	33	41	39	46	69	77
Percent of Forested Land Allocated to Consumptive Uses	87	65	69	69	67	59	61	54	31	23

Alternative NC would have the fewest acres allocated to non-consumptive uses and would maintain the least amount of natural diversity Alternatives G and H have the most acres allocated to non-consumptive uses. These would maintain most of the diversity resulting from natural or unmanaged conditions Other alternatives are similar to one another and intermediate in the amount of natural diversity maintained

Silvicultural practices can affect the diversity of tree species in future managed stands. These practices may be of particular concern in the Sitka spruce zone near the coast because it is relatively limited compared to the western hemlock zone that lies inland. The majority of the planted trees are Douglas-fir, but cultural practices in both zones include planting native conifer species. Alder and western redcedar are replanted in root rot infection centers During release, precommercial thinning, and commercial thinning activities, all commercial species are encouraged rather than just a single species

Significant natural seeding of Sitka spruce and western hemlock occurs in the western part of the forest In the valley margin on the eastern edge of the Forest, Douglas-fir naturally seeds on many sites Natural seeding also occurs in the upper elevation noble fir found on Marys Peak Red alder naturally seeds on most disturbed sites (where mineral soil is exposed) on the west and north parts of the Forest

The Tree Improvement Program for the Forest would not vary by alternative, but the acreage to which it is applied varies in proportion to acreage allocated to consumptive uses, i e , the acres harvested under each alternative The Tree Improvement Program is designed to maintain desired diversity among planted conifers The remainder of the shrubs and trees on a harvested site will continue to provide a natural range of genetic diversity because of natural regeneration Vegetation management as practiced under the standards and guidelines of the Forest Plan would not eliminate species from the harvest sites

In addition to the amount of land allocated to consumptive uses, the distribution of rotation length on those *lands affects diversity Figure IV-1 displays rotation lengths of suitable lands for each alternative* This effect is mostly on vegetation age classes, rather than species composition of plants on a site Consequently, the effects may be greater on diversity of animal species than on plant species Alternatives A and H would assign about 115,000 acres to 133,000 acres on rotations longer than 80 years This is similar to the existing plans which have about 120,000 acres assigned to longer rotation lengths Alternative NC would assign 111,000 acres to long rotations, but would also have more short rotations, since it has the most acreage suitable for timber harvest Alternatives E(PA), F, and G have slightly less land under long rotations All the other alternatives have less land assigned to long rotations

Wood quality and value, resulting from size and frequency of knots,tightness of wood grain and average log size, are affected by silvicultural practices such as stand density management and rotation length Alternatives with more area managed for longer rotations would produce slightly higher quality and value timber These differences will become more important as non-National Forest lands are managed for shorter rotations Alternatives NC, A, E(PA), F, G and H would provide the most suitable land managed for long rotations

All alternatives except F, G and H would manage between 264,000 acres and 396,000 acres on short rotations, favoring earlier seral vegetation and associated wildlife species

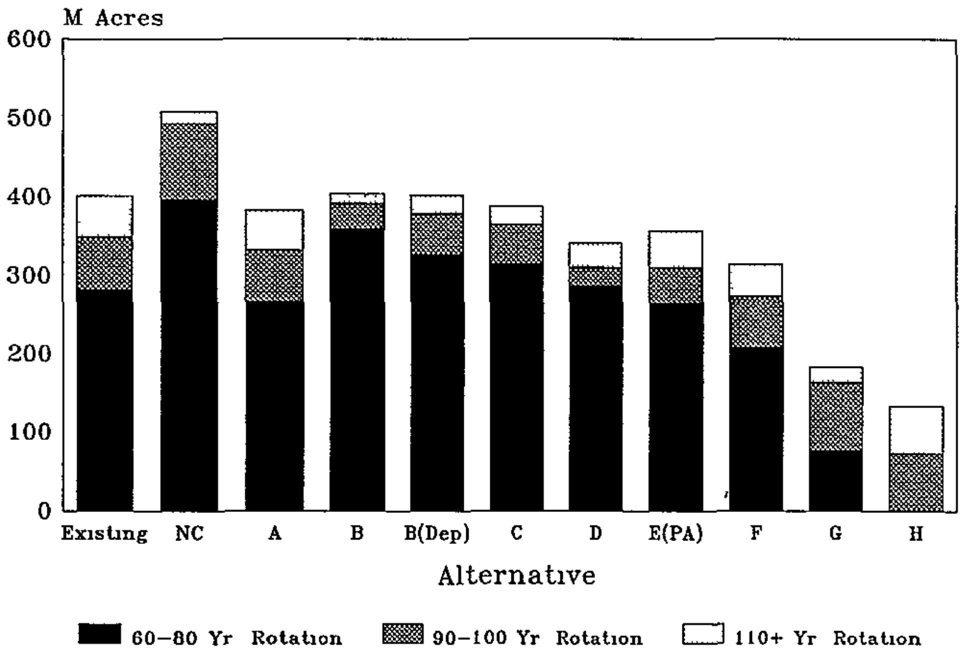


FIGURE IV-1 ROTATION LENGTHS OF TIMBER SUITABLE ACRES

Existing meadows are maintained in all alternatives Alternatives C, E(PA) and G also create permanent meadows.

Changes in the amount of six vegetation groups reflect the differences in rotation length and indicate the direct effects of management activities on vegetation. The classes are groupings of species composition and age classes: grass/forb (openings and sites with trees less than 15 years old); deciduous mix, all ages; riparian, all ages; immature conifer, 15 to 79 years old; mature conifer, 80 to 199 years old; old-growth conifer, 200 years and older. Acres in each vegetative condition at the end of the 1st, 2nd and 5th decades are shown in Table IV-2. Changes are expressed as a percentage of the existing vegetation condition

Table IV-2 Predicted Vegetation

	Thousand Acres and Percent of Existing Condition by Alternative									
Vegetation Groups	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
1st DECADE										
Grass/Forb	108 7 132%	90 1 109%	83 8 102%	95 7 116%	85 2 104%	81 5 99%	81 0 98%	75 4 92%	56 1 68%	41 4 50%
Upland Deciduous Mix	33 6 58%	34 2 59%	54 4 93%	51 4 88%	51 1 88%	52 3 90%	55 9 96%	48 6 83%	50 8 87%	55 9 96%
Riparian	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%
Immature Conifer	161 7 148%	161 7 148%	162 0 148%	162 0 148%	162 0 148%	162 0 148%	162 0 148%	162 0 148%	162 0 148%	162 0 148%
Mature Conifer	175 6 80%	191 0 87%	182 1 83%	173 5 77%	182 8 83%	185 9 84%	174 4 79%	191 8 87%	201 5 91%	211 1 96%
Old-growth Conifer	23 6 70%	27 2 80%	21 9 65%	21 5 64%	23 1 68%	22 5 67%	30 8 91%	26 4 78%	33 8 100%	33 8 100%
2nd DECADE										
Grass/Forb	143 1 174%	89 3 109%	84 0 102%	100 4 122%	82 2 100%	74 3 90%	79 4 96%	67 5 82%	40 1 49%	19 2 23%
Upland Deciduous Mix	27 6 47%	16 7 29%	55 8 96%	50 8 87%	52 4 90%	53 6 92%	43 1 74%	45 5 78%	45 4 78%	54 9 94%
Riparian	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%
Immature Conifer	218 6 200%	218 6 200%	215 9 198%	221 5 203%	216 6 199%	214 8 197%	214 5 197%	211 9 194%	200 6 184%	195 9 180%
Mature Conifer	91 3 41%	153 6 70%	126 6 57%	109 9 50%	130 5 59%	139 0 63%	142 8 65%	152 9 69%	184 3 84%	200 4 91%
Old-growth Conifer	23 6 70%	26 0 77%	21 9 65%	21 5 64%	22 5 67%	22 5 67%	24 3 72%	26 4 78%	33 8 100%	33 8 100%
5th DECADE										
Grass/Forb	74 4 90%	71 9 87%	89 1 108%	81 4 99%	88 0 107%	83 8 102%	86 3 105%	72 7 88%	38 2 46%	21 6 26%
Upland Deciduous Mix	27 6 47%	24 8 42%	23 8 41%	24 7 42%	24 8 42%	25 8 44%	27 7 47%	31 5 54%	40 5 69%	43 2 74%
Riparian	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%	76 6 100%
Immature Conifer	374 4 343%	276 8 254%	268 2 246%	275 2 252%	264 8 243%	257 7 236%	246 6 226%	232 8 213%	195 6 179%	178 8 164%
Mature Conifer	18 0 8%	109 9 50%	102 7 47%	102 3 46%	105 7 48%	115 5 52%	120 1 54%	143 1 65%	196 1 89%	226 8 103%
Old-growth Conifer	9 8 29%	20 9 62%	20 4 60%	20 6 61%	20 9 62%	21 4 63%	23 3 69%	24 1 63%	33 8 100%	33 8 100%

ENVIRONMENTAL CONSEQUENCES ON VEGETATION

The proportion of plant associations displayed as existing condition in FEIS, Chapter III will not change as a result of management activities under any of the alternatives. Plant associations represent potential vegetation on a site Age classes, which depend on disturbance history, would vary by alternative In addition to the conifer age groupings displayed in Table IV-2, age groups in the deciduous mix and riparian cover types would vary, see Tables IV-3 and IV-4 (data for Alternative NC is not available).

Table IV-3. Predicted Upland Deciduous-Mix Age Groups

		Thousand Acres by Alternative								
Age Groups	Existing	A	B	B(Dep)	C	D	E(PA)	F	G	H
		1st DECADE								
0-15 years	0	3 2	2 9	3 5	2 9	2 7	2 7	2 4	1 4	0 6
16-50 years	0	0	0	0	0	0	0	0	0	0
51-100 years	58 4	34 2	54 4	51 3	51 1	52 3	55 9	48 6	50 8	55 9
101+ years	0	0	0	0	0	0	0	0	0	0
		2nd DECADE								
0-15 years		4 6	4 3	5 2	4 2	3 8	4 1	3 5	2 0	0 9
16-50 years		1 6	1 4	1 7	1 4	1 4	1 4	1 2	0	0
51-100 years		15 1	54 4	49 0	51 0	52 2	41 7	44 3	44 7	54 9
101+ years		0	0	0	0	0	0	0	0	0
		5th DECADE								
0-15 years		3 7	4 6	4 2	4 5	4 3	4 4	3 8	1 7	1 1
16-50 years		9 8	1 6	11 5	10 4	9 7	9 5	8 3	4 4	2 4
51-100 years		0	0	0	0	0	0	0	0	0
101+ years		15 0	13 2	13 3	14 4	16 1	18 2	23 2	36 1	40 8

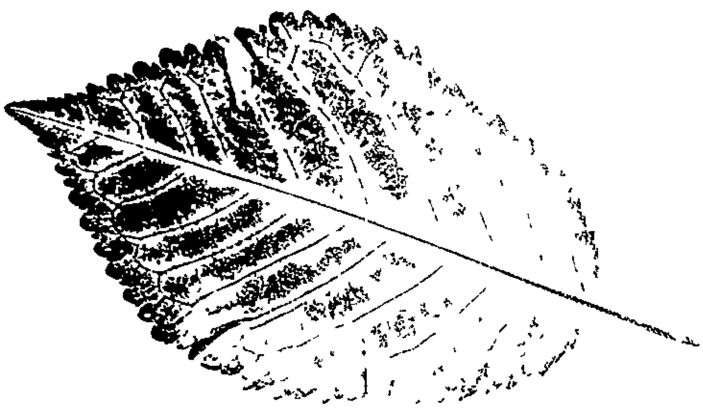


Table IV-4. Predicted Riparian Age Groups

Age Groups	Existing	A	B	B(Dep)	C	D	E(PA)	F	G	H
		Thousand Acres by Alternative								
		1st DECADE								
0-15 years	5 7	2 5	3 3	1 4	2 6	0 5	1 7	0 5	0 5	0 5
16-50 years	6 4	16 5	16 5	16 5	16 5	16 5	16 5	16 5	16 5	16 5
51-100 years	59 6	57 6	56 8	58 7	57 5	59 6	58 4	59 6	59 6	59 6
101+ years	0	0	0	0	0	0	0	0	0	0
		2nd DECADE								
0-15 years		1 0	1 4	0 5	3 5	0	1 2	0	0	0
16-50 years		18 0	18 4	17 4	17 2	17 0	17 9	17 0	17 0	17 0
51-100 years		57 6	56 8	58 7	56 0	59 6	57 5	59 6	59 6	59 6
101+ years		0	0	0	0	0	0	0	0	0
		5th DECADE								
0-15 years		5 9	7 9	11 1	12 2	0	3 1	0	0	0
16-50 years		8 9	13 8	22 1	8 3	0 9	3 6	0 9	0 9	0 9
51-100 years		16 1	16 0	10 1	16 1	16 1	16 2	16 1	16 1	16 1
101+ years		45 7	38 9	33 3	40 0	59 6	53 7	59 6	59 6	59 6

The following effects on vegetation are common to all alternatives·

- Grass/forb responds directly to the number of acres harvested in each alternative
- Immature conifer does not vary among alternatives in the 1st decade because none of it is harvested and the same amount grows into that condition in each alternative
- Riparian area remains constant Age classes within the riparian area change over time Riparian vegetation is all hardwood in the 1st and 2nd decades
- Upland deciduous-mix, all ages, provides at least 24,000 acres of deciduous-mix habitat in all alternatives in the 5th decade (Some alternatives have more)
- Upland deciduous-mix, all ages, declines in all alternatives, especially in the 2nd through 5th decades. Upland deciduous-mix, 50-100 years old, disappears in the 5th decade

Some effects on vegetation apply to particular alternatives

- There are fewer acres of younger aged (replacement stands) upland deciduous-mix in Alternatives G and H, so declines in this vegetation group will be greatest in these alternatives after the 5th decade
- By the end of the 2nd decade, immature conifer doubles or nearly doubles in all alternatives except Alternatives G and H. In Alternatives G and H the increases are slightly less In the 5th decade, immature conifer increases further in all alternatives except G and H In Alternatives G and H it begins to decline
- In the 1st and 2nd decades mature conifer declines in all alternatives In the 5th decade it declines further, except in Alternatives G and H

Old-Growth Stands

The total acreage, stand size and distribution of old-growth stands and ecosystems indicate the effects of each alternative on old-growth resources. Various amounts of old-growth stands are maintained or allowed to develop in each alternative. Table IV-2 and Figure IV-2 show the acres of old-growth conifer stands (greater than 200 years old) in the in the 1st, 2nd and 5th decades All of these are existing old growth now. There are no stands of mature conifer old enough to become old growth within fifty years All alternatives, except NC, would maintain at least 20,000 acres of the existing old-growth stands including 13,600 acres in spotted owl management areas Additional acres are maintained in some alternatives for other reasons, such as soil and water protection. Alternative E(PA) would maintain additional old growth through more protection of other resources or through assignments for other resource programs, such as spotted owl habitat above levels in Alternatives A through D Alternative F would maintain 24,100 acres. In Alternatives G and H all 33,800 acres of existing old growth would be maintained.

Alternatives B, B(Dep), C, D, and F harvest most of the old growth on suitable lands in the 1st decade with some additional cutting in later decades Alternative A shows a more gradual harvest of the suitable old growth over 5 decades Alternative E(PA) does not harvest as much of the suitable old growth in the 1st decade, but by the 5th decade most of it is harvested Alternatives G and H do not harvest any of the existing old growth in any decade.

The 1979 Timber Resource Plan (TRP) on which Alternative NC is based did not detail the rate of harvest of old growth The assumption in the FEIS is that high valued stands would be harvested early in the planning period, unless those stands were to be left for other resource values. The drop in old growth remaining in the 5th decade reflects the harvest of old growth that was deferred until development of management direction for spotted owl habitat Alternative NC assumes that no requirement for owl habitat is established. The other alternatives reflect various levels of old growth retained for spotted owl habitat and other non-timber uses.

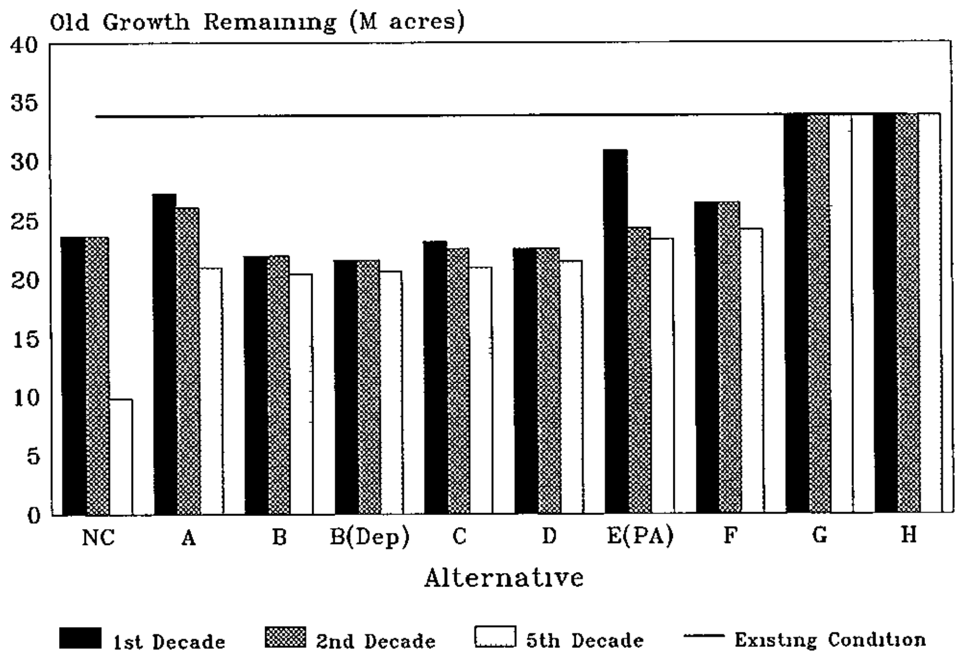


FIGURE IV-2. OLD GROWTH REMAINING AFTER THE 1ST, 2ND AND 5TH DECADES

The opportunities to maintain well distributed existing old growth are limited by the pattern of old growth on the Forest as a result of fires in the 1800s; see FEIS, Chapter III, "Old Growth" Within those limits, distribution of old growth stands is addressed in all alternatives except NC by incorporation of spotted owl habitat areas (SOHAs) (The Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (1988) provides direction for Management Requirement levels of SOHAs) Alternatives A through D provide the Management Requirement level (22 SOHAs); Alternatives E(PA) through H provide more See FEIS, Chapter IV, "Wildlife" In addition, Alternatives E(PA), G and H maintain additional old growth outside of the SOHAs that further provide distribution of old growth throughout the Forest

Corridors and links between old-growth stands would be provided by areas that will not be harvested and by application of standards and guidelines for dispersion of harvest areas As shown in Table IV-1, Alternatives G and H provide the most opportunities for linkage by lands allocated to non-consumptive uses Alternatives NC, B and B(Dep) would provide the fewest links and most fragmentation of old growth

The alternatives vary in their potential for additional old-growth stands All alternatives would include at least 19,700 acres of stands greater than 10 acres, that would not be harvested in the 1st decade, and are of an age that would qualify them for old-growth stands in 100 years If management area assignments made for the 1st decade were to continue through the 10th decade, the vegetation on those unharvested acres would develop into old growth ecosystems if they are not destroyed by fire, wind, insects, or disease. Table IV-5 displays the acreage with potential to develop old-growth characteristics in 100 years The potential is lowest in Alternatives NC, B, and B(Dep); higher in Alternatives A, C D, E(PA), and F, and highest in Alternatives G and H

Table IV-5. Potential Acres of Old Growth in 100 Years

	ALTERNATIVE									
Existing: 33,800	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
Existing Old Growth Maintained	8,500 (1)	20,900	20,400	20,600	20,900	21,400	23,300	24,100	33,800	33,800
Existing Mature Stands on Protected Areas	19,700	89,600	86,500	86,500	88,600	97,100	92,100	110,500	155,800	170,000
Total Potential Old Growth in 100 Years	28,200	110,400	106,900	107,000	109,500	118,500	115,400	134,600	189,600	203,800

(1) Includes 3,200 acres in reserved areas and 5,300 acres of bald eagle habitat

Growth Rates

Fertilization affects the vegetation by increasing health, vigor and growth through introduction of nutrients that are in short supply Fertilization could adversely affect stands by increasing growth of individual trees and making them more susceptible to storm damage Fertilizer would be applied to managed stands of commercial thinning age on soils that have demonstrated a positive response Alternatives with more harvest and subsequent managed stands would have more potential for effects from fertilization

Sensitive Plants

The alternatives are not expected to have any adverse direct, indirect, or cumulative effects on species of plants with sensitive status. Planning for site-specific projects will include investigations for these plants and appropriate protective actions will be taken if they are found

Windthrow, Pests, and Fire

Effects of the alternatives on risk of windthrow are related to the number and size of openings created which are somewhat proportional to the number of acres harvested Increased harvest and roads will increase the chance of windthrow adjacent to such disturbances Orientation of created openings to storm winds is a factor that is not linked with the number of acres harvested.

The risk of pest outbreak, particularly insects, may be higher in those areas where forests are left to develop naturally, and where exceptionally large amounts of damaged, dead and down trees are not removed Alternatives with more lands suitable for timber production would have more access Increased access offers more opportunity for detection and timely treatment.

As more of the Forest becomes available for human activities, the risk of wildfire increases. The Coast Range has a very low historic occurrence of lightning fires. Only 18 of the 513 fires recorded from 1970 through 1988 were lightning caused Since the majority of fires are human caused, any activity that increases human activity in the forest carries an increase in risk of wildfire.

The two causes of fires that are of greatest concern are escaped slash fires and fires relating to timber harvest activities In the last 50 years these fires have been the larger fires and tend to start in areas of heavy fuel concentrations.

Any alternative that includes human activities will have a risk of fire The alternatives that have higher harvest levels will have a greater risk of fire from these activities. Prior to any slash burning, a burn plan is prepared which lists the precautions that will be taken to prevent the burn from escaping The burn plan also contains a contingency plan that is activated if the burn does escape Any activity that takes place on a timber sale area, is covered in the timber sale contract The contract includes the requirements for equipment and operating procedures that reduce the potential for a fire on the timber sale. These precautionary measures would be used in each alternative In spite of these measures, there probably will be some escaped fires for these activities, but there would not be any significant change from historic levels

The Forest develops an annual fire plan, the Fire Management Action Plan, that contain the procedures to be taken if a fire occurs. These include cooperative agreements, dispatch cards, and staffing levels This plan is reviewed and updated annually

Cumulative Effects on Vegetation

Cutting of vegetation and its replacement on intermingled National Forest and lands of others changes the mosaic of vegetation cover. This affects ecological relationships among species and between species and their environment Included are overall changes in: 1) rates of soil nitrogen fixation (from alder and other nitrogen fixing plants), which alters plant growth; 2) relative abundance of vegetation types, such as old growth and Sitka spruce-hemlock, within major portions of the Coast Range; and 3) resistance to root rot and other diseases specific to certain species or ages of trees.

Vegetation changes on lands adjacent to the Forest have been rapid and widespread Harvest on industrial timberlands and many private landholdings has been extensive. Few areas are allowed to develop to old-growth conditions. Because of the cutting harvest pattern on adjacent forested lands, the Forest may serve as a refuge for mobile species that require later seral stages and old growth. Consequently, FEIS alternatives which reduce diversity of tree cover on large areas by cutting and burning vegetation and replacing it with younger seral stages may have a greater cumulative effect on large scale patterns of vegetation than those that maintain more areas with existing species composition

The relative magnitude of these effects is indicated by: 1) the total acreage harvested and planted over the next ten years on both Forest lands and lands of others within major basins of the Coast Range, and 2) the portion of those acres that would be planted with a single or few desired species Alternatives with the most lands planted with a limited number of species in the 1st decade would have the greatest cumulative effects on vegetation.

Assumptions used to predict cumulative effects are: 1) Timber harvest on lands other than National Forest will continue at the same rate as in the past several years. 2) Other land owners will not substantially contribute to the maintenance of old-growth stands 3) Other land owners will continue to plant conifers rather than hardwoods

Consistency with Other Plans and Policies for Vegetation

Timber harvest activities may increase sedimentation in streams used for public water supplies Water districts or municipalities may object to timber harvest on National Forest land in watersheds which feed their water supplies See "Consistency With Plans And Policies Of Other Agencies" in this chapter for more information

Application of chemicals for vegetation management will comply with the Regional Environmental Impact Statement for Managing Competing and Unwanted Vegetation. Burning of vegetation and debris will comply with the State of Oregon Smoke Management Plan

Mitigation Measures for Environmental Effects on Vegetation

A variety of species and ages of vegetation for wildlife, fish and watershed resources will be provided on the Forest at all times This would minimize the direct and cumulative effects on vegetation Snags and logs left for wildlife would provide at least minimum amounts of nutrients for recycling through the soil to replace harvested and burned vegetation Mitigation measures are included as standards and guidelines in FEIS, Appendix D

Indirect Effects on Other Resources

All of the indirect environmental effects on other resource components due to changes in vegetation are discussed in the "direct effects" sections of the other resource components

Assumptions Used to Predict Environmental Consequences on Vegetation

Assumptions used to estimate effects are:

1. For each alternative, the amount of timber planned to be sold and the amount of timber actually cut will be approximately the same for the ten years following adoption of Forest Plan

2. Harvested areas will be planted with species that either are most valuable, or are necessary for various wildlife habitats, or both

3. Wildfire, disease, windthrow, and insect outbreaks will be of similar size and intensity as in the past decade

Incomplete or Unavailable Information on Vegetation

Predictions of effects were made with the most current information available. The following information used to predict those effects is either unavailable or incomplete; additional information is needed on these topics:

1. The succession pattern for areas where vegetation is left in small patches for soil and water protection, and other isolated patches where vegetation is protected.

2. The oldest age red alder can attain.

3. Effects of introducing non-indigenous plant species.

4. Age at which a timber stand reaches an old growth condition. The structural and functional characteristics of old-growth ecosystems. Minimum stand size for old-growth ecosystems

5. Techniques for developing or enhancing old growth characteristics in managed stands

6. The production of red alder replanted in root rot infection pockets; the viability and production of tolerant conifers such as western redcedar when planted in root rot infection pockets.

7. Ecological conditions required for growth of desired species, such as conifers in riparian areas, and of unwanted species, such as brush in plantations

8. Effects of management activities on plant and animal diversity and on the stability of special habitats such as mature conifer or SOHAs.

9. Effects of genetically selected stock on stand growth and yield, pathogen and insect population dynamics, and nutritional quality of wildlife forage

10. Long-term effects of the creation of abrupt boundaries between tree stands of different ages.

11. The economic and effective use of natural regeneration following timber harvest.

12. The economic and effective use of a wide variety of vegetation management techniques, including fire, chemical and manual methods.

13. Effects of fertilization on conifer yields, other tree species, water quality and soils

14. Silvicultural techniques for conifer species such as Sitka spruce, western hemlock and western redcedar and hardwood species such as red alder and big leaf maple

15. Appropriateness of research or management of shore pine for ecological or other purposes.

ENVIRONMENTAL CONSEQUENCES ON WATERSHED (SOIL AND WATER)

WATERSHED TERMINOLOGY

Stream Channel Scour - Erosion of the channel bottom due to high water flows, or loss of channel stability, or both

Debris Slide - A shallow landslide of soil, rock, and organic material that occurs on steep slopes

Debris Torrent - A large debris slide that is charged with water, moves at high speeds, and is confined to a steep stream channel

Domestic Watershed - A watershed which provides water for human consumption by an individual or individuals that does not meet the criteria for a municipal watershed

Dry Ravel - Surface erosion following fire Burning destroys organic matter in the surface soil horizon and weakens the surface soil allowing gravity to rapidly move dry soil particles down steep slopes

Municipal Watershed - A watershed which provides water for human consumption The water systems fed by the watershed serve at least 15 connections or supply at least 25 people on on at least 60 days in a year

Stream Structure - The arrangement of logs, boulders, bedrock, and meanders which modify the flow of water, channel erosion, and fish habitat

Woody Material - Large logs necessary for long term soil productivity, and stream channel stability, and maintenance of watershed condition

Direct Effects on Watershed

The primary direct effects of implementation of the alternatives are

1. Reductions in **soil productivity;**
2. Changes in **soil erosion and sedimentation** through increases in landslides and surface soil erosion;
3. Changes in **stream channel structure;**
4. Increases in **stream scour;**
5. Decreases in **water quality;**
6. Changes in **streamflow**

Soil Productivity

Forest management activities, such as timber harvest and site preparation have the potential to affect soil productivity by 1) disturbance of the surface soil organic matter and duff/litter layer, 2) erosion of mineral soil, and 3) compaction of the soil surface

Some soil productivity is lost after hot prescribed burns (Kraemer and Herman 1979) However, the actual extent of the loss is unknown. In an extreme situation - assuming all harvested units received very hot slash burns - research suggests that 2% to 5% of the soil productivity could be lost on sensitive sites over the next rotation (Barnett 1984). Sensitive sites are those with steep, southwest to southeast slopes that have shallow soils with medium to coarse texture. Sensitive sites occupy approximately 20% of the Forest.

If all broadcast burns on sensitive areas were very hot, 20% of the harvested acres for each alternative could eventually lose 2% to 5% of their timber potential However, less than 50% of broadcast burns on sensitive areas are considered to be very hot Therefore, losses will occur on approximately 10% of the harvested areas. Alternatives proposing the most acres of timber harvesting and broadcast burning will have the greatest potential to reduce soil productivity

Reductions of future supply of large logs on the soil surface due to harvest may result ın long term productivıty losses Large downed logs have been shown to be critical in the supply of energy to soil microorganisms which are directly linked to forest soil productıvıty (Harvey, el al. 1979). They also provide a reservoır for mycorrhizal fungi which are critical to the tree's ability to gather moisture and nutrients (Maser 1985). Quantification of the lost productıvity that may result from fewer large logs is not possible at this time Some logs will be left on clearcut areas to partially mitigate this potential loss. (See Forest Plan, Chapter IV, Forest-wide Standards and Guidelines)

Some types of soil damage do not directly affect enough area to significantly reduce productivity Landslide erosion, while it is common, affects less than 1% of the Forest Compaction occurs when logs are yarded by skidding on moist or wet soils. Due to the steep slopes on the Forest, more than 95% of yarding is done with cable systems that ensure at least partıally suspensıon of the logs over the soil. Therefore, compaction due to skidding is usually found to be less than 5% of the harvested area, and always less than 10% of harvested areas. The effect of such low levels of compaction of soil productivity are not measurable. There may be a slight, but still immeasurable, increase in compaction in alternatives that have more land managed on short rotatıons sınce they have more frequent entrıes

Soil Erosion and Sedimentation

Soil erosion rates following harvest activities (particularly in the form of landslides and dry ravel) are often higher than pre-management rates throughout much of the Forest Evidence of the impacts of timber harvest, road construction and prescrıbed fire on erosıon rates has been documented since the early 1960s Harvesting of timber kills the root systems of trees and other plants which reduces soil strength and increases the landslide potential on unstable slopes where shallow debris slides are the primary type of landslide. Hıgh intensity and long duration burnıng of loggıng slash can increase surface erosion by destroyıng the organic matter that helps bind the surface soıl particles together Road construction can decrease stability of steep slopes by alterıng surface and ground water flow and by displacing or undercutting soıl and bedrock Over the past 15 years, the Forest has inventorıed landslides (Barnett 1980, 1982; Greswell et al. 1979; Swanson and Swanson, 1977; USDA Forest Service 1978, 1980f, 1981d, 1983d, 1986e), and measured surface erosıon (Bennett 1982) to estımate future erosion rates associated with management activıties across the Forest, and especially the Mapleton Dıstrıct (See FEIS, Appendix E)

The natural rate of erosıon is hıghly varıable and difficult to precısely quantify over long perıods of time. However, erosion from unstable slopes that have been harvested, burned, and roaded clearly exceeds the erosion rate on unharvested areas. (Swanston and Dyrness 1973, Ketcheson and Froehlich 1977; Swanson and Swanson 1977; Greswell et al 1979; Ziemer 1981; Barnett 1982; Bennett 1982; Burroughs and Thomas 1977) Alternatives with more short rotations may have higher risk of sedimentation sınce entrıes ınto a given site are more frequent. See the dıscussion on historical trends of erosıon and sedimentation in FEIS, Chapter III, "Watershed"

Many special practıces have been ınstıtuted to mıtigate the increased erosion and sediment rates associated with management activities These practices include vegetatıon leave areas, improved road design, construction, and maintenance, and lower burn ıntensities on sensitive soils As a result of these practices, estimates of future erosion and subsequent sedimentation per managed acre are much lower that those associated with past practıces

The number of landslides associated with management activities is directly related to the amount of timber harvested in each alternative The amount of surface soil erosion and sedimentation is directly related to the amount of high intensity, long duration prescribed burning in each alternative (Estimates of landslides, 10 cubic yards or larger, and surface erosion are based on the Siuslaw Sediment Model, see FEIS, Appendix B) The estimated number of landslides associated with current harvest activities is approximately 79 per year The projected annual averages in the 1st decade compared to now range from 78% higher in Alternative NC to 84% lower in Alternative H, and are displayed for each alternative in Figure IV-3.

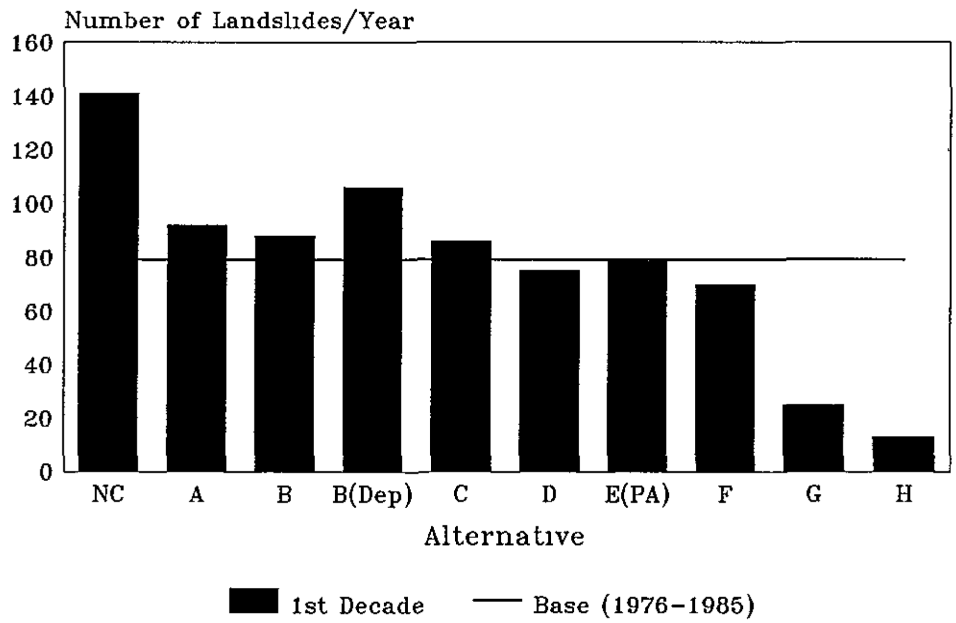


FIGURE IV-3 ESTIMATED LANDSLIDES ASSOCIATED WITH HARVEST ACTIVITIES

Stream Channel Structure

In Alternatives D and H, where most of the riparian area would be undisturbed, loss of debris and channel destabilization would be minimal Such effects would also be low to moderate in Alternatives A, E(PA), F, and G. The rest of the alternatives, B, B(Dep), and C, would retain low levels of streamside trees These trees would not be adequate to replace existing debris as it decomposes This would result in a gradual loss of the structure or "steps" described in Chapter III Watersheds instability and channel erosion would increase The changes would be noticeable in 50 to 100 years (Swanson and Lienkaemper 1978).

Stream Channel Scour

Approximately 8% of landslides scour first, second, and some third order stream channels Channel scour results in increased downstream channel erosion and sediment delivery Presently about six landslides per year, that result from harvesting and road construction, cause channel scour Estimates of changes in the amount of scour in the 1st decade range from about 83% more than existing levels in Alternative NC to about 83% less in Alternative H (Figure IV-4)

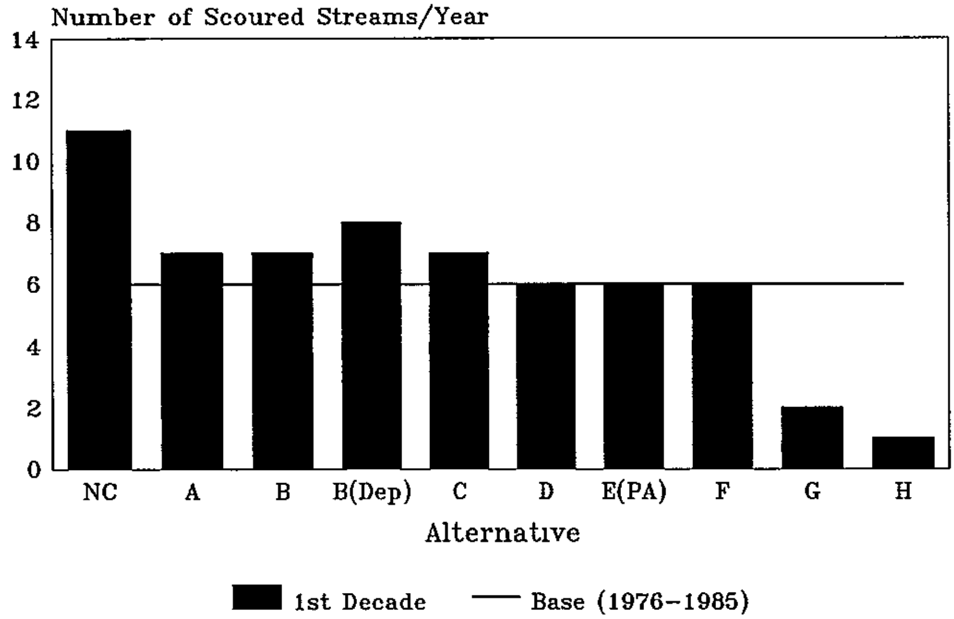


FIGURE IV-4. LANDSLIDES (PER YEAR) THAT SCOUR STREAM CHANNELS

Figure IV-4 shows estimates of the number of scoured streams present at one time Each newly scoured channel does not necessarily increase the total number that exist at one time because channels scoured in the past are renewed by repositioning of logs and sediment by high flows. Therefore, the actual number and length of scoured channels at any point in time will vary from the estimated averages because of annual variations in landslide frequencies, and recovery rates.

Water Quality

Sediment/Turbidity - Turbidity or cloudiness of the water is a direct result of the sediment load. It is dependent on sediment particle size, shape, and color. Turbidity can affect light dependent organisms because it greatly reduces light penetration Turbidity is used to establish standards of water quality by the state of Oregon. No more than a 10% increase above natural or existing turbidity is allowed

The type and intensity of management practices influences sediment production. Clearcutting has a much greater impact on water quality than thinning, even though the activities may be in the same location. Clearcut harvest, road construction, and prescribed burning have proven to be the management activities that produce the majority of sediment over background or natural levels.

An average of approximately 64,000 cubic yards per year of sediment has been produced by harvest activities over the past 10 years. In the 1st decade, it would range from 58% more than now in Alternative NC to 80% less than now in Alternative H. Figure IV-5 displays estimates of sediment production (above natural levels) for the existing condition, and in the 1st decade for each alternative. These estimates are averages for the decade. Sediment levels would range above and below these amounts from year to year, and from season to season as would the natural or pre-management levels The effects of sediment is assumed to last for several years after it first enters the stream system since flushing does not occur immediately following the input (Effects of sediment on fish habitat are calculated ın the Fısh Habitat Index Model, see FEIS, Appendıx B) All alternatives except NC would meet the state water quality standard for turbidity because predicted levels of accelerated sediment and turbidity are well within the assumed range of natural or existing fluctuations

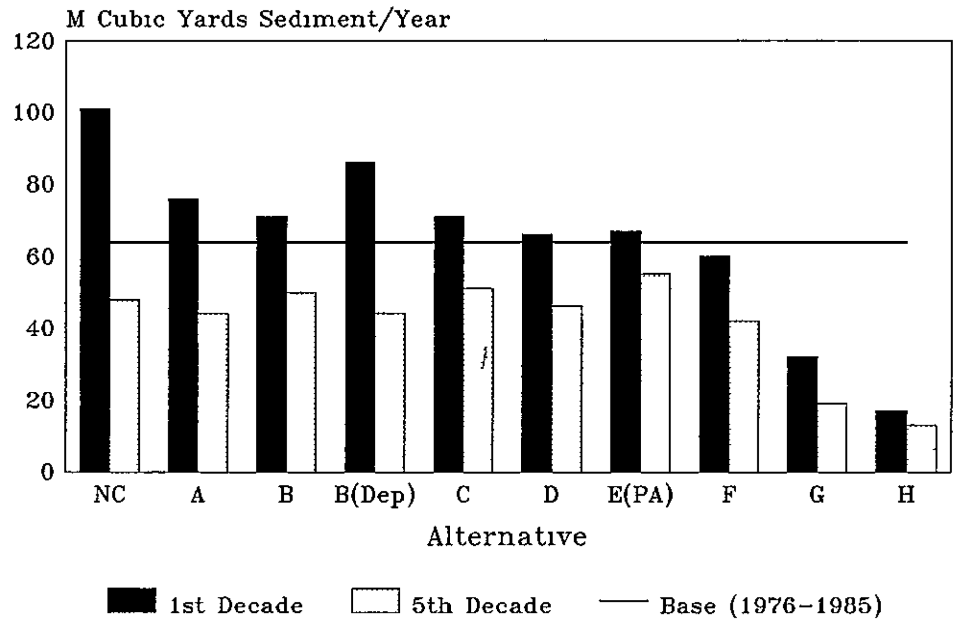


FIGURE IV-5 YEARLY SEDIMENT ASSOCIATED WITH TIMBER HARVEST ACTIVITIES

The estımates of sedıment in the previous figure apply primarily to streams draining Management Areas 14 and 15, where almost all tımber harvest actıvıtıes wıll occur (see the descriptıon of management areas in Appendix D).

Protection measures ın addıtıon to the Management Requırements (MRs) would also be provıded ın specific alternatıves to benefit fish and/or municipal water users Alternative D provıdes a hıgh degree of protection for streams and slopes in landtype associations A, B, C, D, whıch ınclude the hıghest quality coho salmon habıtat The rest of the Forest ın Alternative D, and all of the Forest in Alternative G (ıncludıng many municipal and indıvıdual domestic watersheds), would receive less addıtional protection of unstable slopes and would produce moderate levels of sedıment. Of the alternatives that harvest timber ın municipal watersheds, Alternative A should produce the lowest levels of sediment in the Corvallıs Watershed due to special riparian protection there Alternatives E(PA), F, and G would all have lower sediment levels in municipal watersheds and elsewhere due to hıgher levels of rıparian protection Alternative H would not produce any sediment in addıtıon to natural levels ın any of the municipal watersheds due to the exclusıon of tımber harvestıng. Addıtıonally, very low levels of sedıment would be produced in the rest of the Forest under Alternative H due to prohibition of logging in all high risk landtypes Alternatıve E(PA) would exceed minimum streamsıde protectıon by leaving an average of 100 foot buffers along all Class I and II streams, and 60 foot buffers along all Class III streams.

Some Landtype Associations will produce more sediment per acre than others. Varıations in sediment per acre is primarily a function of rate of harvest sınce all Landtype Associations receive protectıon of unstable soils proportional to the amount of those soils in each Whıle some LTAs will be harvested at rates near the upper limit of 30% per decade in those alternatives where it is allowed (see Forest Plan, Chapter IV), others will be harvested at much lower rates This is due to variations between LTAs in availability and quality of timber, and is true for all alternatives

Since all LTAs in all alternatives (except NC) meet the minimum requirements for both site specific protection (vegetation leave areas), and harvest rate limitation (no more than 30% in any decade), the variations in sediment between LTAs do not influence the Forest's ability to meet state water quality standards for turbidity in all alternatives except NC

Water Temperatures - Water temperatures are expected to remain near natural levels in all alternatives (except NC which has inadequate streamside shading) because the Management Requirements for streamside protection are specifically designed to maintain shade to keep the sun from heating the water.

Toxic Materials - Fuel and agricultural chemicals such as fertilizer are used in conjunction with timber harvesting and reforestation practices. Though specific precautions will be taken to prevent their entry into streams, there will still be some risk of accidental contamination This risk would be highest in Alternatives NC, B, B(Dep), and C, which include minimum widths of vegetation leave areas for streamside protection The risk would be more moderate in Alternatives A, E(PA), F and G because vegetation leave areas adjacent to streams are wider, on the average, than in Alternatives NC, B, B(Dep), and C. Risk of contamination would be even lower in Alternative D, and lowest in Alternative H, where timber would not be harvested within 200 feet of streams, nor in any municipal watersheds.

Disease Organisms - Although disease organisms are uncommon in Forest streams, there is some risk that intestinal diseases could spread through water when waste from humans or other animals enters streams. Alternatives A and E(PA) would restrict access to the Corvallis Watershed, thereby reducing such risk there. Alternative H would prohibit public access to all municipal watersheds and minimize the risk even further. All other alternatives would not restrict access to municipal watersheds The risk of contamination of water in municipal watersheds where public access is not restricted would be the same as for the rest of the Forest

Streamflow

Timber harvesting will temporarily decrease evapotranspiration and result in slight increases in summer and early fall streamflow. Alternative A, which would continue present levels of harvesting, would increase potential water yield by less than 2%. Other alternatives would have slightly lower or higher water yields depending upon their relative timber harvest levels

Cumulative Effects on Watershed

Slope Stability, Sedimentation, and Stream Scour

The number of landslides and the amount of sediment and stream scour associated with management on other lands which share watershed basins with the Forest can be estimated (Bush 1985) This was accomplished by using an inventory of past harvest rates, and by making general assumptions about future harvest practices and associated landslide and sediment rates (see FEIS, Appendix B ,"Cumulative Effects Model")

During the 1st decade, approximately 175 timber harvest-related landslides are expected each year on other lands in basins shared by the Forest. Other lands make up approximately one-half of the basins The overall landslide rate in the 1st decade for the Forest and other land would range from 0.3 slides per 1000 acres in Alternative B(Dep) to 0 2 slides per 1000 acres in Alternatives G and H The actual rates could be higher than these averages in some of the basins and lower in others, depending upon the amount of unstable slopes and storm intensities

Approximately 100,000 cubic yards of sediment would be produced each year (on average) by management-associated landslides and surface erosion on other lands. (This figure does not include natural sediment). The sediment volume for all lands (National Forest and other lands) would range from twice the amount predicted for the Forest in Alternative NC to seven times the Forest rate in Alternative H

Within the large basins used to assess cumulative effects, approximately 14 streams on other lands would be scoured by debris slides during the 1st decade in all alternatives (see Planning Records) This figure does not include stream scour from landslides associated with harvest activities on the Forest or natural landslides. The other lands make up approximately one half of the assessment areas The total number of scoured streams (including those on Forest lands) would range from 25 in Alternative NC to 15 in Alternative H. The cumulative effects of landslides on stream scour and sedimentation would, therefore, be greatest in the alternatives in which more Forest land is harvested

The combined effect of these impacts would be to reduce fish habitat and lower water quality from present levels Alternatives which lead to less land in a clear cut condition (F, G, and H) would have less cumulative impact. Alternatives which clearcut more acres would contribute more impacts to the total watershed According to projections made using the cumulative effects model, a combined harvest rate for National Forest and other lands of 30% or more in ten years within an assessment basin would result in increases in landslide and sediment rates, and changes in stream channel condition that could cause significant degradation of watershed stability However, cumulative impacts are not predicted to exceed the 30% threshold in any of the major assessment watersheds Therefore, long term, unacceptable cumulative effects are not expected as a result of implementing any of the alternatives

Stream Channel Stability

Cumulative effects on streams in "shared" basins include downstream effects on larger streams and estuaries Since the areas along small streams on most lands outside the National Forest in the Coast Range are managed intensively for timber, sources of large organic debris are scarce This will increase streamflow velocity and channel instability when the existing debris decomposes In Alternatives NC, B, B(Dep) and C, minimum stream buffer widths on Forest streams would produce low to moderate amounts of large organic debris Combined with very low levels of large organic debris in streams draining other lands, the cumulative effects of the changes in stream structure would affect streams draining large areas Moderate to high levels of protection of riparian vegetation along National Forest streams in Alternatives A, D, E(PA), F, G, and H would maintain more natural hydrologic conditions on streams draining Forest lands

Where National Forest land occupies a major portion of a watershed, some of the cumulative effects of low levels of woody material in streams on other land may be offset Where National Forest lands are a minor portion of a watershed, the effect would be overshadowed by the effects from streams draining other lands.

Stream Temperature

Streams which drain other land may have elevated water temperatures where streamside vegetation is not retained and shade is inadequate. Maintaining shade on Forest streams in shared watersheds may moderate the heating of water from other land when water from Forest streams mixes with it

Water Contamination

The many precautions required when handling toxic materials minimize the risks of contaminating Forest streams. Most of the potential for contamination is down stream from National Forest lands where agricultural use of toxic materials is common, and where major highways along large streams are used to transport chemicals.

Consistency with Other Plans and Policies for Watershed

Leaving vegetation on unstable slopes and along most perennial and some intermittent streams is generally more restrictive than required by the Oregon Forest Practices Act. The requirements for watershed protection in the alternatives are inconsistent with State of Oregon goals to maximize timber harvest (see FEIS, Chapter II, "Management of Forest Resource Programs - Timber" and "Consistency With Plans And Policies Of Other Agencies" in this chapter for more information)

Mitigation Measures for Environmental Effects on Watershed

Primary mitigation measures include 1) leave native vegetation on all slopes having unstable soils judged to require the reinforcing qualities of the vegetation to prevent landslides. 2) leave all vegetation along perennial streams necessary to maintain channel stability and water temperatures 3) limit the use and/or intensity of post harvest prescribed burning on soils that would suffer damage to long term productivity from that practice. 4) design, build and maintain forest roads to prevent landslides. See FEIS, Chapter II, "Mitigation Measures" and FEIS, Appendix H for more detail

Indirect Effects on Other Resources

Vegetation

Vegetation growing on stream banks that are subject to accelerated rates of landslides from timber harvesting would be scoured out or damaged by the slides. The effect would be short-lived and is the same as where the forest is undisturbed, except that it occurs more often Where soil productivity is reduced (10% or less of the areas harvested), long-term growth of vegetation may be reduced up to 4%

Fish

In general, fish habitat is affected by, and responds directly to, changes in watershed conditions As watershed resources are protected, and adverse effects mitigated, so fish habitats are protected or enhanced. (See "Environmental Consequences on Fish" for a complete discussion of these effects for each alternative)

Aquifers

Research studies indicate timber harvesting generally increases annual water yields. This is due primarily to reduced evapotranspiration (Harr 1983). Other factors which further minimize potentials to effect changes in streamflow are high natural variability, flow measurement accuracy is within 5% at best (so potential changes are less than what is measurable in large watersheds), and most of the flow increases occur when it is needed the least or is unusable (during fall storms)

Research generally shows increases in summer flow result on-site immediately after harvest in western Oregon. Effects of harvesting timber on groundwater recharge and aquifers are similar to effects on streamflow, except for timing differences; eg , aquifer responses are typically slower and fluctuate less than streamflow.

Therefore, the above-mentioned research findings indicate timber harvesting on a sustained yield basis, as is presently practiced and will be practiced under any selected forest plan alternative, is expected to have a negligible, unmeasurable effect on downstream aquifers Best Management Practices (see Standards and Guidelines) will ensure adequate infiltration characteristics are maintained Only if extensive, contiguous areas were compacted would infiltration be expected to be reduced so as to adversely affect downstream aquifers.

Aquifers are not mapped since timber harvesting is not expected to change quantity or quality of water in downstream aquifers

Municipal Watersheds

All alternatives would attempt to maintain water quality by preventing contamination, surface erosion, and accelerated landslides within municipal watersheds. Changes in watershed condition in Alternatives G, and H would result in the lowest potential for erosion and sedimentation and highest water quality The high level of stream protection in Alternative A would result in very low potential for sedimentation and contamination of the Corvallis watershed Excluding most timber harvesting and public access in municipal watersheds in Alternative H would prevent any management related adverse effects on water quality in those watersheds All remaining alternatives would result in erosion and sedimentation substantially higher than undisturbed rates, but the water would be treatable and well within the state of Oregon water quality standards

Wildlife

There are no measurable environmental effects on wildlife that result from predicted changes in watershed conditions associated with management activities

Recreation

Reductions in fish habitat lower the Forest capacity to produce fish and recreational fishing opportunities See "Environmental Consequences on Fish"

Scenery

Alternatives which cause the fewest landslides along main roads would produce the fewest scars from debris slides and torrents Some structures in streams (especially in streams that have been scoured) may improve the appearance Others may appear to be fabricated and unnatural These structures include logs, root wads, and boulders placed to create rearing pools and spawning beds

Wildernesses, Undeveloped Areas and Old Growth

There are no environmental effects on Wildernesses, undeveloped areas, or old growth from changes in watershed condition associated with management activities

Cultural Resources

Where debris torrents happen as a result of management activities, cultural resources near streams may be covered by soil, rock and organic debris or scoured away Such losses are irretrievable (see "Environmental Consequences on Cultural Resources" for a complete discussion of these effects).

Communities

Water treatment costs for communities amd individuals may increase as as result of increased sediment following management activities.

Minerals

There are no environmental effects on minerals from changes in watershed resources

Farmlands, Wetlands,and Floodplains

The amount of sediment deposited during flood flows onto flatter areas downstream from Forest lands will be directly proportional to the amount of land harvested in each alternative Sediment that remains in the channels carries nutrients that encourage growth of aquatic life such as algae.

Other Environmental Components

There are no environmental effects on air, roads, insects and disease, American Indian religious sites, consumers, civil rights, minority groups and women that result from changes in the watershed resources

Assumptions Used to Predict Environmental Consequences on Watershed

Assumptions for predicting effects on watershed condition include·

1 Timber harvest and road construction will increase erosion rates, reduce watershed condition, and degrade water quality similarly to that observed in the past.

2. The strength added to soils on steep slopes by tree and brush roots is an integral component of slope stability. Loss of the root strength through management activities such as timber harvest and broadcast burning increases the potential for landslides on unstable areas.

3. Intense burning of soil organic matter increases dry ravel erosion, and reduces the amount or availability of nitrogen and other soil nutrients which reduces long-term soil productivity.

4 Slopes and stream systems are in dynamic equilibrium Significant changes in erosion rates and instream channel stability upsets the equilibrium and degrades fish habitat and water quality.

5. Normal evapotranspiration is reached 12 years after a harvested area has been replanted with trees.

6. The effects of clearcut harvest and broadcast burning on erosion rates are insignificant after 10 years

Incomplete or Unavailable Information on Watershed

Predictions of effects were made with the most current information available The following information used to predict those effects is either unavailable or incomplete; additional information is needed on these topics:

1. Site-specific effects of changes in erosion rates and stream channel structure on watershed condition and fish habitat.

2 Degree of loss of site productivity following intense burns, removal of woody debris, and soil compaction

3 A complete inventory of residences using National Forest water

4. The effects of creating large numbers of abrupt boundaries between timber stands of different ages on overall slope stability, and accelerated erosion rates

5 The effectiveness of headwall and streamside leave areas for preventing accelerated landslides

ENVIRONMENTAL CONSEQUENCES ON FISH

Direct Effects on Fish

General

The major effects of the alternatives on fish are changes in habitat conditions Although viable populations of fish are maintained on the Forest in all alternatives, the amount of fish habitat in addition to MR levels does vary by alternative - primarily in response to effects of timber harvest on watershed conditions. As discussed in the FEIS, Chapter IV, "Environmental Consequences of the Alternatives on Watershed", aspects of watershed condition most affecting anadromous fish habitat include stream structure, sediment from landslides, and water quality. The primary aspect is stream structure, which is emphasized in the model predicting impacts on fish habitat

Stream Structure

There is an average of about 20 large pieces of woody debris per 100 meters of undisturbed stream in the Coast Range (Sedell et al 1984). Streams flowing through areas which have been harvested have an average of less than four pieces Most large woody debris will last for 50 to 100 years in the water (Swanson and Lienkeamper 1978) Unless adequate numbers of large conifers are left along streams, debris would drop below present levels Alternatives NC, B, B(Dep), and C would leave minimal amounts of mature trees along streams. Implementation of these alternatives would create a situation where stream structure would be noticeably disintegrating in 50 to 100 years, because there would be relatively little replacement of decomposing large woody debris Alternatives A and E(PA) would provide additional protection for streamside vegetation, but large woody debris levels would probably still decrease slightly in the next 50 to 100 years as existing debris decomposes and replacement debris recruitment is not yet abundant enough to offset decomposition

Mature trees which are left along all perennial streams (Alternatives D, F, G and H) would adequately replace most structure directly used by fish However, in some alternatives, harvest of mature trees along upper tributaries would result in quicker flushing of food and gravel downstream Less food would be produced in the tributaries; and gravel would be supplied in more irregular surges, rather than gradually over time. Alternatives D, F, G and H would provide adequate replacement of woody material to maintain complex channel structure and relatively good fish habitat

Alternatives D, G, and H also would protect trees along various amounts of intermittent streams and assure gradual dispensing of gravel and food organisms downstream Based on present levels of woody debris and the relative habitat quality index in the effects model (See FEIS, Appendix B), the estimated abundance of woody pieces in Forest streams in each alternative after 50 years is shown in the following table. The present forest-wide quality index averages 5 14; the forest-wide range of wood abundance is 0 5 to 22 pieces per 100 meters

Fish

Table IV-6 Abundance of Woody Debris in Forest Streams

Abundance of Wood (Pieces per 100m)	Quality Index	Alternatives
Low (less than 5)	1 36-3 37	NC, B, B(Dep), C
Medium (average of 10)	4 36-4 46	A, E(PA)
High (more than 15)	4 69-4 80	D, F, G, H,

Sediment

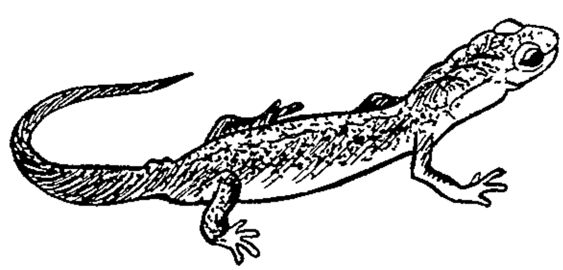
Sedimentation due to accelerated rates of landslides and surface erosion overloads the natural flushing capacities of streams. Sediment can settle into gravel beds and kill incubating eggs or immature fish Sediment deposits may also cover gravel to the extent that spawning opportunities are eliminated Though unusual in larger streams, stream scour can eliminate gravel beds on some stream segments (Refer to "Environmental Consequences on Watershed" in this chapter for a discussion of estimated differences in sedimentation and stream scour between the alternatives)

Stream Temperature

In all alternatives, water temperatures would be within the critical range of state water quality standards because sufficient amounts of vegetation would be maintained in riparian areas to shade the streams (See Appendix H "Information Regarding Management Requirements" and "Environmental Consequences on Watershed" in this chapter for more discussion of water temperature)

Fish Populations

Changes in fish habitat conditions, as discussed above, directly affect fish populations As measured by the Coho Smolt Habitat Capability Index (CSHCI, an index of the potential of stream habitat to produce coho salmon smolts expressed in thousands of smolts), fish populations are estimated to be lowest in Alternative NC and highest in Alternative H. CSHCI for the Forest in the 5th planning decade would range from 316 in Alternative NC to 1120 in Alternative H This compares to an existing CSHCI of 1019 (See Appendix B for an explanation of the CSHCI model) Figure IV-6 displays the CSHCI for all alternatives for the 1st and 5th planning decades Estimates for the 5th decade are most meaningful, because the model used is very sensitive to long-term levels of large woody debris (see "Fish" in FEIs Chapters II, III, and IV for details).



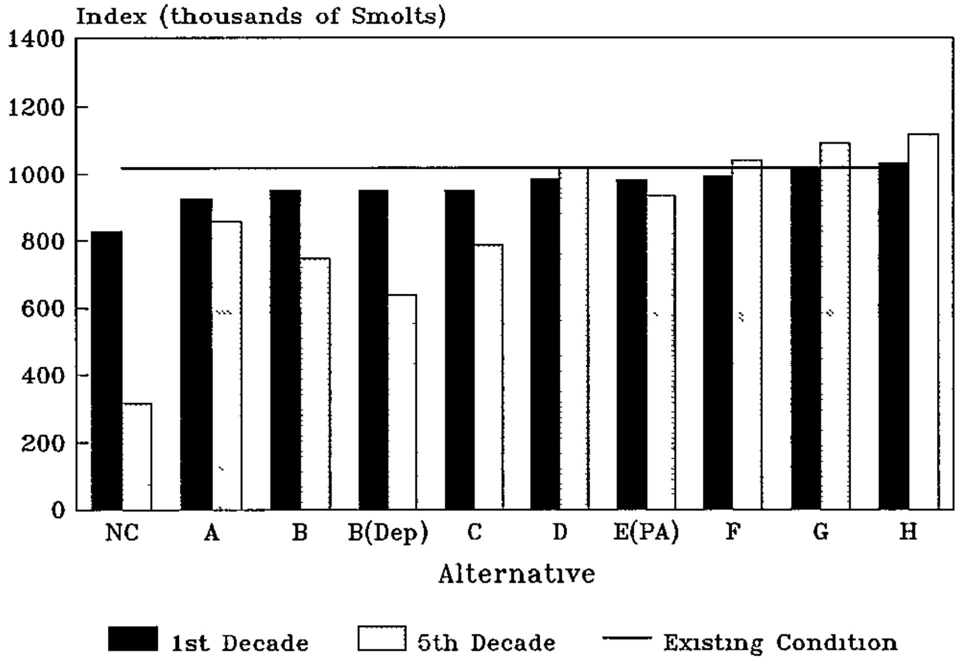


FIGURE IV-6. COHO SMOLT HABITAT CAPABILITY INDEX

Variations in relative changes of CSHCI among major areas of the Forest are shown in Table IV-7. Landtype associations are related to major Forest river drainages; however, this relationship is only approximate as data was calculated for landtype associations which generally are much larger than river basins.

Table IV-7. Percent Change in CSHCI by Landtype Association (LTA) (1)

		ALTERNATIVE									
LTA	**Major Drainage**	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
A	Coastal Lakes	-86	-36	-35	-46	-33	+9	-22	0	+8	+14
B	Alsea/Siuslaw R	-74	-22	-34	-42	-25	+3	-8	+3	+8	+10
C	Alsea/Siuslaw R	-61	-13	-30	-45	-23	+10	-10	+7	+15	+18
D	Alsea R	-66	-14	-25	-33	-20	-2	-11	-1	+1	+4
E	Yaquina R	-100	-19	-30	41	-23	-3	-9	-1	+3	+4
F (2)	Smith R	-85	-13	-19	-29	-18	-1	-3	+3	+11	+11
G (2)	Smith/Umpqua R.	-100	-25	-28	-36	-22	-5	-4	-2	+2	+3
M (2)	Coastal basalt	-41	-5	-9	-16	-8	-2	-3	-1	+1	+3
N	Sand Lake	-53	-13	-23	-35	-21	-5	-17	+2	+4	+10
P	Siletz R	-38	-16	-29	-41	-33	+3	-5	+7	+10	+14
Q	Marys R	-89	-11	28	-40	-23	-3	-7	+1	+5	+6
R	Nestucca R	-69	-31	-39	-50	-40	-17	-19	-8	-1	+2
T	Nestucca/Salmon R	-51	-7	-24	-35	-23	+2	-9	+5	+14	+18
	Forest Average	-69	-16	-27	-37	-23	0	-8	+2	+7	+10

(1) Percent change in Coho Smolt Habitat Capability Index between existing condition and predicted condition after the 5th decade

(2) Landtype associations F,G and M are the most unstable on the Forest

Generally, those landtype associations which exhibit greater change than the forest-wide average for the alternative, start out in a relatively pristine existing condition (e g , LTAs A, N, and R in Alternative E(PA)) On the other hand, LTAs F, G, and M which contain a higher proportion of unsuitable land and therefore lower proportional levels of harvest activities, change less than the forest-wide average in most alternatives LTAs such as B, C, D, and T which have experienced periodic disturbance in the past, seem to more closely approximate the forest-wide average change in CSHCI

The CSHCI index used in this FEIS is based on the best available information and coordinated with the Oregon Department of Fish and Wildlife The CSHCI will be adjusted as new and better information becomes available During the life of the Forest Plan, the Forest will schedule and conduct stream habitat surveys on most anadromous fish-bearing streams As required, the CSHCI will be revised, based either on rearing habitat capability and density coefficients derived from the site-specific studies or rearing habitat coefficients agreed to by fisheries and land management agencies within the Coast Range Future habitat assessment survey procedures will be standardized and coordinated between Regions to provide a standard set of information to use in Forest Plan implementation

Recreational Fishing

Recreational fishing would not significantly affect fish habitat

Cumulative Effects on Fish

In addition to the cumulative effects of changes in stream structure (discussed in "watershed" in this chapter), fish habitat is adversely affected when food production is reduced due to more rapid flushing of fine organic material through the tributaries. When structure is maintained at relatively high levels - as in Alternatives D, F, G and H - changes in stream productivity would be small, and overshadowed by greater changes from management of other lands in the same basins. When less structure is maintained on Forest streams - as in Alternatives NC, B, B(Dep), and C - cumulative effects of less food being delivered to downstream stretches of fish habitat, including estuaries, could be significant when added to losses due to management activities on other lands Alternatives A and E(PA) would be intermediate to these two groups.

Timber harvesting on other lands would substantially increase sedimentation within basins compared to undisturbed conditions Based on an inventory of past harvest rates on other lands, general assumptions about harvest practices on these lands, and subsequent landslide rates (see Appendix B), the amount of sediment can be estimated. The amount would be highly variable, and cannot be predicted for any particular stream segment. However, the amount of sedimentation in large assessment basins would be roughly proportional to the number of landslides in those areas.

Consistency with Other Plans and Policies for Fish

See "Consistency With Plans And Policies Of Other Agencies" in this chapter for more information

Mitigation Measures for Environmental Effects on Fish

Primary mitigation measures include 1) all those listed in "Watershed" earlier in this chapter; 2) additional levels of riparian protection in some alternatives; and, 3) limitations on the percent of a watershed that can be harvested in any 10-year period. See FEIS, Chapter II, "Mitigation Measures" and FEIS, Appendix H for more detail.

Indirect Effects on Other Resources

Vegetation - There are no environmental effects on vegetation from changes in fish habitat.

Water Quality - Structures which improve fish habitat also improve water quality by stabilizing stream channels. These improvements and their effects on water quality are discussed earlier in this Chapter, see "Environmental Consequences of the Alternatives on Watershed".

Soil - There are no effects on soil from changes in fish habitat

Wildlife - There are no effects on wildlife from changes in fish habitat

Recreation - Increases in fish habitat would increase fishing recreation days.

Scenery, Wildernesses, Undeveloped Areas, Old Growth, and Cultural Resources - There are no effects on scenery, Wildernesses, undeveloped areas, old growth, or cultural resources from changes in fish habitat.

Communities - Increases in fish habitat that produce higher commercial catches and more recreational fishing would increase revenues in local communities.

Other Environmental Components - There are no effects on other components of the environment from changes in fish habitat.

Assumptions Used to Predict Environmental Consequences on Fish

Assumptions for predicting effects on fish include.

1 Habitat is fully utilized by fish

2 All size and life stages of fish are affected the same

3 Changes in coho salmon habitat are representative of changes in habitat of other species

Incomplete or Unavailable Information on Fish

Predictions of effects were made with the most current information available. The following information used to predict those effects is either unavailable or incomplete; additional information is needed on these topics:

1 Site-specific changes in fish habitat as a result of management activities (for all streams)

2. Documentation of recovery rates of stream systems following disturbance

Other informational needs are:

1 Reactions of fish species to patterns of habitat created or altered by management and natural succession.

2 The amount of instream large woody debris necessary to maintain productivity of fish habitat

3 Baseline productivity levels of fish habitat

4 Cumulative effects of timber management activities on stream stability.

5 Effects of fish habitat enhancement and rehabilitation projects on fish populations and stream hydrology

6 Minimum flow levels needed in major streams to support fish populations.

7 Ways to manage riparian areas to increase levels of large woody debris in streams.

ENVIRONMENTAL CONSEQUENCES ON WILDLIFE

The primary effects of the alternatives on wildlife occur through changes in habitat type and diversity Changes in habitat result in changes in populations of associated species. A relative measure of conditions called the Habitat Capability Index (HCI) expresses the relationship between habitat and populations Because species respond differently to changes in habitat, the effects of the alternatives are primarily displayed by indicator species Indicator species serve as surrogates for species that have similar habitat requirements.

Management Indicator Species

Spotted Owl - Old-Growth Conifer Habitat

Changes in Habitat - The alternatives would provide various amounts and patterns of spotted owl habitat. The habitat would provide food, cover, and nesting sites for the owl and other wildlife that prefer old-growth (see FEIS, Chapter III "Wildlife" for the characteristics of spotted owl habitat). Table IV-8 displays the number of sites maintained for spotted owls and the total acreage of habitat provided by those sites for Alternatives A through H Alternative NC would not harvest timber on 13,000 unspecified acres for an interim period to provide spotted owl habitat All the other alternatives designate specific Spotted Owl Habitat Areas (SOHAs) of 2,000 acres each and provide additional habitat in reserved areas (Wildernesses and Cascade Head Scenic Research Area) The SOHAs would be scattered across the Forest (see FEIS, Appendix I for a map of the SOHAs) and provide links between the habitat in the reserved areas and on adjacent BLM lands

Table IV-8. Spotted Owl Habitat

	ALTERNATIVE								
	A	B	B(Dep)	C	D	E(PA)	F	G	H
Number of Sites (SOHAs and reserved areas)	30	30	30	30	30	37	33	35	45
Currently Occupied Sites	18	18	18	18	18	23	21	23	23
Total Area in Sites (M Acres)	60	60	60	60	60	71	67	71	86

Alternatives A, B, B(Dep), C, and D contain habitat for long-term viability for spotted owls at the Management Requirement level identified in the Record of Decision (ROD) for the Supplement to the Environmental Impact Statement (SEIS) for an Amendment to the Pacific Northwest Regional Guide, issued in December, 1988 This level includes habitat for eight pairs of owls on reserved lands and habitat for 22 pairs in SOHAs. Two of the twenty-two sites, containing less than 50% suitable habitat, were assigned to provide links with other SOHAs The conifer stands in these sites are primarily 100 to 120 years old and will require 90 to 100 more years to develop old-growth characteristics By the 5th decade, habitat outside of these sites would be fragmented and scattered and the total capacity of the Forest to support pairs of owls would decline The 5 pairs of owls in currently occupied habitat, not included in SOHAs would either move into unoccupied SOHAs or disappear However, occupancy of the SOHAs and habitat in reserved areas would increase as offspring from birds in 18 currently *occupied sites move into unoccupied territories.*

Alternative E(PA) would include seven more SOHAs than the MR level for a total of 29 Five of the additional SOHAs contain suitable habitat and are currently occupied by spotted owl pairs Two contain stands that have the potential to grow into suitable habitat in the future; they are designated to provide links with BLM spotted owl management areas adjacent to the Hebo Ranger District Designating seven additional SOHAs would increase the habitat capability of the Forest to support spotted owls because more of the owl population would be included, the existing population would have more opportunity to interact within and outside the Forest, and more habitat would be available to replace sites damaged by catastrophic events. By the 5th decade habitat outside of the designated sites would be fragmented and scattered and the total capacity of the Forest to support pairs of owls would decline from current conditions However, occupancy of the SOHAs and habitat in reserved areas would increase as offspring from birds in 23 currently occupied sites move into the unoccupied territories

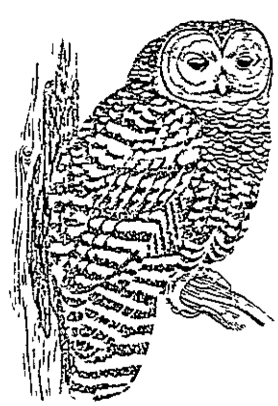
Alternative F would include three more SOHAs than the MR level for a total of 25. By the 5th decade habitat outside of the designated sites would be fragmented and scattered and the total capacity of the Forest to support pairs of owls will have declined from current conditions However, occupancy of the SOHAs and habitat in reserved areas would increase as offspring from birds in 21 currently occupied sites move into the unoccupied territories

Alternative G would include five more SOHAs than the MR level for a total of 27. The additional sites contain suitable habitat as well as all verified pairs of owls By the 5th decade habitat outside of the designated sites would be fragmented and scattered and the total capacity of the Forest to support pairs of owls would decline from current conditions However, occupancy of the SOHAs and habitat in reserved areas would increase as offspring from birds in the 23 currently occupied sites move into the unoccupied territories

Alternative H would include 15 more SOHAs than the MR level for a total of 37 and would result in the greatest habitat capability for spotted owls and other species that prefer mature and old-growth habitat. By the 5th decade habitat outside of the designated sites would be approximately what it is today Occupancy of the SOHAs and habitat in reserved areas would increase as offspring from birds in the 23 currently occupied sites move into the unoccupied territories

Changes in Habitat Capability - The existing condition provides an HCI of 59 pairs Alternatives NC, A, B, B(Dep), C and D would provide the lowest habitat capability (HCIs of 38 or less) in the 5th decade. Alternative H would plan for the highest habitat capability (HCI of 60). Alternative E(PA) would produce an HCI of 42 in the 5th decade. The spotted owl HCI for the 1st, 2nd, and 5th decades is displayed for each alternative in Figure IV-7.

Other Effects - The noise and physical activity associated with timber harvesting activities disturb spotted owls and other species that live in mature and old-growth habitat These disturbance effects are not well understood at present but are expected to be proportional to the number of acres harvested



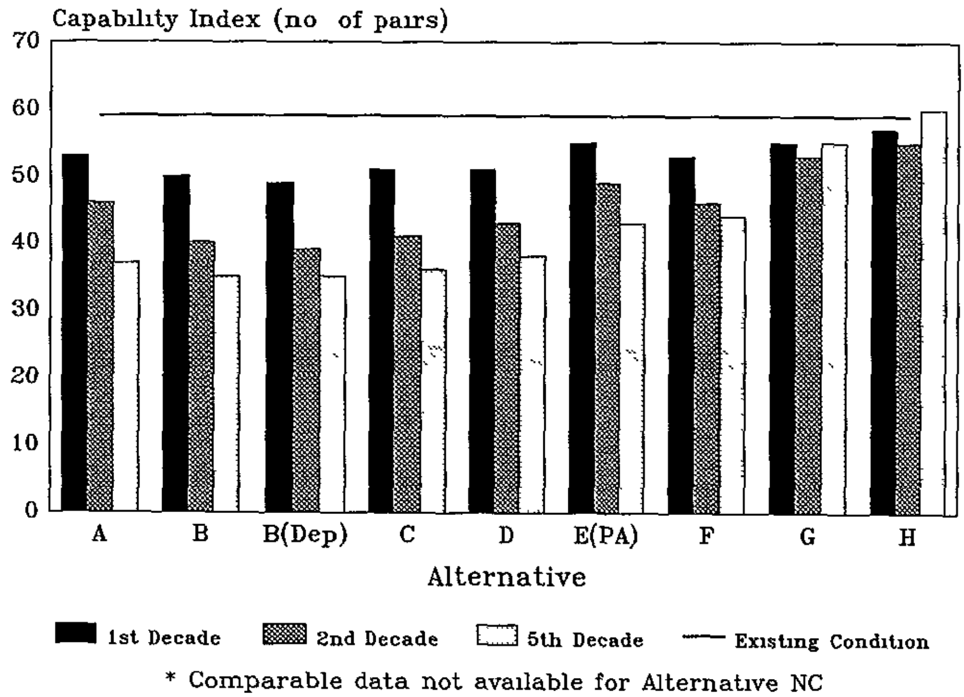


FIGURE IV-7. SPOTTED OWL HABITAT CAPABILITY INDEX

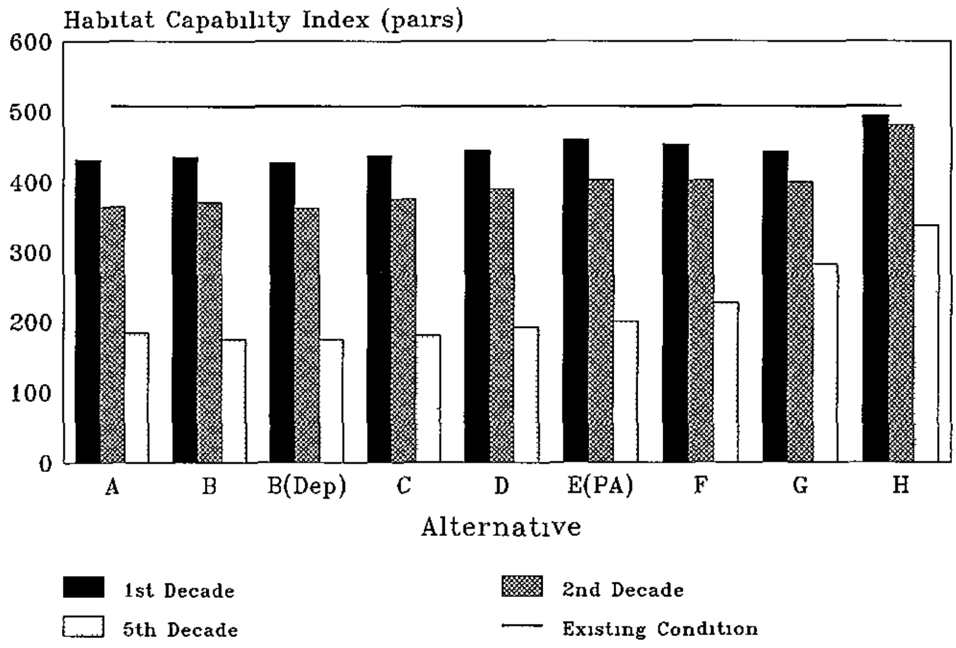
Pileated Woodpecker and Marten - Mature Conifer Habitat

Changes in Habitat - Mature conifer habitat provides food, cover, and reproductive sites for the pileated woodpecker, marten, and other species of wildlife that prefer mature conifer The amounts of mature conifer habitat (80-190 years old) would vary by alternative, both by design and as a result of management for other resources

At present, there are adequate overall amounts of habitat, but much of it consists of areas that are too small and clumped to meet the habitat needs of either species Thus, if trends were to continue, the habitat units would become isolated This would reduce genetic interchange and long term chances of survival of species that prefer mature conifer habitat

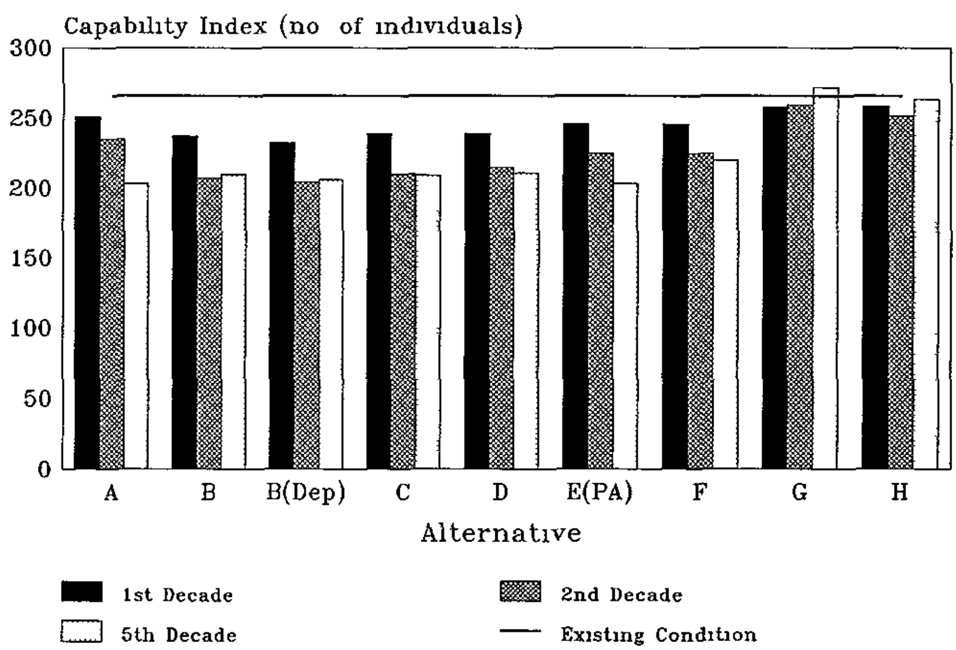
All of the alternatives would meet or exceed Management Requirements and assure at least viable populations of pileated woodpecker and marten Sites would be scattered across the Forest, with additional habitat in areas where timber harvest is not scheduled

Changes in Habitat Capability - Figures IV-8 and IV-9 show the estimated habitat capability for pileated woodpecker and marten in the 1st, 2nd and 5th decades The existing HCI for pileated woodpecker is 508 and for marten is 266 The HCIs would decrease in the first 5 decades as mature conifer habitat is harvested, and then increase gradually as trees mature in areas not suitable for timber production



* Comparable data not available for Alternative NC

FIGURE IV-8. PILEATED WOODPECKER HABITAT CAPABILITY INDEX



* Comparable data not available for Alternative NC

FIGURE IV-9 MARTEN HABITAT CAPABILITY INDEX

Other Effects - Timber harvesting activities will determine the location of mature conifer habitat As trees are cut in one area the mature conifer species would relocate in other mature stands Also, the sounds of harvesting activities disturb wildlife in adjacent habitat These effects would be proportional to the amount of timber harvest

Guild of Species - Dead and Defective Tree (Snag) Habitat

Changes in Habitat - Alternatives A, E, F, G and H would exceed Management Requirements (20% of biological potential) for dead and defective tree (snag) habitat by providing at least enough habitat to support 40% of the natural population levels of dependent species throughout each subbasin on the Forest. The snags provide habitat for prey species and roosting and nesting sites

Table IV-9 displays the effects of the alternatives on the amount of dead and defective habitat in the 1st, 2nd, and 5th decades. The snag resource across the Forest is presently about 75% of biological potential. Under all alternatives, snag levels would decline during the next 5 decades Between the 2nd and 5th decades, harvesting would destroy snags faster than snags would develop in adjacent areas. After the 5th decade, habitat is expected to remain constant The snag levels would be higher in the 1st decade for Alternatives G and H, because additional snags formed as trees die in protected areas would more than offset those lost on the relatively small areas harvested

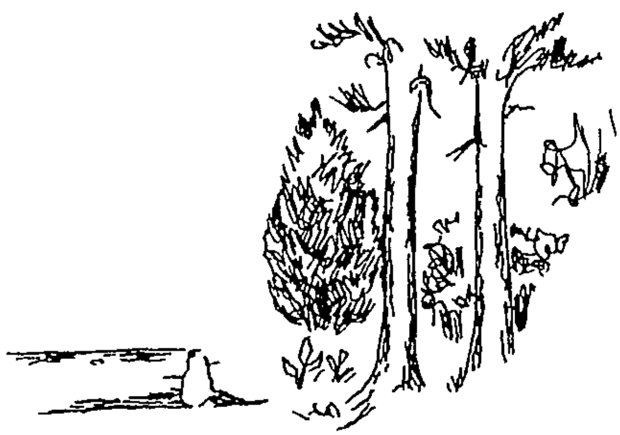
Existing snags and trees with potential for naturally becoming snags are not distributed evenly. Because of this, some areas would have fewer than the average for the Forest shown in Table IV-9, but each subbasin would always be at least 40%

Table IV-9. Dead and Defective Tree Habitat in Decades 1 and 5 (1)

	PERCENT OF NATURAL LEVEL BY ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
1st Decade	40%	69%	68%	68%	67%	70%	68%	71%	77%	82%
2nd Decade	40%	62%	60%	60%	60%	64%	62%	66%	75%	81%
5th Decade	40%	53%	46%	47%	47%	52%	50%	57%	72%	80%

(1) Existing condition is 75% of biological potential

Changes in Habitat Capability - The abundance of wildlife would be directly related to the amount of habitat. Changes in HCI would mirror the changes in habitat discussed above The HCI for the guild of species dependent on dead and defective tree habitat for the 1st, 2nd and 5th decades is compared to the existing condition in Figure IV-10.



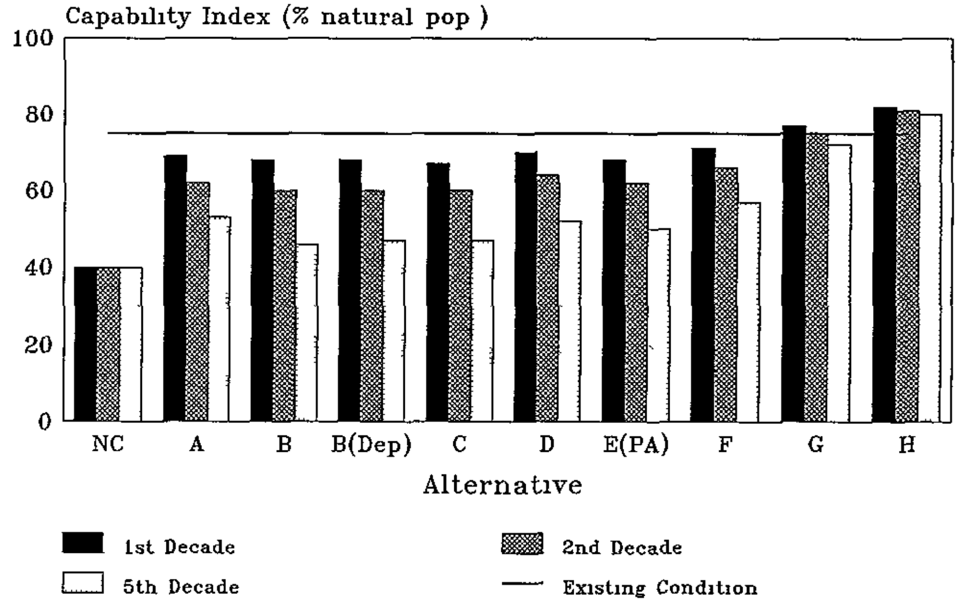


FIGURE IV-10 DEAD AND DEFECTIVE TREE HABITAT CAPABILITY INDEX

Other Effects - The number of dead and defective trees would be reduced, but each harvested area is expected to contain at least enough to maintain viable populations of dependent species

Dead and defective tree habitat on areas harvested in the past would gradually increase as planted trees die Habitat on lands unsuitable for timber production should gradually increase or be maintained at natural levels.

Provisions for safety of people working in harvest units will affect the distribution of the habitat Safety considerations may also affect the number of "hard" snags left after harvest and burning These tend to be more hazardous and are usually cut down "Soft" snags are often damaged or destroyed during harvest operations by cables and suspended logs being moved to the landings Most snags within 100 feet of public roads and within developed recreation sites will be removed for safety reasons

Salvage of dead and defective trees would reduce habitat for dependent species Actions such as logging, salvage logging, burning, and firewood gathering would reduce the amount of dead woody material on the ground

Roosevelt Elk - Mixture of Forage and Cover Areas.

Changes in Habitat - All of the alternatives would affect the amount, quality, and distribution of habitat (forage and cover) used by Roosevelt elk None of the alternatives would adversely affect the amount of thermal, hiding, or survival cover used by elk All alternatives would maintain existing meadows in a grass/forb condition; Alternatives C, E(PA) and G would establish additional meadows

Alternatives A, C, E(PA) and G would distribute forage fairly evenly over space and time However, forage is mostly short-lived and the elk would have to range about to find adequate forage associated with cover. Alternatives B, B(Dep), F, and H would produce forage that is concentrated in some areas but scarce in others Fluctuations in the amount of forage will lead to similar, but delayed, fluctuations in elk numbers. The HCI for elk would be much lower in Alternative H than in Alternative C because of forage quality, even though the pounds of available forage would be similar.

None of the alternatives is expected to effect elk cover adversely because of the rapid growth of brush and trees on the Forest.

Changes in Habitat Capability - Elk populations are influenced by the quantity and quality of habitat, the distribution of the habitat, and the number of animals transplanted. Alternatives A, C, E(PA) and G would program elk transplants into areas with a forage surplus

The HCIs for each alternative for the 1st, 2nd, and 5th decades are compared to the existing HCI in Figure IV-11. The changes over time would result from timber harvest and direct elk management actions.

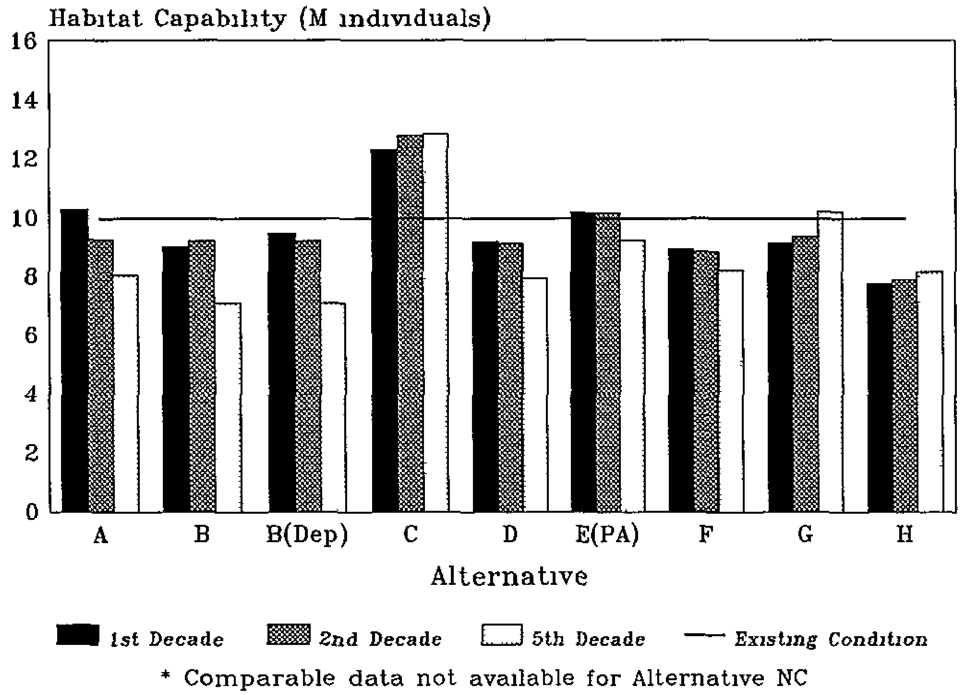


FIGURE IV-11. ELK HABITAT CAPABILITY INDEX

Other Effects - In all of the alternatives, there will be some disturbance of elk from traffic and logging activity These effects would be more prevalent in alternatives with high harvest levels In Alternatives C, E(PA) and H, more roads would be closed to provide diverse hunting opportunities Closures would also reduce disturbance of elk.

Western Snowy Plover - Open Sand Near Estuaries

The snowy plover lives on open sandy beaches in the Sutton Area on the Mapleton Ranger District and on the Oregon Dunes National Recreation Area (U.S Fish and Wildlife Service 1985). Plover populations seem to be affected by predation from other birds (primarily crows) and, to some extent, by disturbance from humans and domestic animals Plover nesting areas at Siltcoos, Tahkenitch, and Tenmile outlet areas are closed to motorized vehicles year round. Nesting areas at the north spit of the Umpqua River have been damaged by wave action and construction of the jetty.

At the Sutton Area, all alternatives, except B and B(Dep), would protect snowy plover habitat by restricting motorized access to the spit and beach yearlong. Motorized vehicle closures help maintain near-natural conditions for nesting and rearing of plover young. Vehicle closures on National Forest system lands adjacent to beaches where plovers nest will avoid motor vehicle associated adverse effects Populations of snowy plover will continue to nest and use areas at Siltcoos, Tahkenitch, and Tenmile outlet with no anticipated decline in the quality of their habitat. In Alternatives B and B(Dep), plover populations in the Sutton Creek area may be adversely affected in some areas adjacent to areas open to vehicle use. The ability of the habitat to support birds could decline in these alternatives in the Sutton Creek area

Bald Eagles - T & E

All alternatives, except NC, would provide nesting habitat needed to meet or exceed the objective of the Recovery Plan for Bald Eagles (US Fish and Wildlife Service 1986), which is to manage for the recovery of the bald eagle population Twenty-three nest sites are needed (see the Wildlife section in Chapter III). All alternatives manage at least 23 bald eagle territories; 7 of these are currently occupied Most alternatives would have 125 acres per site, two alternatives would have larger sites, Alternative NC has smaller sites (See Table IV-10) All alternatives would protect bald eagle pairs and nesting habitat

Table IV-10. Bald Eagle Nesting Territories

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Number of Sites	93	23	23	23	23	23	23	23	23	23
Acres per Site	40	125	125	125	125	125	125	125	325	625

More sites may be available for eagles than are managed in the alternatives The 23 sites dedicated to eagle population recovery on the Forest are the best habitat available. Other habitat may exist outside the recovery sites but are not needed for recovery HCI for eagles is related to the number of managed sites and is the same for Alternatives A through H. Alternative NC would have more sites, but their smaller size would provide too little area to protect adequate habitat for bald eagles (US Fish and Wildlife Service 1986) All alternatives, except NC, are expected to eventually increase the number of eagles using the Forest to Recovery Plan levels. Alternatives G and H would likely produce more eagles than the other alternatives, by providing more habitat in each site, thereby improving the probability of consistent territory occupancy.

Oregon Silverspot Butterfly - T & E

The alternatives would enhance silverspot butterfly habitat and populations All would satisfy the U S Fish and Wildlife Service's Recovery Plan for the butterfly, improve the habitat, and increase the capacity for butterfly populations (Clady and Parsons 1984)

Other Management Indicator Species - T & E

The Forest includes some habitat for Aleutian Canada geese, brown pelicans, and peregrine falcons that would be protected under all alternatives Thus, the alternatives are not expected to have any direct, indirect, or cumulative effects on habitat of these species

Sensitive Species

Pacific Western Big-eared bat - Caves used by the big-eared bat are a special habitat that would be protected in all alternatives. No adverse direct, indirect, or cumulative effects are expected

Other Sensitive Animals - Some other sensitive species, such as white-footed voles and marbled murrelets, are typically associated with mature and over mature conifer habitat. These are part of the guild of species that are represented by indicator species pileated woodpecker, marten and spotted owl. The HCI for marbled murrelet and white footed voles would range from 76% to 102% of existing levels, depending on the Alternative. Alternatives G and H would produce the highest HCI for murrelets and voles with 102% and 99% of existing levels respectively in the 5th decade. Management Requirement levels would be met in all alternatives. Other sensitive species include aquatic and riparian species such as the long billed curlew, western pond turtle and red legged frog. Populations of these species are expected to remain at current levels because habitat would be provided by the protection and management given to streams, lakes and riparian habitat under all alternatives See FEIS, Chapter IV, "Fish" and the following section on riparian habitat

Sensitive Plants - The alternatives would not have any adverse direct, indirect, or cumulative effects on sensitive plants on the Forest Planning for site specific projects would include investigations for these plants and appropriate protective actions would be taken if they are found

Other Species and Special Habitats

Blacktail Deer - Deer have more flexible habitat requirements than elk Except for Alternative H, in which deer populations would be greatly reduced, the effects of the alternatives would keep habitat capability above 95% of existing levels of 31,500 in the 1st decade. In all the alternatives, deer habitat capability would decline by the 5th decade when all alternatives are expected to provide more than 66% of existing levels. The decline would be smaller in Alternatives C, E(PA) and G Deer populations are expected to be well above viable population levels in all alternatives. Table IV-11 displays the HCI for deer for the 1st, 2nd, and 5th decades for Alternatives A through H. No data is available for Alternative NC.

Table IV-11. Deer Habitat Capability Index (HCI)

	HCI BY ALTERNATIVE								
(Existing is 31,500)	A	B	B(Dep)	C	D	E(PA)	F	G	H
1st Decade	33,700	30,500	34,900	32,700	32,200	32,500	31,200	31,900	15,800
2nd Decade	30,200	28,100	30,200	31,900	29,700	31,100	29,300	31,000	15,400
5th Decade	23,100	23,300	20,800	30,400	24,500	28,200	25,400	29,200	14,500

Black Bear - Black bear are omnivores and use many food sources throughout the year. Habitat used by bears is very similar, in terms of structure and juxtaposition of components, to that used by deer and elk Trends in habitat quality for black bear should be similar to changes shown for deer No adverse direct, indirect, or cumulative effects to bear are expected to result from implementation of any of the alternatives.

Cougar - Cougar habitat quality and capability is expected to parallel the changes displayed for deer and elk. This tie is based on the cougar's dependence on deer and elk as prey, as well as the secretive nature of cougar and its ability to inhabit a wide variety of habitats No adverse direct, indirect or cumulative effects to cougar are expected to result from implementation of any of the alternatives

Small Mammals and Birds - Some small mammal and bird populations that do not have specific habitat requirements such as old-growth, mature conifer, riparian or caves and cliffs, commonly use managed stands less than 60 to 90 years old. These animals use a wide variety of edge environments where different successional stages are adjacent to each other. These populations will closely follow the habitat/population trends of big game. Animals that prefer larger blocks of habitat or have specialized habitat needs, are represented by management indicator species such as spotted owl, pileated woodpecker or marten

Mature Deciduous-Mix Habitat - This is defined as stands of hardwoods such as red alder or maple, or a mixture of hardwoods and conifers The hardwood age is between 51 and 100 years old A wide variety of species inhabits deciduous-mix habitat including hawks, grouse, hummingbirds, warblers, mountain beaver, squirrels, and mice By the 5th decade all existing mature deciduous-mix habitat will be older than 100 years (See Table IV-3 in FEIS, Chapter IV, "Vegetation") Some habitat features of existing 51-100 year old stands will begin to deteriorate by the 5th decade This reduction will result in fluctuations in the kinds and numbers of species inhabiting localized areas Viable populations will remain above viable levels; some species may increase in numbers Although some of the habitat features will remain past age class 100, as the hardwood deteriorates, the stands become brushfields or stands of scattered conifers

Riparian Habitat - Riparian habitat is predominantly in stands between 51 and 100 years old Age groups older than 100 years will begin to change to brushy habitats and eventually return to either deciduous or a mix of conifer and deciduous species Wildlife use riparian areas because of a strong dependence on either seasonal or permanent water Wildlife species that inhabit riparian areas include shrews, bats, otters, weasels, wrens, thrushes, swallows, as well as a variety of reptiles and amphibians Changes in vegetative structure and species composition will result in shifts in number and distribution of riparian dependent wildlife Alternatives A, B, B(Dep), C, D and E(PA) would harvest some riparian acres in the 1st decade which would provide young riparian age groups in later decades Effects to riparian species include reduced overwinter survival, impaired mobility, and reduced reproduction in areas disturbed by management activities Viable population levels will be maintained for all species, but changes in density and distribution are anticipated

Special Habitats - Cliffs, talus slopes, swamps, meadows, and bogs would be maintained in all alternatives Species that use these habitats include raccoons, bats, marmots, chipmunks, frogs, insects, ducks, and turtles. Activities in adjacent areas may disturb these habitats, but to a minor degree There are no adverse effects expected to any species that use these special habitats

Cumulative Effects on Wildlife

Spotted Owls

The chance of having any cumulative effects on spotted owl habitat capability would be greatest in alternatives that harvest the most timber. Effects from road building, timing of harvest, and habitat changes can all contribute to the cumulative impacts on spotted owls Activities on adjacent private land could eliminate all habitat outside of Forest Service and BLM ownership Consequently, Forest Service and BLM lands could become the only source of suitable habitat Cumulative effects are lower in alternatives that provide for the potential for linkages between Forest Service and BLM sites such as Alternative E(PA) and H. Alternatives that have more acres in timber management have a greater chance of contributing to the adverse cumulative impacts on spotted owls

The final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (SEIS), issued in July, 1988 addressed the long-term cumulative impacts of the network selected as the preferred alternative in that document. Forest Plan alternatives have varying degrees of cumulative effects on the spotted owl. However, since all meet the requirements described in the SEIS, the spotted owl population in the Coast Range is expected to remain at or above the viable population level

Pileated Woodpecker and Marten

Mature conifer habitat, necessary to maintain populations of pileated woodpeckers and marten, is expected to decline on all ownerships in the Coast Range in the next 50 years (see FEIS, Appendix B, "Cumulative Effects Model"). Habitat of private industrial lands will decline to very low levels Little or no habitat is currently found on small private woodlots because they generally are too small in area to meet minimum habitat size requirements Habitat on BLM lands will decline but some will be provided in spotted owl management areas and in Areas of Critical Environmental Concern Habitat on the Forest will also decline, but less than on other ownerships The cumulative effect of these habitat declines will be a strong reliance on the habitat on the Forest and on BLM to provide for viable populations in the Coast Range There will be a reduced capacity to interchange individuals between habitat blocks. All alternatives would meet or exceed Management Requirements for pileated woodpecker and marten on National Forest System lands. The greatest cumulative effects would be in alternatives that most reduce acres of habitat. Alternatives A, B, B (Dep), C and D have the greatest chance of adverse cumulative effects.

Guild of Species - Dead and Defective Tree (Snag) Habitat

Among the species that use this habitat are smaller woodpeckers, nuthatches, chickadees, bats, squirrels, ducks, and many insects It is expected that there will be very little dead and defective tree habitat provided on adjacent private lands in the future Alternatives B, B(Dep) and C provide the lowest levels of habitat on National Forest lands However, all alternatives retain habitat above the Management Requirement level for Forest Service lands In the Coast Range, total dead and defective tree habitat is expected to decline significantly. On the Forest, habitat will decline from a current level of 75% of potential to 50% of potential in the 5th decade Viable populations will be maintained on the Forest. Because the effectiveness of dead and defective tree habitat is largely limited to the immediate site, none of the Forest Service alternatives significantly contribute to or moderate the adverse effects that may occur on adjacent private land.

Roosevelt Elk

Elk are mobile and ignore boundaries while traveling to food and cover in their home range Actions taken by other landowners will provide habitat for elk which could complement habitat on the Forest and help meet Oregon Department of Fish and Wildlife (ODFW) goals. On the other hand, habitat provided by one owner may not be used by the elk if its production is not coordinated with the production of habitat elsewhere A shortage of habitat on lands of one owner could magnify damage problems on other lands. A major redistribution of elk from public land to private land could result in fewer elk overall due to an increase in the number of damage hunts needed. Actions will have to be monitored and coordinated through ODFW, which has responsibility for wildlife populations.

Western Snowy Plover

Very little plover habitat exists on other ownerships in the vicinity of the Forest. Most existing plover habitat is found south of the Forest along the Oregon Coast and in California and the high desert of eastern Oregon and Nevada Plovers are migratory, so some of the population from adjacent areas may winter on the Forest. There are no adverse cumulative effects anticipated for the snowy plover from any alternatives except B and B(Dep) These alternatives have the greatest probability of adverse cumulative effects on the Forest because they would allow ORV disturbance in snowy plover habitat in the Sutton area resulting in reduced nesting success, lower recruitment to the population, and fewer birds in the long run

Bald Eagles

The Recovery Plan for Bald Eagles considered the cumulative requirements and consequences on all lands and assigned habitat protection goals to public land management agencies. Adverse cumulative effects would be prevented by the Forest's contribution to habitat protection activities as described in the alternatives

Oregon Silverspot Butterfly

The cumulative effects on the butterfly were considered when the US Fish and Wildlife Service prepared the recovery plan. Most suitable habitat is in National Forest ownership and more will be acquired if it becomes available. No adverse cumulative effects are expected from implementing any of the alternatives

Blacktail Deer

Like elk, deer utilize habitat without regard for ownership Predicted conditions on adjacent ownerships would provide considerable deer habitat that would compliment habitat on the Forest. No adverse cumulative effects on deer are expected

Other Species and Special Habitats

Special habitats on the lands of others in the Coast Range may be disturbed if no special protection is provided On the Forest, all of these habitats would be maintained and would provide viable populations of dependent species. Cumulatively, the total amount of special habitats on all ownerships is expected to decline over time reducing the species' range and resulting in overall population declines

Consistency with Other Plans and Policies for Wildlife

See "Consistency With Plans And Policies Of Other Agencies" in this chapter for more information

Mitigation Measures for Environmental Effects on Wildlife

Adverse effects on wildlife habitat are minimized through the following practices: 1) removing mature and old-growth conifer habitat for spotted owls and bald eagles from the suitable land base; 2) maintaining existing mature habitat for pileated woodpeckers and marten until suitable replacement habitat exists, 3) leaving sufficient numbers of dead and defective trees after harvesting activities; 4) creating meadows for elk through the removal of overstory tree and brush species; 5) controlling the timing of activities to reduce disturbance, 6) closing roads, either seasonally or yearlong; and, 7) providing interpretative information to Forest users (See FEIS, Chapter II, "Mitigation Measures.")

Indirect Effects on Other Resources

Vegetation

Increased elk and deer populations in Alternatives B, B(Dep), D, F, and H would eat more conifer and hardwood seedlings. This may reduce reforestation stocking levels if the seedlings are not protected or alternate forage is not provided.

Water Quality and Soil

Increases in elk populations may increase bank erosion in heavily used areas.

Fish

There would be no effects on fish as a result of changes in wildlife.

Recreation

Increases in watchable wildlife (elk, deer, small mammals, and birds) generally increase the satisfaction of most Forest recreationists

Increases in big game could increase hunting demand (See Effects on Recreation in this Chapter).

Scenery, Wildernesses, Undeveloped Areas, Old Growth, Cultural Resources

There are no effects on these components as a result of changes in wildlife

Communities

Increases in watchable wildlife and big game would increase recreation and benefit the tourist trade

Insects

Changes in populations of insectivorous birds can reduce the duration and severity of insect outbreaks

Farmlands, Wetlands,and Floodplains

Increases in elk herds would increase grazing on farmlands, floodplains, and wetlands

Minerals, Fire, Air, Roads, Disease, American Indian Religious Sites, Consumers, Civil Rights, Minority Groups and Women

There are no effects on these environmental components as a result of changes in wildlife.

Assumptions Used to Predict Environmental Consequences on Wildlife

Assumptions for predicting effects on wildlife include.

1 Habitat requirements of indicator species are the same throughout the range of the species even though there may be significant differences in the vegetation types (plant associations)

2 Indicator and other species will interact with populations on other lands

3 Management for indicator species will address the needs of all species dependent on a given habitat and each species will be viable

4 The Forest is capable of producing suitable marten habitat

5 Snag densities at 60% of biological potential will provide sufficient denning and/or foraging habitat for marten and pileated woodpeckers for both the long and short terms.

6 A density of three snags per acre meets the biological potential for cavity nesters at the 100% level

7. Deciduous mix and riparian habitat will become unsuitable after 100 years due to the deterioration of the mature hardwoods These stands will be followed by brushfield conditions

8. Favorable habitat conditions for many species are often present on lands not specifically managed for those species

9. Habitat capability indices (HCIs) are reasonable estimates of the ability of an area to support given wildlife populations.

Incomplete or Unavailable Information on Wildlife

The following information used to predict effects on wildlife is either unavailable or incomplete; additional information is needed on these topics

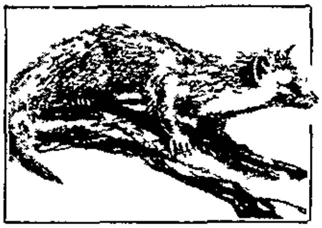
1 Estimates of maximum distances that can be allowed between habitat areas for all management indicator species

2 The length of time hardwoods will provide useful habitat to wildlife in a deciduous-mix stand

3. The extent to which deciduous-mix wildlife is dependent on mixed stands with more than 50% hardwoods.

4. An accurate measure of the quality of forage produced in immature and mature conifer stands

5 Statistically reliable estimates of marten populations in the Coast Range



MARTEN

ENVIRONMENTAL CONSEQUENCES ON RECREATION

Direct Effects on Dispersed Recreation

This section deals with dispersed recreation Dispersed recreation is use of areas away from developed sites such as campgrounds, picnic grounds, and vista points

The alternatives prescribe different combinations of "recreational settings". A recreational setting consists of the physical characteristics of an area, such as the distance from roads, evidence of humans (e.g. buildings, fences, timber harvest units, camping improvements, etc.) and the social characteristics of the area, such as the likelihood of meeting other people, whether motor vehicles are used in the area, and the degree to which people's actions are regulated by the Forest Service

A particular setting directly provides a specific set of recreational opportunities The interplay between the availability and demand for such opportunities determines how much recreational use actually results (See FEIS, Chapter III for a complete discussion of recreational opportunities on the Forest)

Semiprimitive Nonmotorized (SPNM)

Semiprimitive nonmotorized opportunities are available in predominantly undisturbed, natural environments of moderate size in which roads or other permanent improvements are rare. Interactions between users are infrequent and there is no motorized use The chance of experiencing solitude is fairly high.

The settings which provide SPNM opportunities include Wildernesses and undeveloped areas. An area's capacity for supplying SPNM opportunities is determined by its size and the extent of the trail system since terrain and dense vegetation often make cross-country travel difficult.

Areas in Which SPNM Opportunities Do Not Vary by Alternative -

Undeveloped Areas In Oregon Dunes National Recreation Area (NRA) - Present management plans for the Oregon Dunes NRA are incorporated in the Forest Plan As a result, the two undeveloped areas closed to off-road vehicles (ORV) at the Oregon Dunes NRA (Umpqua Spit and Threemile Lake) would provide the same level of SPNM opportunities in all alternatives Umpqua Spit is expected to remain natural and stay at its present capacity, at least until the effects of the recent mining claim patent action are felt Three and one-half additional miles of trail would increase slightly the capacity of Threemile Lake.

Part of the Umpqua Spit undeveloped area on the Oregon Dunes NRA which supplies SPNM opportunities is a potential Research Natural Area (RNA). RNA designation would not affect SPNM opportunities because objectives for the two types of areas are compatible

Two of the four undeveloped areas in the Oregon Dunes NRA would continue to provide SPNM opportunities on almost 5,000 acres in all alternatives.

Areas in Which SPNM Opportunities Vary Among Alternatives -

Wilderness and Undeveloped Areas - The area in Wilderness does not vary by alternative, but the level of development within the Wildernesses does vary Differences in the length of the trail systems affect the amount of SPNM opportunities. See FEIS, Chapter IV, "Environmental Consequences on Wilderness" for miles of trail provided in each Wilderness under each alternative.

In Alternatives NC, A, B, B(Dep), and D, no undeveloped areas outside the Oregon Dunes NRA are designated so no SPNM opportunities would be provided in other undeveloped areas The number of acres providing SPNM opportunities in these alternatives would be moderate (about 42% of the maximum) but the portion of projected 5th decade demand for SPNM recreation which would be met is less than 31% in all five alternatives, and less than 24% in Alternatives A and NC

In Alternatives C and E(PA), Wassen Creek, Drift Creek Adjacent and the two undeveloped areas in Oregon Dunes NRA closed to ORV use would be kept undeveloped and would continue to provide SPNM opportunities. More acreage is included in Alternative E(PA) than in Alternative C The length of the trail system in each area would be roughly proportional to the size of the area and the amount of SPNM opportunity provided would be proportional to the trail mileage In Alternatives F, G, and H, all the areas which now provide SPNM opportunities would be kept undeveloped, although the size of each area would vary. The length of the trail system would be roughly proportional to the size of the area and the amount of SPNM opportunity would mirror the trail system length.

Alternative H would provide the most SPNM opportunities, about 63,000 acres of Wilderness and undeveloped areas. Alternative H would provide the longest trail system in undeveloped areas (82 miles by the end of the 5th decade) Alternative H also would include the North Fork Smith River area, which would be allowed to revert to an undeveloped condition offering SPNM opportunities Alternatives F and H would be capable of meeting over 65% of the projected 5th decade demand, Alternative G would meet 76%

In Alternative H, there would be over 250,000 more acres unsuitable for timber production than in other alternatives Where these acres occur in large contiguous blocks without roads, some additional SPNM opportunities could result.

Table IV-12 displays the acres that would provide SPNM opportunities and the anticipated average annual use in the 5th decade It also shows the percentage of demand that would be met in the 5th decade.

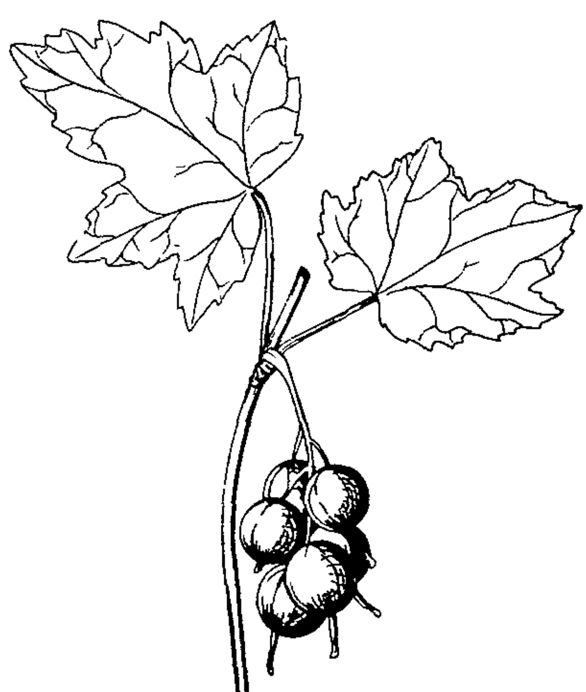


Table IV-12. SPNM Opportunities and Anticipated Average Annual Use

Existing M Acres 57	ALTERNATIVE									
Existing MRVDs 7.6	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
SPNM Opportunities (1) (MAcres)	27	27	27	27	34	27	34	44	48	64
Anticipated Use (2) MRVDs	28 (3)	28	36	36	56	28	49	79	94	80
% 5th Decade Demand Met	23 (3)	23	30	30	46	23	40	65	76	65

(1) This is all the unroaded and undeveloped area which would be capable of providing SPNM recreation (2,500 contiguous acres or larger and closed to motor vehicles) in each alternative It includes the three Wildernesses (22,200 acres), and the majority of the two undeveloped areas in the Oregon Dunes National Recreation Area (approximately 4,800 acres) in all alternatives The number of acres that would provide SPNM opportunities in the other undeveloped areas which are included in each alternative are shown in "Environmental Consequences of the Alternatives on Undeveloped Areas" in this chapter For a display of the trail mileage and anticipated use in each of the Wildernesses, see FEIS, Chapter III, "Environmental Consequences of the Alternatives on Wilderness"

(2) The amount of use varies because of the acreage established and the amount of trail miles

(3) This assumes the same management of the Oregon Dunes NRA unroaded areas and the same level of trail development in Wildernesses and the Oregon Dunes NRA unroaded areas as Alternative A.

For a detailed description of the characteristics of the recreational opportunities in each of the roadless areas, and the environmental consequences of each alternative, see FEIS, Appendix C.

Semiprimitive Motorized (SPM)

SPM opportunities are present in natural environments which are very similar to those in which SPNM opportunities are present, except that use of off-road motor vehicles (ORVs) is likely. Usually ORV use increases the evidence of human disturbance, creates more interaction with other people, and reduces the chance of experiencing solitude.

Undeveloped Areas In Oregon Dunes NRA - Large, gentle sand areas in two of the undeveloped areas (Woahink, 5,060 acres and Tenmile 7,800 acres) in the Oregon Dunes NRA are open to ORVs and provide SPM opportunities in all alternatives (Table IV-13)

Due to steep slopes and dense brush elsewhere on the Forest, the only other large, contiguous areas capable of providing SPM opportunities are the other two roadless areas in the Oregon Dunes NRA These two (Umpqua Spit and Threemile Lake) are managed to provide SPNM opportunities under all alternatives

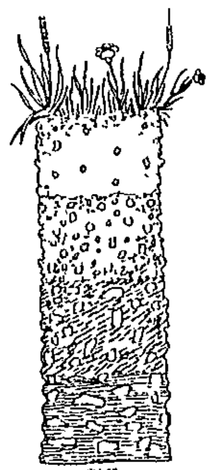


Table IV-13. Semiprimitive Motorized Recreation

SPM Acreage	10,300 Acres
Existing Use	242,054 RVDs
Anticipated Average Annual Use in the 5th Decade	481,978 RVDs
Projected 5th Decade Demand Which Can Be Met	84%
Year Projected Annual Demand is Expected to Exceed Capacity	2013

Part of the Tenmile undeveloped area on the Oregon Dunes NRA is a potential RNA RNA designation would reduce the acres available for SPM opportunities because motorized use is not compatible with RNA objectives. The reduction in opportunities would be small because vegetation and topography already limit motorized use on the part of the area proposed for the RNA

Roaded Natural (RN)

The semiprimitive ROS classes discussed previously do not contain roads improved for highway vehicles The next two classes, Roaded Natural (RN) and Rural (R) do have improved roads These classes are combined in terms of anticipated use, but are treated separately in terms of the settings which provide recreational opportunities

RN opportunities exist where the environment appears natural when seen from heavily used places (main roads, developed recreation sites, trails) Permanent roads and other improvements are common, but usually inconspicuous Interactions with other people may be frequent

A number of settings provide RN opportunities They include portions of the Oregon Dunes NRA, Cascade Head Scenic-Research Area, Sand Lake and Sutton Recreation areas, four existing or potential Special Interest Areas, scenic viewsheds managed for a predominantly natural appearance, and, in some alternatives, the rest of the Forest

Areas in Which RN Opportunities Do Not Vary By Alternative

Oregon Dunes NRA - Those portions of the Oregon Dunes NRA between the highly developed corridors and the undeveloped areas would provide RN opportunities in all alternatives

Cascade Head Scenic-Research Area - Except for a small amount of land adjacent to the private residences (which would provide rural recreational opportunities), all of this area would provide RN opportunities in all alternatives

Marys Peak - In July 1989, 924 acres at the top of Marys Peak was designated as a Scenic-Botanic Special Interest Area by the Regional Forester As a Special Interest Area (SIA) all of the scenic and botanic features and all of the recreational opportunities will be retained in all alternatives These features include large meadows, unique plant communities including stands of noble fir, vistas of the Willamette Valley, Cascade Range and Coast Range, trail hiking opportunities, and opportunities for snowplay during the winter months Developed recreation sites and electronics facilities (even though not necessarily consistent with RN recreation) are also present in all alternatives

Sand Lake Recreation Area - Except for the small amount of land surrounding the Sand Lake Campground (which would provide rural recreational opportunities), all of the Sand Lake Area would provide RN opportunities in all alternatives

Sutton Recreation Area - Except for the small amount of land adjacent to highly developed corridors (which would provide rural recreational opportunities), all of the Sutton Area would provide RN opportunities in all alternatives. See FEIS, Appendix F for additional information on the Sutton Area

Portions of the Oregon Dunes NRA, Cascade Head Scenic-Research Area, and Sand Lake and Sutton Recreation areas include almost 15,400 acres that would provide RN recreational opportunities in all alternatives. The contribution of these areas to the total anticipated use in the roaded ROS classes is shown in Table IV-15

Areas in Which RN Opportunities Vary by Alternatives -

Special Interest Areas - Three areas - Cape Perpetua, Mt. Hebo and Kentucky Falls - possess such unique or exceptional recreation values that they are being considered as Special Interest Areas Although the RN opportunities these areas provide are important, the fate of the recreational attractions in each of the alternatives is of equal or greater concern

Cape Perpetua - Cape Perpetua's most notable scenic features and recreational opportunities, those associated with the ocean frontage, would be protected in every alternative These features include 2,060 acres of rocky cliffs, tidepools, beaches, spouting horn, shell middens, wind swept vegetation, and ocean vistas. The Visitor Center, other developed sites, and trails associated with the ocean front would be present in all alternatives Alternative NC would retain the designated Scenic Area (about 990 acres) and would therefore have some of the natural, dense forest with some of the scenic groves of large old-growth trees. It would also provide some opportunities for hiking and backpacking on existing and potential trails near Cape Perpetua Alternatives A, C, F, G, and H would add about 1100 acres to the SIA, most of which is natural, dense forest with some scenic groves of large, old-growth trees. Alternative E(PA) would add about 1800 acres to the SIA These alternatives would also provide opportunities for hiking and backpacking on existing and potential trails in the forest Alternatives NC, B, B(Dep), and D would eliminate most of the natural forest and associated recreational opportunities because areas outside the ocean front would be managed for timber production

Mt. Hebo - Most of the scenic features and recreational opportunities on Mt Hebo would be retained in all alternatives, because the area would be managed to protect the habitat of the threatened Oregon silverspot butterfly The features include the alpine appearance of meadows and conifer stands, vistas of the Pacific Ocean and Coast Range, spectacular flower displays, rare and unique plants, the Oregon silverspot butterfly, and opportunities for winter snowplay and hiking through diverse and attractive landscapes. Electronic sites (even though not necessarily consistent with RN recreation) would be present under all alternatives

Alternatives NC, A and D would not recommend Mt Hebo as a Special Interest Area, so parts of the area could be used for commercial activities such as decking logs, or quarrying for road rock. In addition, Oregon silverspot butterfly habitat and the electronics facilities would be managed with less attention to protecting scenery Alternatives B, B(Dep), C, E(PA), F, G, and H recommend Mt Hebo as a Scenic-Biological Area; all activities would be managed to protect the scenery

Kentucky Falls - The Kentucky Falls Area's most spectacular scenic features, waterfalls and cascades on the North Fork Smith River and Kentucky Creek, would be retained in all alternatives The area is also attractive because of the mature Douglas-fir--western hemlock forest surrounding the water features

In Alternative H, the Kentucky Falls area would be included in the North Fork Smith River undeveloped area, rather than being recommended as a scenic area This undeveloped area would be created by allowing some roaded areas to revert to a natural condition (see the section on undeveloped areas in this chapter). Alternatives F and G would include a large scenic area Alternatives F, G, and H would protect all the scenic attractions along Kentucky Creek and North Fork Smith River

Alternative C would protect a small scenic area which includes the major waterfalls and cascades on Kentucky Creek and N. Fork Smith River, and enough of the surrounding forest to screen out clearcuts The possibility for an unmodified forest setting along the lower several miles of N. Fork Smith River would be lost due to timber harvesting Presently, the setting in this lower area includes several clearcuts close to the river. Alternative E(PA) would protect a larger area (1,680 acres) by including more area along the river.

Alternatives NC, A, B, B(Dep), and D would not include a scenic area This would eliminate the unmodified forest setting for the water features and reduce their recreational value.

The contribution of the Special Interest Areas to the total anticipated use in the roaded ROS classes is displayed in the FEIS, Chapter II

Scenic Viewsheds - Scenic viewsheds which are managed for visual quality objectives (VQOs) of preservation, retention and partial retention, supply a portion of the RN recreation opportunities Alternatives G and H would provide the most viewsheds - over 61,000 acres. No acres would be managed for those VQOs in Alternatives B and B(Dep) The other alternatives would fall between those extremes

The contribution of the scenic viewsheds to the total anticipated use in the roaded ROS classes is included in Table IV-15

Other Parts Of The Forest - Some parts of the forest would probably provide RN opportunities as a side effect of other management activities These opportunities would be greatest in the 100,000 acres or more of spotted owl management areas in Alternative G In addition, part of the land unsuitable for timber production to protect unstable slopes would probably also provide RN opportunities

The contribution of the other parts of the Forest to the total anticipated use in the roaded ROS classes is included in Table IV-15

Rural (R)

Rural opportunities occur in settings in which the natural environment is substantially modified. Extensive changes in natural vegetation, good roads, buildings, and other improvements are typical Interactions with other people may be high, but in many settings, particularly those managed primarily for wood, the probability of interacting with others is fairly low

Two major types of settings provide rural opportunities One is portions of recreation management areas which have been intensively developed The other, and by far the more extensive, is portions of the Forest where timber is managed intensively. This is the interior of the Forest, where roads and clearcut harvest units dominate the landscape.

Areas in Which Rural Opportunities Do Not Vary by Alternative -

Intensively Developed Portions Of Recreation Areas - Parts of the Oregon Dunes NRA, Cascade Head Scenic-Research Area, Cape Perpetua Scenic Area, Marys Peak, Mt Hebo, and Sand Lake and Sutton Recreation Areas have been substantially modified to provide developed recreation and electronic transmission facilities In all, these areas would provide about 6,200 acres of rural recreation opportunities in all alternatives

Areas in Which Rural Opportunities Vary Among Alternatives -

Portions Of The Forest Managed Primarily For Timber - In most alternatives, the greatest amount of recreational opportunities would be in the rural class. Settings which provide these opportunities are produced primarily through timber management In most alternatives, the majority of the Forest would be managed for timber

In Alternatives A through F, over 450,000 acres (more than 70%) of the Forest would provide rural recreational opportunities. In Alternatives NC, B, B(Dep), and D, it is over 80%.

For Alternatives G and H, it is not clear how much of the area managed for timber would provide rural opportunities It is possible that some land unsuitable for timber production due to soil and water protection will be contiguous and provide RN opportunities. However, it is estimated that about 56% and 30%, respectively, of the Forest would provide rural opportunities.

Direct Effects on Developed Recreation Sites

The previous discussion has dealt with dispersed recreational use. This section deals with use of developed sites. Developed sites include campgrounds, picnic grounds, and vista points

All alternatives would provide enough developed sites to meet projected demand through the 5th decade To do this, developed site capacity must be increased by more than one-third This would result in the use *shown in* Table IV-14, *in all alternatives*

Table IV-14. Developed Recreation Use

Period	Anticipated Use (MRVDs/year)
Existing	780
1st Decade	817
2nd Decade	904
3rd Decade	1,000
4th Decade	1,106
5th Decade	1,224

Total Recreation Use

The following table shows the total anticipated recreation use in the 5th decade by ROS class

Table IV-15 Recreational Use (MRVDs/year) by ROS Class, 5th Decade

MRVDs	ALTERNATIVE										
	Existing	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Dispersed Recreation											
UNROADED											
SPNM Wilderness	6	10 (1)	10	19	19	21	10	19	29	38	12
SPNM Undeveloped	4	18 (1)	18	18	18	35	18	30	50	56	68
SPM	242	482 (2)	482	482	482	482	482	482	482	482	482
ROADED											
Roaded Natural and Rural	514	(3)	706	702	702	709	706	731	715	728	716
Developed Recreation											
Roaded Natural and Rural	661	1,224 (4)	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224	1,224
TOTAL ALL	1,427	(3)	2,440	2,446	2,446	2,472	2,440	2,487	2,500	2,527	2,502

(1) This assumes the same management of the Oregon Dunes NRA unroaded areas and the same level of trail development in Wildernesses and the Oregon Dunes NRA unroaded areas as in Alternative A

(2) This assumes the same management of motorized use in the Oregon Dunes NRA unroaded areas as in Alternative A

(3) The TRP did not display a recreation program for the Forest Reasonable estimates can be made some categories in this table because they are limited areas of land with specific purposes The "roaded" ROS category is the large, general dispersed area of the Forest, and it is more difficult to accurately estimate probable use For purposes of comparison with the other alternatives, use the same figure as Alternative A.

(4) This assumes the same recreation development program as in all the other alternatives

Cumulative Effects on Recreation

Pressure for ORV use on beaches in the Oregon Dunes NRA could increase if the state of Oregon, which controls vehicles on the beaches, limits such use elsewhere The same is true of state or private recreation sites Fewer opportunities to use recreation sites elsewhere could increase demand for Forest sites.

Consistency with Other Plans and Policies for Recreation

Alternatives which would reduce recreational opportunities on the Forest may conflict with the desires of local communities that a wide array of recreation be provided for tourists

Mitigation Measures for Environmental Effects on Recreation

Mitigation measures for effects on recreational activities include:

1. Roadside brush clearing and cleanup.
2. Road design to provide for safety of users
3. Avoidance, where possible, of facilities such as trails and campgrounds during project planning.
4. Restoration of damage to facilities after project implementation.
5. Establishment of areas where certain recreational opportunities can take place (such as undeveloped areas).

See Forest Plan, Chapter IV, "Standards and Guidelines" for other mitigation measures on recreation.

Indirect Effects on Other Resources

Vegetation

Vegetation in areas providing SPNM recreational experiences would develop naturally and the species composition would depend on random disturbances (i e , windstorms, fire, insects and disease) Increased recreation use would increase the risk of human caused fires that may damage or destroy vegetation

Water Quality

Recreational activities in riparian areas without adequate waste disposal facilities increase the risk of contaminating water with human disease organisms This could require more treatment by communities using the watershed for a domestic supply.

Soil

Dispersed recreational activities may increase risk of wildfires during dry weather This would indirectly increase risk of erosion in watersheds due to the destruction of ground cover and root strength

Fish

The presence of inland developed recreation sites near fishable streams and lakes could contribute to reductions of local fish populations Heavy fishing pressure could reduce wild populations of trout and salmon in smaller bodies of water to the extent that habitat would be underutilized

Development of access to streams and lakes for recreational purposes encourages stocking of hatchery fish.

Scenery

Construction of developed sites or trails would increase traffic along roads leading to them and may increase visual sensitivity This may also occur along roads to areas providing SPNM recreation

Construction of developed recreation sites may result in local conditions that do not meet the visual quality objectives for the whole viewshed.

Wildlife

Sights and sounds of more recreation may reduce the quality of habitat for some wildlife Species most likely to be affected by human activity are bald eagles, snowy plovers and perigrine falcons Forest Standards and Guidelines (See Appendix D) are designed to minimize this effect

Recreational wood-gathering can reduce habitat of wildlife dependent on dead and defective trees for nesting, roosting, and feeding

Wilderness

Alternatives that would provide fewer SPNM recreational opportunities in undeveloped areas may result in increased use of Wildernesses This could reduce naturalness, solitude, and other Wilderness values

Communities

More recreational opportunities would enhance the appeal of the areas adjacent the Forest and could increase jobs and income in tourist industries.

Roads and Forest Facilities

An increase in the volume of recreation traffic would not significantly increase road maintenance or reconstruction costs Trail and campground reconstruction and maintenance costs would increase with increased use.

Other Components of the Environment

There would not be any effects on other components of the environment.

Assumptions Used to Predict Environmental Consequences on Recreation

Assumptions for predicting effects on recreation include:

1. The majority of semiprimitive motorized, developed, and roaded natural recreation opportunities on the Forest will continue to be concentrated near the coast.

2. The recreation setting and the kind of recreation available in the inland portion of the Forest is most strongly influenced by the amount, timing, and kind of timber management practiced

3. Increases in tourism in Western Oregon will result in increasing demand for recreational opportunities on the Forest.

Incomplete or Unavailable Information on Recreation

Predictions of effects were made with the most current information available Research or additional information on future demand for recreation opportunities is needed.

ENVIRONMENTAL CONSEQUENCES ON WILDERNESS

Direct Effects on Wilderness

There are two major types of effects of the alternatives on the three Wildernesses those that are created by management activities within the boundaries, and those that are created by management activities outside the boundaries.

Effects From Activities Within The Boundary

The primary effects on Wilderness from within the boundaries come from trails and camping spots developed to organize or facilitate recreational use Facility construction has two kinds of effects. it destroys a small amount of the localized, physical environment immediately adjacent to trails and camps, and it allows more people to use the area than if there were no facilities. This is especially important in the Wildernesses on the Forest because, except for Drift Creek, they are relatively undeveloped, and brush is so thick that cross country travel is very arduous

Up to a point, a trail system allows people to participate in primitive and unconfined types of recreation, one of the major reasons Wildernesses are established A longer trail system would allow more people to be dispersed throughout the area at one time with less likelihood of coming in contact with each other On the other hand, as more people use a Wilderness, there is a greater chance for loss of solitude overall, and it is more likely that evidence of humans will be greater

The effects of recreation development in Wilderness will be greatest in Drift Creek and Cummins Creek Wildernesses. None of the alternatives proposes any 1st decade trail development in Rock Creek Wilderness; only Alternative G proposes any by the 5th decade. Alternative G would be most likely to produce effects from a trail system because it proposes the most miles of trail in each Wilderness, totalling almost 65 miles Alternative H would produce the least effect, since no more trails would be built. Other alternatives would fall between these two extremes, although each Wilderness may have the same level of trail development in more than one alternative See Table IV-16

Table IV-16 Wilderness Trails (Miles) and Anticipated Use (MRVDs)(1) in the 5th Decade

	ALTERNATIVE										
	Existing	NC (2)	A	B	B(Dep)	C	D	E(PA)	F	G	H
Cummins Creek											
Miles	3 0	12 0	12 0	12 0	12 0	26 0	12 0	12 0	26 0	26 0	3 0
MRVDs	1 0	6 7	6 7	6 7	6 7	14 0	6 7	6 7	14 0	14 0	1 0
Drift Creek											
Miles	8 5	8 5	8 5	17 0	17 0	8 5	8 5	15 5	23 0	23 0	8 5
MRVDs	5 5	5 5	5 5	10 4	10 4	5 5	5 5	8 5	13 7	13 7	5 5
Rock Creek											
Miles	0	0	0	0	0	0	0	0	0	15 5	0
MRVDs	0 5	0 5	0 5	0 5	0 5	0 5	0 5	0 5	0 5	9 0	0 5

(1) MRVDs = thousands of recreation visitor days

(2) There were no Wildernesses designated when the TRP was written, so information on planned trail mileage is not available To complete this table it was assumed that Alternative NC would be the same as Alternative A.

Table IV-17 shows the effect of three different levels of trail development (high, moderate and low) on the three Wildernesses. Effects are measured in terms of density of trail development, projected use per trail mile, and projected use overall when the areas are used at planned capacity These figures estimate the development and use of each Wilderness compared with Mt. Jefferson, Mt Washington, and Three Sisters Wildernesses (using average 1980 use figures). When making the comparisons, it should be remembered that the Coast Range Wildernesses have low elevations, and their capacities for use are based on a 365 day season, whereas the other Wildernesses have a much shorter snowfree season

Table IV-17. Relationship between Trail Length, Acreage, and Use in Wildernesses

	Trail Miles	Trail Miles/ 1,000 Acres	RVDs/Mile	RVDs/Acre
Siuslaw Wildernesses, Level of Development				
Cummins Creek				
High	26.0	2.9	537.0	1.5
Moderate	12.0	1.3	555.0	0.7
Low	3.0	0.3	320.0	0.1
Drift Creek				
High	23.0	3.9	596.0	2.3
Moderate	17.0	2.9	611.0	1.8
Low	9.0	1.5	652.0	0.9
Rock Creek				
High	15.5	2.1	580.0	1.2
Moderate	7.0	1.0	593.0	0.6
Low	0	0	N/A	0.1
Other Wildernesses (based on average 1980 use)				
Mt Jefferson	160.0	1.6	555.0	0.9
Mt Washington	27.0	0.6	401.0	0.2
Three Sisters	241.0	1.3	460.0	0.6

It is expected that the effects of recreation development and use would be acceptable even in the alternatives with the highest use

Effects From Activities Outside the Boundary

Activities outside the boundary of a Wilderness have the potential to interfere with preservation of the area's natural conditions, and to reduce feelings of solitude Timber management activities near the boundary could increase exposure to winds and blowdown of trees within the Wilderness; muddy water or avalanche debris when logging operations or road construction are conducted upstream from the Wilderness; wildfire in the Wilderness from an escaped slash fire, smoke from slash burning; noise from logging operations or road construction; and views of clearcuts and roads from within the Wilderness

Effects of activities outside the boundary are more likely for the Drift Creek Wilderness because of the amount of upstream area in private land and in non-Wilderness management areas The Rock Creek and Cummins Creek Wildernesses have boundaries that include more of their headwaters.

Effects from activities outside the Wildernesses are most likely in Alternatives NC, B and B(Dep) since they include more land available for timber harvest Effects would be slightly less in Alternatives

A, and D, and least likely in Alternatives G and H, which have the least land available for timber harvest. Alternatives C, E(PA), F, G and H would provide increased protection for the Drift Creek Wilderness because they manage portions of the surrounding lands as the Drift Creek Adjacent Undeveloped Area.

Cumulative Effects on Wilderness

There are no significant cumulative effects of the alternatives on Wilderness

Consistency with Other Plans and Policies for Wilderness

See the section on Consistency With Plans And Policies Of Other Agencies in this chapter for information

Mitigation Measures for Environmental Effects on Wilderness

Alternatives C and E through H propose all or part of the Drift Creek Adjacent area for undeveloped management. This would mitigate some of the risk to Drift Creek Wilderness from management activities outside the Wilderness boundary

All alternatives would include some degree of mitigation of effects on Wilderness through information and education programs for Wilderness users

Indirect Effects on Other Resources

Vegetation

The environmental consequences of the alternatives on vegetation in Wildernesses are localized trampling and destruction of plants by trail construction and maintenance and by foot traffic near trails and camp sites. These effects vary by alternative and are proportional to the increased length of trail system and increased use of trails and campsites

Additional effects on vegetation could result from human caused fires The risk of human caused fires in Wildernesses is low because access is limited to non-vehicular traffic The risk will increase in proportion to the length of trail in each alternative, assuming uniform use of any trails that are developed. Development of trails will also facilitate control of a fire, if one should start, by providing some access and fuel breaks

Water Quality

Increased recreational use of Wildernesses may result in contamination of water by human wastes in places where people concentrate.

Soil

The environmental consequences of the alternatives on soil in Wildernesses are localized compaction by foot traffic on trails and camp sites and occasional gully erosion along compacted trails and areas where hikers cut through switchbacks These effects vary by alternative and are proportional to the increased length of trail system and increased use of trails and campsites

Fish and Wildlife

There are no significant environmental consequences of the alternatives on fish and wildlife as a result of changes in Wilderness.

Recreation

The effects of the alternatives on recreation in Wilderness are proportional to the amount of trails and campsites proposed in the various alternatives. Development of trail systems in Wildernesses will provide recreation opportunities for people who prefer natural conditions and solitude. (See "Effects on Recreation" for a complete discussion of these effects)

Old Growth

There are no significant environmental consequences of the alternatives on old growth as a result of changes in Wilderness

Cultural Resources

Ground-disturbing activities are preceeded by cultural resource surveys Such activities, except for trail construction, are not allowed in Wildernesses so cultural resources are less likely to be discovered in alternatives that have less trail construction

Research Opportunities

There are no significant environmental consequences of the alternatives on research as result of changes in Wilderness.

Other Components of the Environment

There are no significant environmental consequences of the alternatives on other components of the environment as a result of changes in Wilderness

Assumptions Used to Predict Environmental Consequences on Wilderness

Assumptions for predicting effects on Wilderness include

1 Timber harvest may occur up to the Wilderness boundary, depending on the management objectives of adjacent management areas

2. Human impacts within the Wildernesses will be concentrated on developed trails and campsites.

Incomplete or Unavailable Information on Wilderness

Predictions of effects were made with the most current information available. The following information is either unavailable or incomplete; additional information is needed on these topics·

1. Demand for and use of the Wildernesses

2. Potential for escape of prescribed fires, blowdown, and pest infestations as a result of timber harvest that will be located around the periphery of the Wildernesses

ENVIRONMENTAL CONSEQUENCES ON UNDEVELOPED AREAS

Direct Effects on Undeveloped Areas

An undeveloped condition exists when a large area (usually 2,500 acres or more) of land does not contain any improved roads maintained for highway vehicles and has no noticeable evidence of timber harvest or other permanent alterations Not counting the Wildernesses, an undeveloped condition presently exists in all or part of seven of the roadless areas analyzed in the second Roadless Area Review and Evaluation (RARE II) These areas are:

Hebo-Nestucca	(formerly Hebo 1A)
Drift Creek Adjacent	(remainder of Drift Creek roadless area after designation of Drift Creek Wilderness)
Wassen Creek	(formerly Smith-Umpqua)
Tenmile	
Woahink	
Threemile Lake	(formerly Tahkenitch)
Umpqua Spit	

These seven areas include about 47,000 acres (See Appendix C for a detailed description of the roadless areas and the effects of the alternatives on each)

An undeveloped condition can also be produced by limiting management activities and letting the area revert to a condition where the roads and other past improvements are no longer noticeable. Several roads have been treated this way, and are included within existing undeveloped areas

Tenmile, Woahink, Threemile Lake and Umpqua Spit are in the Oregon Dunes National Recreation Area (NRA). These four would remain undeveloped in all alternatives This means that in all alternatives there would be at least 20,000 acres in an undeveloped condition (not including the Wildernesses)

Part or all of the undeveloped condition in the other three areas would be maintained in Alternatives F, G, and H In addition, by allowing some land that now has harvest units and roads to revert to an undeveloped condition, a new area, North Fork Smith River, would add over 5,800 acres of future undeveloped condition to Alternative H This 5,800 acres includes the Kentucky Falls potential SIA

All the existing and potential undeveloped land would be included in Alternative H (about 37,000 acres in addition to that in the Oregon Dunes NRA) Alternative G also would provide a high amount of undeveloped condition In addition, undeveloped conditions might develop in all alternatives if roads happen to be eliminated in large contiguous spotted owl habitat areas and other lands unsuitable for timber production

In Alternatives NC, A, B, B(Dep), and D, none of the existing or potential undeveloped condition would be maintained other than that in the Oregon Dunes NRA See Table IV-18 for a display of the amount of land in each undeveloped area which is included in the alternatives

Table IV-18. Acres of Proposed Undeveloped Management

		ALTERNATIVE									
	Exist-ing	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Hebo-Nestucca	13,200								4,700	4,700	13,800
Drift Creek Adjacent	5,900					2,600		2,600	6,700 (1)	6,700 (1)	8,200 (1)
Wassen Creek	7,700					4,800		4,700	4,800	9,200 (1)	9,200 (1)
North Fork Smith River											5,800 (1)
Oregon Dunes NRA areas	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
TOTAL	46,800	20,000	20,000	20,000	20,000	27,400	20,000	27,300	36,200	40,600	57,000

(1) Includes land which is presently roaded or developed which would be closed to future development and allowed to revert to an undeveloped condition.

Timber management activities would eliminate unroaded conditions where land has not been allocated to undeveloped management prescriptions. The rate at which undeveloped conditions would be eliminated is contingent on the rate of harvest and the distribution of roads and harvest areas within the area. The FEIS, Appendix C contains projections of the rate of harvest for the Hebo-Nestucca, Drift Creek Adjacent, and Wassen Creek RARE II areas. Even though much of the Hebo-Nestucca area will remain unharvested well into the 3rd decade, roadbuilding and harvest unit dispersion is expected to remove the undeveloped conditions in the 2nd decade in Alternatives A, B, B(Dep), C, D, and E(PA). Alternatives F and G will lose unroaded conditions after the 2nd decade in all but 5,060 acres in the Powder Creek area.

Those portions of the Drift Creek areas overlapped by SOHAs and immediately adjacent to the Drift Creek Wilderness will retain their unroaded condition through the 5th decade in all alternatives, but other portions, not designated unroaded in Alternatives A, B, B(Dep), and D will begin to lose their unroaded condition in the 1st decade as additional roads are built and timber is harvested.

The underlying Spotted Owl Habitat Areas (SOHAs) in the Wassen Creek area will result in the maintenance of unroaded conditions in most of that area through the 5th decade in all alternatives.

Cumulative Effects on Undeveloped Areas

Since undeveloped areas on lands of other ownerships are limited, cumulative effects on undeveloped areas are confined to actions taken by the Forest and BLM. The primary cumulative effect of actions which would change unroaded areas to a roaded, and presumably harvested, condition is a loss of recreational opportunities (primarily semi-primitive non-motorized) in the areas. Effects would be extreme if all agencies were to reduce or eliminate undeveloped conditions on the lands they manage.

Consistency with Other Plans and Policies for Undeveloped Areas

See the section on Consistency With Plans And Policies Of Other Agencies in this chapter for information

Mitigation Measures for Environmental Effects on Undeveloped Areas

On lands that are managed for their undeveloped condition, ground disturbing activities, which would affect the undeveloped characteristics are not planned On lands that are not allocated to undeveloped management, no mitigation is planned to maintain the undeveloped character and it would gradually be lost as roads and timber harvest activities are implemented

Indirect Effects on Other Resources

Undeveloped areas meet the minimum requirements for future Wilderness consideration by Congress Alternatives which do not designate all the potential undeveloped areas would reduce the opportunities for Congress to add new areas to the National Wilderness Preservation System.

The environmental effects of designating undeveloped areas on other components of the environment are minimal. See FEIS Appendix C for more discussion of effects on the physical environment Economic and social effects are incorporated in the discussion in FEIS Chapter IV, "Environmental Consequences of the Alternatives on Communities"

Assumptions Used to Predict Environmental Consequences on Undeveloped Areas

Assumptions for predicting effects on undeveloped areas include:

1 No more undeveloped areas will be found
2 Timber management activities and associated road construction will eliminate areas from being classified as undeveloped until the evidence of those activities is essentially gone
3 Timber harvest will occur in immediately adjacent areas, depending on the management objectives of adjacent management areas
4 Human impacts within undeveloped areas will be concentrated on developed trails and campsites

Incomplete or Unavailable Information on Undeveloped Areas

Predictions of effects were made with the most current information available. The following information is either unavailable or incomplete, additional information is needed on these topics.

1 Demand for and use of the undeveloped areas
2. Potential for escape of prescribed fires, blowdown, and pest infestations as a result of timber harvest that will be located around the periphery of undeveloped areas

ENVIRONMENTAL CONSEQUENCES ON WILD AND SCENIC RIVERS

Direct Effects on Wild and Scenic Rivers

All alternatives will manage eligible Wild and Scenic Rivers (W&SR) in the same manner FEIS, Appendix L describes the process used to determine which Forest rivers have outstandingly remarkable features and are eligible for consideration as W&SRs Rivers found to be eligible will be managed in such a way that their eligibility is not reduced. None of the alternatives would have any direct effects on the rivers that were found to be eligible: Nestucca, Alsea, Siuslaw, Drift Creek (Siletz), North Fork Smith, Wassen Creek, Umpqua.

A full eligibility evaluation was not done for the Siltez River, Lake Cr, Lower Siuslaw River and Smith River. These rivers must be managed as if they are eligible so that W&SR options are protected until an eligibility determination is completed. There will be no direct effects on these rivers in any of the alternatives.

Rivers found to be ineligible (Little Nestucca River and Three Rivers) will receive no special management with respect to the W&SR act Because they are not eligible, they have no W&SR characteristics to be affected by any of the alternatives

Cumulative Effects on Wild and Scenic Rivers

No cumulative effects on potential Wild and Scenic Rivers are anticipated because eligibility is maintained on all rivers found to be eligible and on all rivers where an eligibility determination has not been completed

Consistency with Other Plans and Policies for Wild and Scenic Rivers

The Forest is awaiting eligibility evaluations by other agencies with responsibility under the W&SR act (e g., BLM for Wassen Creek) before proceeding with a suitability determination Some rivers (e.g., Drift Creek of the Siletz) are entirely on National Forest land and suitability determinations will proceed on these rivers. Coordination with appropriate agencies will take place for the rivers for which an eligibility determination was not completed In all cases, the Forest will coordinate the suitability determinations with appropriate County Comprehensive Plans to ensure consistency with State Land Use Goals.

Mitigation Measures for Environmental Effects on Wild and Scenic Rivers

The standards and guidelines require that eligibility be maintained for all rivers that have been found eligible and all rivers for which an eligibility evaluation was not completed This will avoid any adverse effects to W&SR.

Indirect Effects on Other Resources

Maintaining W&SR eligibility for the Drift Creek (Siletz), North Fork Smith River, and Wassen Creek will have a slight indirect effect on vegetation since portions of these streams are eligible for either "Scenic" or "Wild" classification. Timber harvest activities may be slightly modified in order to maintain the eligibility of these three rivers. Maintaining eligibility for the other W&SR will have no indirect effects on other resources as they all qualify for "Recreational" classification and current activities in the river corridors will not affect their eligibility

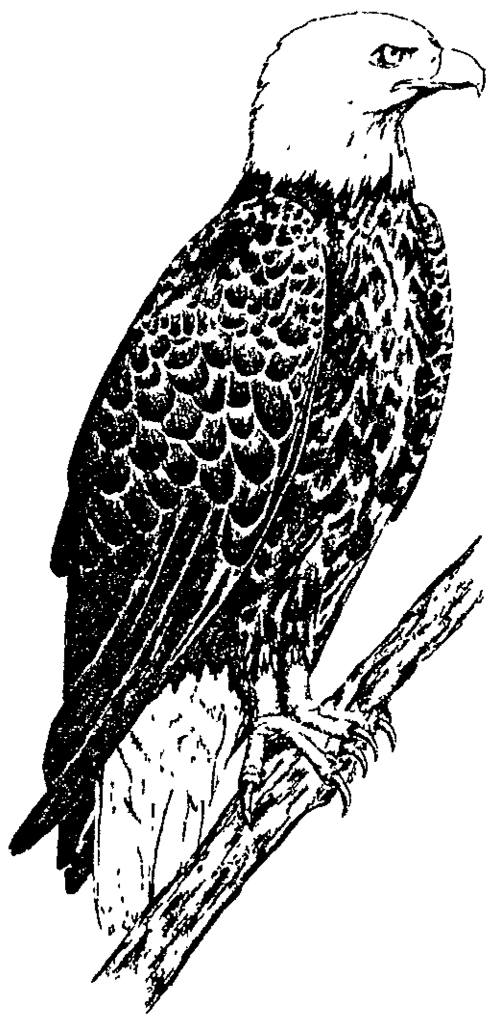
Assumptions Used to Predict Environmental Consequences on Wild and Scenic Rivers

Assumptions for predicting effects on W&SRs include:

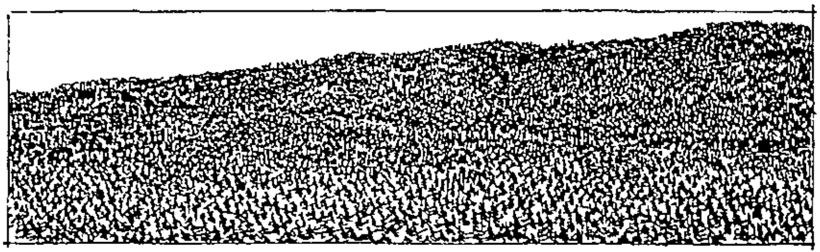
1 No more potentially eligible W&SRs will be found.
2 Timber management activities and other activities will not affect the "recreational" classification on rivers eligible for that designation

Incomplete or Unavailable Information on Undeveloped Areas

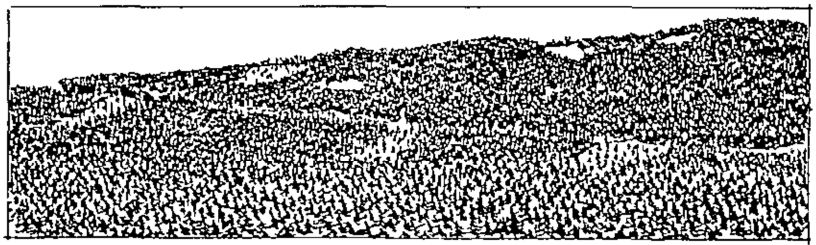
All information necessary to evaluate eligibility for rivers with a significant component of National Forest system land adjacent to the river was available.



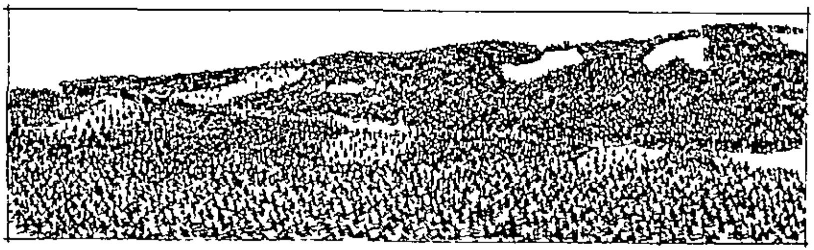
VISUAL QUALITY OBJECTIVE CATEGORIES



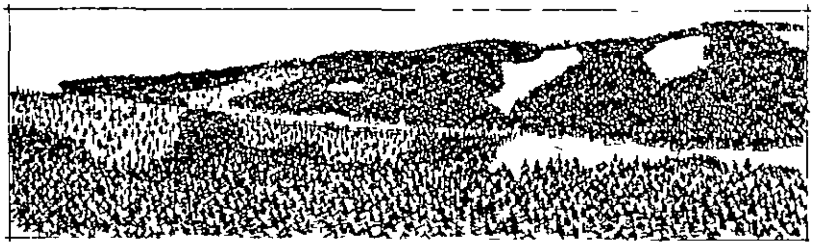
Natural — PRESERVATION



Natural Appearing — RETENTION



Slightly Altered — PARTIAL RETENTION



Moderately Altered — MODIFICATION

Heavily Altered — MAXIMUM MODIFICATION

ENVIRONMENTAL CONSEQUENCES ON SCENERY (VISUAL QUALITY)

Direct Effects on Scenery

Effects on 574,000 acres of scenery depend upon the resource objectives of each alternative Of particular importance is the amount of protection planned for important viewsheds seen from roads, rivers, or recreation sites.

Effects on the remaining 57,000 acres of scenery would not vary by alternative because they are largely in areas established by Congress: Rock Creek, Cummins Creek and Drift Creek Wildernesses; the Oregon Dunes National Recreation Area; and the Cascade Head Scenic-Research Area, which includes Neskowin Crest Research Natural Area Also included is Flynn Creek Research Natural Area, established by the Chief of the Forest Service.

Two major factors determine the quality of a landscape: the variety of features such as land form, water bodies and vegetation; and, the degree to which the natural appearance is altered

Effects on scenery are presently measured by the degree of change from its natural appearance On the Forest, such changes are primarily the result of clearcutting and associated road construction Therefore, management areas in which timber harvesting is prohibited generally would have a natural or lightly altered appearance Management areas in which timber harvesting is permitted usually would not appear natural In some cases, however, timber harvesting has little effect on the scenery because of particular location and design of individual harvest units.

Effects of the alternatives on visual quality are considered from the overall, Forestwide perspective, and the perspective of important viewsheds.

Forest-wide Appearance

Forest-wide visual quality is the appearance of the Forest as it might be seen from an airplane or from high points on the Forest Unlike for the viewsheds, there are no specific locations from which to judge such visual quality Forest-wide effects are the extent to which the overall appearance deviates from natural. This would vary by alternative, with Alternative H being the most natural, and Alternatives B and B(Dep) the most heavily altered (See Table IV-19 for the percentage of the Forest which would have a natural, lightly altered, and heavily altered appearance in each alternative)

Alternative H

Alternative H would provide the most natural appearing landscapes because it would include the least area suitable for timber production - about 133,000 acres In Alternative H

a Approximately 75,000 acres would be in areas with a natural appearance, such as Wilderness or undeveloped areas

b At least 151,000 acres would have a lightly altered appearance This would include smaller blocks of land which are unsuitable for timber production, such as spotted owl and bald eagle habitat areas, old growth, Special Interest Areas, and domestic watersheds In these areas, the signs of activities would be evident, but a natural forest character would dominate Because each spotted owl habitat area would be 2,000 acres, and roads through some of them may be eliminated, part of this area may appear natural, rather than lightly altered.

c. The 133,000 acres suitable for timber production would have a heavily altered appearance dominated by the mosaic pattern of clearcuts.

d. It is not clear how the remaining acres would appear. These would be unlogged areas intermingled with areas suitable for timber production, including the numerous areas where the vegetation would be left intact to protect watersheds. Where these areas would be small and intermingled with clearcut units, the units would dominate and the appearance would be heavily altered Where the unharvested areas are contiguous, there may be a lightly altered or natural appearance The latter is likely in many parts of the Forest, so it is estimated that about two-thirds of the Forest (over 400,000 acres, instead of the 226,000 acres described in a and b above) would probably have a lightly altered or natural appearance (The harvest of timber stands at 130-year or more intervals would also help protect the scenery)

Alternative G

a. Approximately 62,000 acres would be in areas with a natural appearance, such as Wilderness or undeveloped areas

b. At least 81,000 acres would have a lightly altered appearance These areas are similar to those described under b in Alternative H, but there would be less acreage in Alternative G.

c. The 183,000 acres suitable for timber production would have a heavily altered appearance

d. For the reasons described under item "d" in Alternative H, it is predicted that about half the Forest (or about 316,000 acres, instead of the 143,000 acres discussed in a and b above) would be natural or lightly altered in Alternative G

Alternatives B and B(Dep)

The Forest's natural appearance would be most heavily altered in Alternatives B and B(Dep), due to the large area suitable for timber production - about 403,000 acres. In these alternatives:

a. About 37,000 acres in Wilderness and undeveloped areas would appear natural

b. About 65,000 acres would have a lightly altered appearance.

c. About 525,000 acres would have a heavily altered appearance Areas of vegetation left undisturbed to protect water and fish resources would be too small and interspersed among the clearcuts to offset the mosaic pattern of clearcuts

Alternatives A, C, D, E (PA) AND F

From a Forest-wide appearance standpoint, these alternatives are similar to Alternatives B and B(Dep) See Table IV-19.

Table IV-19 Visual Appearance of the Forest in the 5th Decade

	ALTERNATIVE									
Percent of Forest	**NC**	**A**	**B**	**B(Dep)**	**C**	**D**	**E(PA)**	**F**	**G**	**H**
Natural Appearance	6%	6%	6%	6%	7%	6%%	8%	9%	20% (1)	22% (1)
Lightly Altered Appearance	6%	11%	10%	10%	10%	10%	10%	11%	30% (1)	45% (1)
Heavily Altered Appearance	88%	83%	84%	84%	83%	84%	82%	80%	50%	33%

(1) As explained in item "d" of Alternative H, above, it is estimated that in Alternative H, approximately two thirds of the Forest would have a natural or lightly altered appearance, and one third would have a heavily altered appearance In Alternative G, it is estimated that approximately half of the Forest would have a natural or lightly altered appearance and half would have a heavily altered appearance

Appearance of Sensitive Viewsheds

Landscapes often seen by the public, such as from a road, river, or recreation site, have greater value than the scenery on the rest of the Forest, and are called sensitive viewsheds The appearance of viewsheds significantly affects the recreational experience of those viewing it

About 81,000 acres of Forest land are within 33 sensitive viewsheds The Visual Management System (VMS) recommends that the landscapes in the 10 most sensitive viewsheds (Level 1), have a natural appearance In the 23 less sensitive viewsheds (Level 2), a natural appearance should dominate the foreground, while the area beyond the foreground may be moderately altered The extent to which the VMS recommendations would be met by each alternative in sensitive viewsheds are displayed in Table IV-20

DEFINITIONS OF EXPECTED VISUAL CONDITIONS FOR VIEWSHEDS

Natural Appearance - viewsheds with a VQO of Preservation

Slightly Altered Appearance - viewsheds with a VQO of either Retention for part of the area and Partial Retention for the remainder, or Partial Retention for the whole viewshed

Moderately Altered Appearance - viewsheds with VQOs of Partial Retention and Modification for various parts

Heavily Altered Appearance - viewsheds with a VQO of Modification for all, or Maximum Modification for all or part of the area

See the Glossary for definitions of the visual quality objectives

In the following table, the expected visual condition of the 33 sensitive viewsheds is displayed for each alternative except Alternative NC The Timber Resource Plan (TRP) on which Alternative NC is based did not identify which viewsheds would receive protection of visual quality

Table IV-20. Expected Viewshed Appearance

VIEWSHEDS	Total		Expected Future Condition of Alternative (1)				
	Acres	Existing	NC (2)	A	B	B(Dep)	C
Sensitivity Level 1							
Highway 101 - Coastal	4,286	••		••	••••	••••	••
Highway 101 - Hebo	6,294	•••		••	••••	••••	••
Highway 38	2,609	••		••••	••••	••••	••
Highway 34	7,689	••		••	••••	••••	•••
Highway 18	1,836	••		••	••••	••••	•••
Highway 126 (3)	1,532	••••		••••	••••	••••	•••
Three Capes Road	3,154	••••		••	••••	••••	•••
Marys Peak Road	6,254	••		•••	••••	••••	•••
Mercer Road	54	••		••••	••••	••••	•••
Highway 36 (3)	4,128	••		••••	••••	••••	•••
Sensitivity Level 2							
Highway 22	3,256	•••		•••	••••	••••	•••
Mt Hebo Road	1,710	••		•••	••••	••••	•••
Smith River Road	1,426	••		••••	••••	••••	•••
Five Rivers Road	4,261	•••		•••	••••	••••	••••
Yachats River Road	3,435	•••		•••	••••	••••	••••
Sand Beach Road	2,413	•••		•••	••••	••••	••••
Nestucca River Road	2,620	•••		•••	••••	••••	••••
Little Nestucca River Road	2,913	••		•••	••••	••••	••••
North Fork Siuslaw River Road	4,098	••		••••	••••	••••	••••
Canal Creek Road	786	••		•••	••••	••••	••••
Canal Creek Campground	45	••		•••	••••	••••	••••
Harlan Road	1,272	•••		•••	••••	••••	••••
North Fork Smith River Road	1,847	••		••••	••••	••••	••••
Fall Creek Road	566	••		•••	••••	••••	••••
Canary-Ada Road	1,235	••		••••	••••	••••	••••
Lobster Creek Road	2,698	•••		•••	••••	••••	••••
Big Elk Campground	24	••		•••	••••	••••	••••
Elk Creek Road	1,474	••		•••	••••	••••	••••
Deadwood Creek Road	1,293	•••		••••	••••	••••	••••
Linslaw Road	361	•		••••	••••	••••	••••
Highway 229	416	••		•••	••••	••••	••••
Indian Creek Road	3,768	•••		••••	••••	••••	••••
Sweet Creek Road	1,456	•••		••••	••••	••••	••••

(1) Key Existing and expected viewshed conditions •= natural appearing; ••= slightly altered, •••= moderately altered, ••••= heavily altered
(2) Data for Alternative NC is not available, see preceeding text
(3) Includes acres from East & West Mapleton Roads, which will be managed for modification in foreground and middleground

Table IV-20 Cont. Expected Viewshed Appearance

VIEWSHEDS	Total		Expected Future Condition of Alternative (1)				
	Acres	Existing	D	E(PA)	F	G (4)	H
Sensitivity Level 1							
Highway 101 - Coastal	4,286	••	••	••	••	••	•
Highway 101 - Hebo	6,294	•••	••••	••	••	••	•
Highway 38	2,609	••	••••	••	••	••	•
Highway 34	7,689	••	••••	••	••	••	•
Highway 18	1,836	••	••••	••	••	••	•
Highway 126 (3)	1,532	••••	••••	••	••	••	•
Three Capes Road	3,154	••••	••••	•••	••	••	•
Marys Peak Road	6,264	••	••••	••	••	••	•
Mercer Road	54	••	••••	•••	••	••	•
Highway 36 (3)	4,128	••	••••	•••	•••	••	•
Sensitivity Level 2							
Highway 22	3,256	•••	••••	•••	•••	•••	••••
Mt Hebo Road	1,710	••	••••	•••	•••	•••	••••
Smith River Road	1,426	••	••••	••••	•••	•••	••••
Five Rivers Road	4,261	•••	••••	••••	•••	•••	••••
Yachats River Road	3,435	•••	••••	••••	•••	•••	••••
Sand Beach Road	2,413	•••	••••	•••	•••	•••	••••
Nestucca River Road	2,620	•••	••••	•••	•••	•••	••••
Little Nestucca River Road	2,913	••	••••	•••	•••	•••	••••
North Fork Siuslaw River Road	4,098	••	••••	••••	•••	•••	••••
Canal Creek Road	786	••	••••	••••	•••	•••	••••
Canal Creek Campground	45	••	••••	•••	•••	•••	••••
Harlan Road	1,272	•••	••••	••••	•••	•••	••••
North Fork Smith River Road	1,847	••	••••	••••	•••	•••	••••
Fall Creek Road	566	••	••••	••••	•••	•••	••••
Canary-Ada Road	1,235	••	••••	••••	•••	•••	••••
Lobster Creek Road	2,698	•••	••••	••••	•••	•••	••••
Big Elk Campground	24	••	••••	•••	•••	•••	••••
Elk Creek Road	1,474	••	••••	••••	•••	•••	••••
Deadwood Creek Road	1,293	•••	••••	••••	••••	•••	••••
Linslaw Road	361	•	••••	••••	••••	•••	••••
Highway 229	416	••	••••	•••	••••	•••	••••
Indian Creek Road	3,768	•••	••••	••••	••••	•••	••••
Sweet Creek Road	1,456	•••	••••	••••	••••	•••	••••

(4) Alternative G incorporates the viewshed appearance which would be expected from meeting the level of scenic protection recommended by using the process in "Agriculture Handbook Number 462, The Visual Management System "

Table IV-21 is a summary of the previous table and shows how many of the sensitive viewsheds would be in each of the categories. No information is available for Alternative NC.

Table IV-21. Number of Viewsheds Expected to be in Each Visual Condition Category

		ALTERNATIVE								
	Existing	A	B	B(Dep)	C	D	E(PA)	F	G	H
Natural Appearance	1									10
Slightly Altered Appearance	19	5			3	1	7	10	10	
Moderately Altered Appearance	11	16			10		11	18	23	23
Heavily Altered Appearance	2	12	33	33	20	32	15	5		

Overall Visual Quality

The effects on Forest-wide conditions and viewsheds are not the same in each alternative, so it is difficult to judge the overall visual quality of an alternative Table IV-22 illustrates a composite visual quality index for each alternative. This is the average of the percent of the Forest with a natural and slightly altered appearance and the percent of the scenic viewsheds with Visual Quality Objectives (VQOs) of preservation, retention, and partial retention A higher visual quality index number indicates that the alternative protects more visual values, overall

Table IV-22. Composite Visual Quality Index for Overall Visual Quality of the Alternatives

		ALTERNATIVE									
	Existing	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Percent of Forest Lightly Altered or Natural Appearance	34%	12%	17%	16%	16%	17%	16%	18%	20%	50% (1)	67% (1)
Percent Viewshed Acres with VQOs of Preservation, Retention, or Partial Retention	44%	(2)	44%	0%	0%	31%	5%	49%	66%	74%	74%
Visual Quality Index	39	(2)	31	8	8	24	10	34	43	62	71

(1) Estimate

(2) Documentation for the Timber Resource Plan on which Alternative NC is based suggests that 17 to 91 percent of the viewshed would have retention or partial retention A value of 50%, similar to Alternative A and existing condition, is probably reasonable, and the visual quality index would be 28

Cumulative Effects on Scenery

The above predictions of effects apply only to Forest land within the viewsheds. Other parts of the viewsheds are often privately owned Timber management activities on private lands usually do not comply with objectives recommended by the VMS, so these areas may be heavily altered, while the Forest Service may be trying to provide a more natural appearance Where this occurs, the cumulative effect would be a more altered appearance than predicted. However, with careful design and scheduling, Forest Service harvest units can be used to mitigate the effect of cutting on private land by eliminating straight lines and square corners.

Consistency with Other Plans and Policies for Scenery

See the section on Consistency With Plans And Policies Of Other Agencies in this chapter for information

Mitigation Measures for Environmental Effects on Scenery

As noted in the Cumulative Effects Section, the best ways to mitigate the adverse effects of timber harvest activities are to design the harvest units to eliminate straight lines, square corners, and the like Other mitigation measures used to maintain or improve visual quality include locating activities where they will be screened from Forest visitors, designing activities so the appearance harmonizes with natural conditions or is otherwise inconspicuous, and assuring that colors resulting from an activity do not contrast with the surroundings. (See FEIS, Chapter II, "Mitigation")

Indirect Effects on Other Resources

Vegetation, Water Quality, Soil, Fish, and Wildlife

Harvesting activities, designed to maintain a visual management objective, will effect vegetation, water quality, soil, fish, and wildlife. The impacts will be generally less than harvest activities where wood fiber production is the primary objective. See the appropriate sections in this chapter for a discussion of the effects of harvesting

Recreation

Scenery protected within a viewshed will usually enhance recreational experiences

Wilderness, Undeveloped Areas, and Old Growth

There are no effects on old growth, Wilderness, or undeveloped areas as a result of changes in scenery

Community and Social

Scenery protected within scenic viewsheds will usually enhance recreational experiences and improve the local tourist trade Conversely, protecting scenery may affect timber harvest levels slightly and have an effect on the timber related portion of the local economy

Remainder of the Environmental Components

There are no effects on the remainder of the environmental components as a result of changes in scenery.

Assumptions Used to Predict Environmental Consequences on Scenery

Assumptions for predicting effects on scenery include:

1. It is physically and operationally possible to locate and design timber harvest units and roads so that harvesting the programmed acreage and volume of timber can be done within the limits of visual alternation specified.

2. The calculated time required for a harvested area to pass from one visual condition to another is correct.

3. The visual condition classes described pertain to National Forest land only

Incomplete or Unavailable Information on Scenery

Predictions of effects were made with the most current information available The following information used to predict those effects is either unavailable or incomplete; additional information is needed on these topics:

1. The percent of each viewshed owned by others

2 The effects on scenery of wildfire, windthrow, and pest outbreaks

3 The amount and rate of future harvest on private lands within scenic viewsheds

ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES ON RESEARCH

Direct Effects on Research

Opportunities for research on natural forest systems would be reduced most by Alternatives NC, A, B, B(Dep) and C because they would require extensive vegetation disturbance to emphasize production of elk and timber, and economic efficiency

Alternatives that emphasize undeveloped recreation, spotted owl and fish habitat, and protection of watersheds and scenery (Alternatives F, G, and H) would maintain more opportunities for research on natural systems, because vegetation disturbance would not be allowed on large areas In addition, management areas for bald eagles, spotted owls, and undeveloped recreation in some alternatives would at least partially include specific areas proposed as Research Natural Areas (RNAs) or identified as having special research values. Effects of Alternatives D and E(PA) would be intermediate

There are several areas with research values which would not be affected by the alternatives The following would be managed under existing plans which largely protect the existing research values

1. Rock Creek Wilderness
2. Cummins Creek Wilderness
3 Drift Creek Wilderness
4. Flynn Creek RNA
5 Cascade Head area of the Hebo Ranger District, including
   a Cascade Head Experimental Forest
   b Neskowin Crest RNA
   c Other portions of Cascade Head Scenic-Research Area
6 Undeveloped status of the potential Threemile Lake and Tenmile Creek RNAs

Effects of Alternatives on Potential Research Natural Areas

Cummins/Gwynn Creek - The Cummins Creek/Gwynn Creek area has several aquatic and terrestrial systems of high scientific value One is Cummins Creek itself, which is an undisturbed anadromous fish stream flowing through both Sitka spruce/western hemlock and Douglas-fir forests. Undisturbed vegetative communities not available for research elsewhere in the central to northern Coast Range are western hemlock/swordfern, old-growth Douglas-fir and western hemlock/swordfern, and old-growth Douglas-fir and western hemlock/Oregon grape The land is steep, highly dissected, and very unstable About 1000 of the 4800 acres of the site are currently protected from timber harvest as part of the Cape Perpetua Scenic Area The remainder is in the Cummins Creek Wilderness

Alternatives E(PA) and H would designate the Cummins/Gwynn Creek area as a potential RNA Opportunities for research relative to the wild fish populations and vegetative communities would be preserved Examples of common natural earthflow phenomena would also be maintained for research purposes

Alternatives NC, A, B, B(Dep), C, D, F, and G would not designate the Cummins/Gwynn Creek area as a potential RNA In order to understand the environmental consequences of this action, the Cummins Creek and Gwynn Creek portions should be considered separately

Cummins Creek - This portion is in the Cummins Creek Wilderness Not designating it for RNA purposes in Alternatives NC, A, B, B(Dep), C, D, F, and G would have little or no immediate impact on the inherent scientific values All natural systems and processes, both aquatic and terrestrial, would remain largely intact under Wilderness management and the associated low levels of other uses. In view of the large size of the streams and vegetative ecosystems to be preserved, it is unlikely that even trail development would have a significant effect.

Gwynn Creek - Of the eight alternatives that do not designate a potential RNA, five (A, C, D, F, and G) would preserve a 1960-acre Cape Perpetua Scenic Area The 1000-acre Gwynn Creek portion of the RNA in question would be protected in the larger Scenic Area An intact forest is the key component of the ecosystem, so damage to the inherent scientific values would be unlikely. The stand of old growth, in particular, is very remote and there is little chance of significant impacts from recreation or other non-timber uses.

Alternatives B and B(Dep) would preserve a 160-acre Cape Perpetua Scenic Area which does not include the potential Gwynn Creek RNA. Thus, the old-growth stand and the rest of the potential RNA would be available for timber harvest. Removal of the trees would alter the natural systems and processes and abruptly destroy the scientific values. Alternative NC would preserve 990 acres of Scenic Area, which would include about 200 acres of the RNA.

Reneke Creek - The most notable scientific feature of the Reneke Creek area is an ecosystem dominated by red alder that is drained by two matched perennial streams These streams would be particularly useful for studying nutrient cycling in a deciduous forest. The research values have been protected under administrative status since 1978 as part of the Hebo Planning Unit

Alternatives B, B(Dep), C, and D would not protect the potential RNA at Reneke Creek. Timber harvest of part of the area would remove the natural stand of red alder and otherwise alter the aquatic and terrestrial systems and processes so that they would have little value as baselines for scientific study.

Alternatives NC, A, E(PA), F, G, and H would protect the potential RNA from timber harvest This action would clearly maintain the scientific values since the brushy terrain would prevent significant impacts from other uses.

Sand Lake - The most notable scientific features of the Sand Lake area are massive, active parabola sand dunes that extend almost four miles inland from the ocean About 240 acres of the most inland dunes and adjacent forest with old-growth trees make up the potential RNA Some of these large trees, but little of the actual dunes of interest, are protected by a 40-acre bald eagle management area present in all alternatives.

Alternatives NC, A, B, B(Dep), C, and F would not designate a potential RNA at Sand Lake Although the area of concern is still relatively intact because of closures and inaccessability, it could be vulnerable to damage from heavy recreational use Of particular concern is ORV activity, which has already altered much of the natural vegetation elsewhere in the dune system at Sand Lake (Wiedemann 1984). Disturbance and loss of vegetation on the potential RNA would destabilize the dunes. Loss of scientific values would probably occur gradually as recreational use increases in the area

Alternatives D, E(PA), G, and H would designate an RNA at Sand Lake and prohibit any development or heavy use of the area for purposes other than research. Because of the vulnerability of the area to unintended impacts, however, construction of fences and purchase of adjacent land by The Nature Conservancy or other special measures may also be needed to truly protect the scientific values from damage by ORV use

Cumulative Effects on Research

Regardless of the alternative, the effect of forest activities on research opportunities on natural systems becomes more critical when the greater rate of loss of such natural systems on adjacent privately-owned land is considered. If trends continue, most of the natural systems needed for RNAs will be found only on National Forest lands.

Consistency with Other Plans and Policies for Research

Areas such as Wassen Creek, Lily Lake, and Table and Euchre Mountains, which are deemed worthy of preservation for research purposes by the Oregon Natural Heritage Program (ONHP) (ORS 273 576, ONHP Data Base 1985), are not considered for RNA status in any alternative They may, however, be somewhat protected by management for other resources Other ONHP recommended sites such as Gwynn Creek, Reneke Creek, and Sand Lake are proposed for RNA study in some alternatives but not others. Alternatives which do not propose the study of all potential RNAs [all except E(PA) and H] are inconsistent with national and regional plans for the RNA system (USDA Forest Service 1984d), which identified the need for studying all potential RNAs and preserving specific needed ecosystems found there.

Mitigation Measures for Environmental Effects on Research

Standards and Guidelines will ensure that active research projects will not be adversely affected by other management actions Research activities into natural processes will be designed to be unobtrusive in some management areas

Indirect Effects on Other Resources

Vegetation

Productivity and natural genetic composition of vegetation in RNAs would be maintained The vegetation occupying these areas would grow without any human influence on the species composition or stand characteristics that develop. Because RNAs are undisturbed, fuel loading and risk of wildfire may increase Permitting fire to run its course inside RNAs could endanger other resource values outside

Watersheds

High quality water and fish habitat are maintained in RNAs (See "Environmental Consequences of the Alternatives on Watersheds" and "Environmental Consequences of the Alternatives on Fish" for a complete discussion of these effects).

Recreation

Motorized or developed use would be prohibited within RNAs (see "Environmental Consequences of the Alternatives on Recreation" for a complete discussion of these effects)

Scenery

The existing scenery would be retained (see "Environmental Consequences of the Alternatives on Scenery" for a complete discussion of these effects)

Wildlife

Wildlife most adversely affected by RNAs would be species dependent on early successional stages Wildlife most dependent on mature and older forest successional stages would benefit most from RNAs (see "Environmental Consequences of the Alternatives on Wildlife" for a complete discussion of these effects)

Communities

RNAs do not make a direct economic contribution to local communities in the short run However, information and understanding of the ecology of forest systems gained through research in those areas could increase abilities to produce greater economic and aesthetic values on the remainder of the Forest over the long run.

Air Quality

RNA management would not affect air quality because activities that create large amounts of air pollution are prohibited (see "Effects on Air Quality" for a complete discussion of these effects).

Insects and Diseases

Insects and diseases would develop naturally Epidemics or root rots that do get started would not be controlled unless they jeopardize resource values outside the RNAs

Cultural Resources

RNA management prohibits land-disturbing activities, so cultural resources would not be inadvertently destroyed. On the other hand, intensive excavations would not be allowed, so any buried cultural resources would not be found

Other Environmental Components

The effects of the alternatives on research opportunities would have no indirect effects on other environmental components.

Assumptions Used to Predict Environmental Consequences on Research

One assumption for predicting effects on research is that few additional areas with high research values will be discovered to offset any losses in known areas. Intact natural systems are in short supply

Incomplete or Unavailable Information on Research

The predictions of effects were made with the most current information available More detailed information on priorities of the Oregon Natural Heritage Program is needed to more accurately predict effects on that program.

ENVIRONMENTAL CONSEQUENCES ON COMMUNITIES

Direct and Indirect Effects on Communities

The major effects of the alternatives on local communities would be changes in economic opportunities associated with Forest resources and changes in the quality of amenities like scenery, fishing and firewood gathering. Economic opportunities are examined by considering the amount of money which would be paid from Forest receipts to counties and changes in employment and income levels resulting from changes in Forest outputs, receipts and expenditures These factors, along with less quantifiable measures of changes in amenity values are considered in examining the effect of the alternatives on lifestyles and community structure.

In general, the effects of the alternatives are determined by comparing projected conditions in the next decade to average conditions from the past 5 and 10 years The baseline from which social and economic changes are measured is an estimate of the present contribution of Forest activities and outputs to local communities. This baseline is intended to represent the average level of activitiies and outputs from the Forest

The social analysis focuses on economic changes during the 1st decade within communities in the 8 counties surrounding the Forest Most of these changes are expected to result from variations in the amount of timber harvested on the Forest, because of the timber economy ties between the Forest and the surrounding communities Recreation opportunities and wildlife and fish habitat are also important in terms of jobs, but their impact on the local economy would not become apparent until later decades In the 1st decade, the quality and location of recreation use is projected to differ only slightly among the alternatives

See Chapter III, "Social and Economic Setting" section for a description the existing conditions and Appendix B, "Social and Economic Impact Analysis" section for a description of the assumptions and analysis procedures.

Payments to Counties

Twenty-five percent of the gross receipts collected on the Forest are distributed to counties for school and road programs. These payments are projected for each alternative based on the receipts from future timber sales and fees from mineral leases, livestock grazing permits, campground users and special use permits Most of the effects of changes in payments would be in Douglas, Lane, Lincoln, and Tillamook counties which receive 92% of the payments The remaining 8% would be to Benton, Coos, Polk and Yamhill counties Changes in the amount of money paid to counties would change both the amount of money available for road and school programs and the tax burden on local residents

The differences in payments to counties among alternatives would be primarily due to differences in the amount of timber harvest Timber harvest in the 1st decade would range from 80 MMCF/year in Alternative B(Dep) to 13 5 MMCF/year in Alternative H. Alternative E(PA) would harvest 61 MMCF/year of timber in the 1st decade (see Chapter II for more detailed information on timber harvest by alternative)

The annual payments to counties in the 1st decade are projected to range from $4 million (adjusted for inflation to 1982 dollars) for Alternative H to $23 million for Alternative B(Dep) (Figure IV-12). Payments for Alternative E(PA) are projected to be $18 million/year Payments in the 1st decade in all alternatives except G and H are expected to be higher than the average 1979-1988 payments of $12 million.

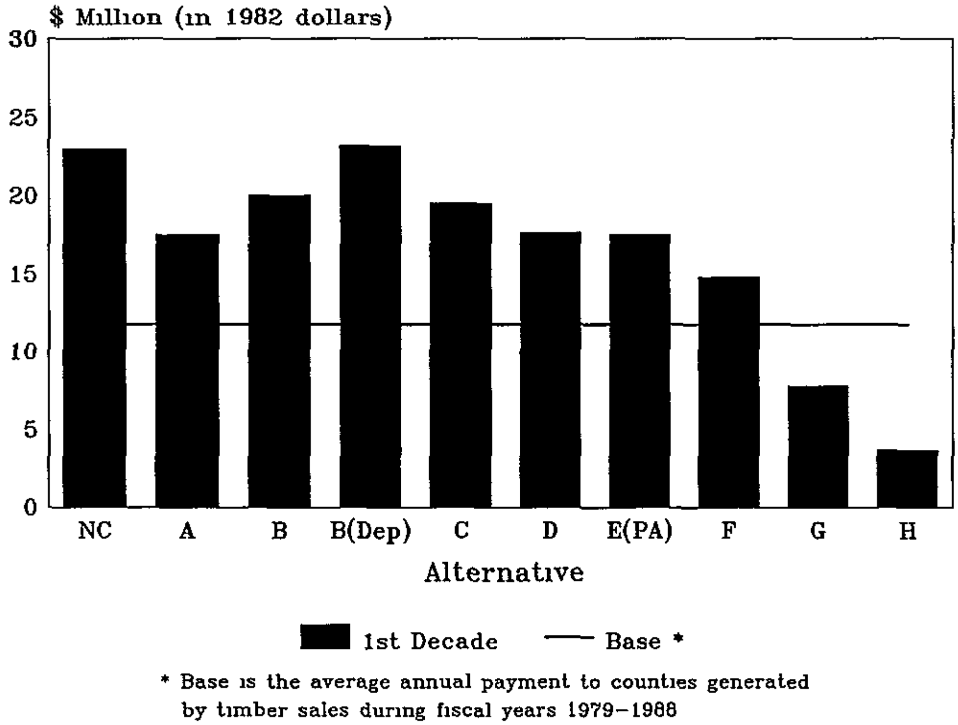


FIGURE IV-12. 1st DECADE PAYMENTS TO COUNTIES

Employment and Income

Changes in Forest outputs which support local industries, payments to counties, and costs to operate the Forest (expenditures for salaries, services and supplies) would result in changes in employment and income in local communities. These changes are projected for the 1st decade for the 8 counties surrounding the Forest, and are based on the expected level of timber harvest, recreational use, wildlife and fish habitat, payments to counties, and Forest Service expenditures The projections include both the direct effects that changes in Forest outputs would have on jobs and income in the lumber and wood products, tourist, and fishing industries, and the indirect effects in all sectors of the local economy. The projections are based on the Siuslaw IMPLAN model The estimates have not been adjusted to account for recent advancements in sawmill technology Details of the IMPLAN model are provided in Appendix B, "Economic Impact Model "

Changes in jobs dependent on Forest outputs and activities relative to the present contribution of 7,800 jobs are projected to range from a 44% increase in Alternative B(Dep) to a 46% decrease in Alternative H (Figure IV-13). Changes in employees' income dependent on Forest outputs and activities relative to the current contribution of $153 million are projected to range from a 57% increase in Alternative B(Dep) to a 47% decrease in Alternative H (Figure IV-12). The alternatives which would contribute the most jobs and income in the 1st decade are B(Dep) and NC Alternatives G and H would initiate decreases in jobs and income The expected changes for the other alternatives range from -28 to +35%.

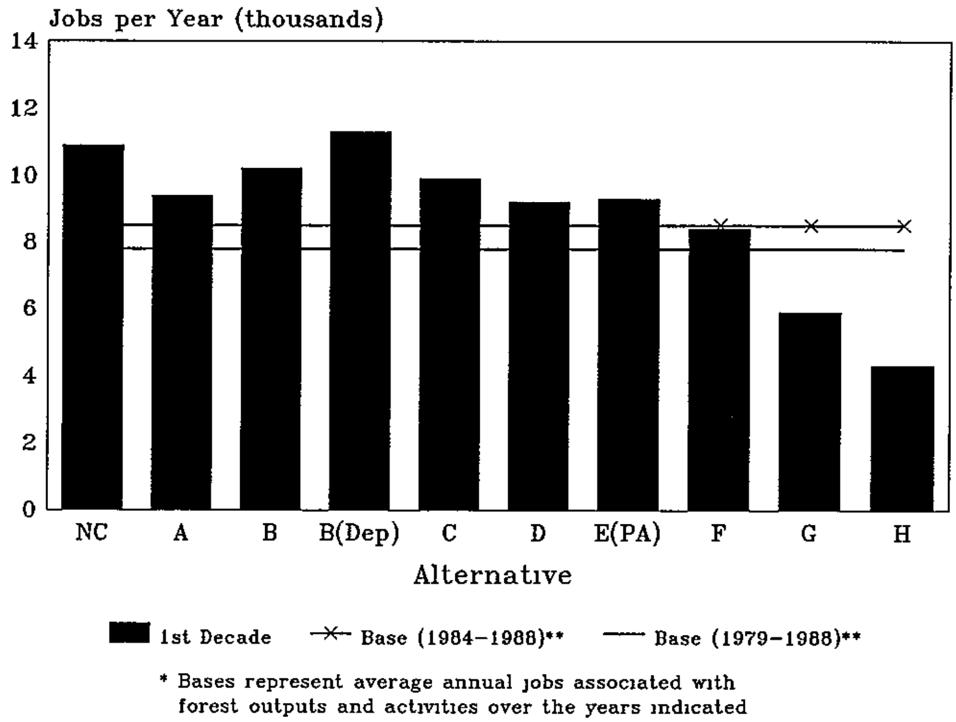
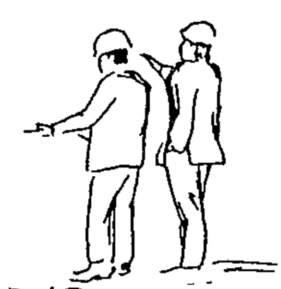


FIGURE IV-13 1st DECADE CHANGES IN LOCAL EMPLOYMENT

The differences in jobs and wages among alternatives are primarily due to differences in the amount of timber available for harvest. Most of the economic activity dependent on the Forest is associated with timber sales to local lumber and wood products industries, payments to counties from timber receipts, and Forest Service expenditures for timber and road management activities Employment opportunities and income are expected to remain the same or increase in most of the alternatives because they (1) provide more timber than was harvested in the past, and (2) provide more Forest Service payments to counties, and/or (3) require more Forest Service expenditures than made in the past 10 years



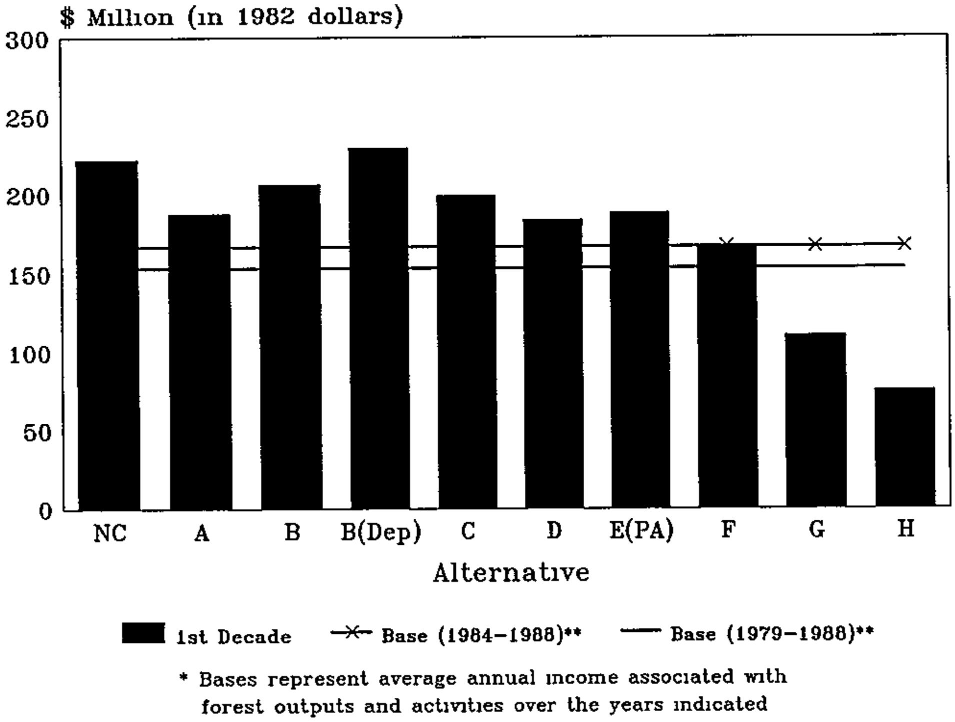


FIGURE IV-14 1st DECADE CHANGES IN INCOME FROM LOCAL EMPLOYMENT

Most of the changes in job opportunities would occur in the sectors associated with lumber and wood products manufacturing, but other sectors are also affected Figure IV-15 compares 1st decade jobs by five highly aggregated sectors for each alternative and the 1984-1988 base period The five categories displayed in Figure IV-15 are Agriculture (AG), Construction and Manufacturing (CON & MFG), Wood Products (WOOD PROD), Transportation and Utilities (XPT, UT) and the service type sectors Finance, Services and Government (F,S,G). This graph displays how employment in the four sectors responds to changes in outputs and activities among the alternatives In all alternatives, the service type sectors are the largest employer. The agricultural sector is relatively stable and less influenced by Forest Service activities. Variation in recreation, fish and wildlife outputs among alternatives does not offset employment effects of changes in timber harvest. However, in Alternatives F, G and H it can be seen that the employment in other sectors does not decline as sharply as employment in the wood products sector.

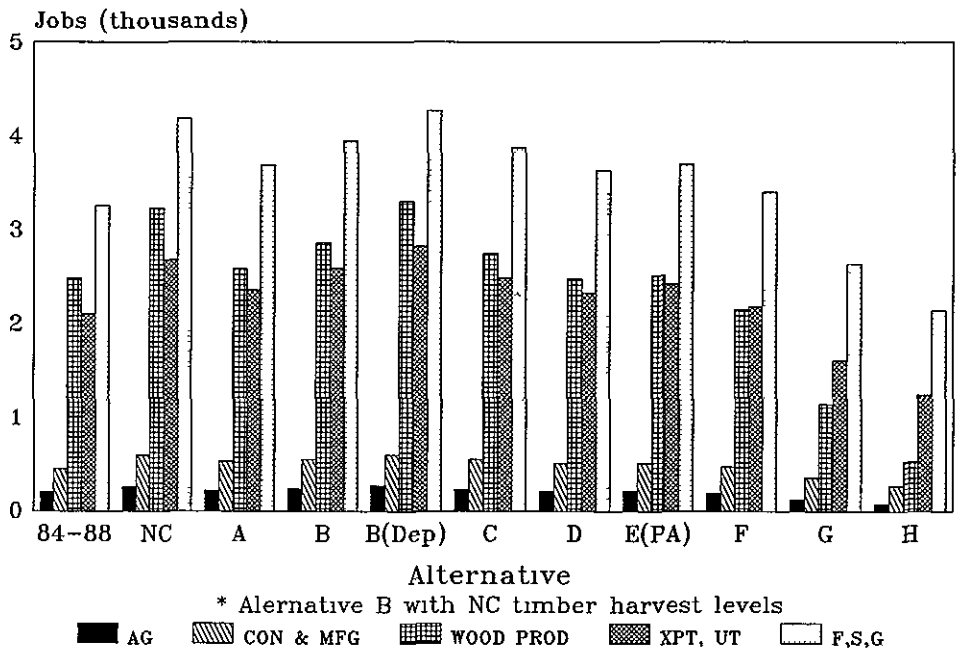


FIGURE IV-15 1st DECADE CHANGES IN EMPLOYMENT BY SECTOR

With the exception of Alternatives NC, B(Dep), G and H, the magnitude of community change resulting from Forest activities is expected to be within the range of changes experienced by local communities during the last ten years However, national and regional economic trends may modify the effects of the alternatives on local communities For example, if timber is not harvested because of weak markets for wood products, fewer job opportunities would be provided than projected Likewise, the past decade has seen a decline in labor intensity of wood products manufacturing In 1979, sawmills in Oregon employed an average of 4 5 workers per MMBF of lumber produced; by 1986 only 2 8 workers were employed per MMBF To the extent this trend continues in the future, there will be fewer jobs associated with timber manufacturing.

Lifestyles

Lifestyles are the characteristic ways different groups of people live, including both work and leisure time. Some people have lifestyles that are financially dependent on a particular Forest resource, such as people working in lumber and wood products, fishing and tourist industries Others are less financially dependent upon a particular Forest resource

Many people (regardless of financial dependency on Forest resources) participate in recreational activities on the Forest, such as hunting, fishing, picnicking, viewing wildlife and scenery and gathering firewood However, the primary ties between the Forest and surrounding communities are related to employment from forest resources because leisure activities on most of the Forest is severely limited by the steep topography and dense vegetation. Therefore, most of the changes in lifestyles generated from the alternatives are expected to be caused by changes in the amount of timber harvested, Forest Service payments to counties, and Forest Service expenditures

In general, changes in Forest outputs and activities would have a more noticeable impact on small rural communities adjacent to the Forest These communities, with resource-dependent economies and lifestyles, are more immediately and directly affected than the larger, more diversified, communities in the Forest's area of influence. The economic consequences to communities are directly affected by changes in the timber program because the changes in timber activities and outputs are larger than the changes in recreation, fish habitat, and amenities

Alternatives NC, B, B(Dep) and C - In the 1st decade, this group of alternatives would provide between 26% and 44% more employment opportunities, with most of the change being in jobs dependent on the lumber and wood products industries. While the job opportunities in the 1st decade would be greatest in Alternative B(Dep), the situation would be temporary because harvest levels begin to fall after the 1st decade.

Employment opportunities in these four alternatives would change primarily in small mountain, coastal and valley communities which have economies dominated by lumber and wood products firms. Opportunities in the larger coastal ports and urban areas in the Willamette Valley would not be as noticeable Opportunities for people involved in tourism and commercial fishing would remain similar to present levels or increase slightly due to increases in recreation use.

These alternatives would also affect lifestyles by altering noncommodity resources. Opportunities for some personal uses such as hunting and recreation associated with roaded portions of the Forest would remain at current levels or increase slightly. People would find less of some resources such as old growth, wildlife habitat, visual quality, and undeveloped areas

Alternatives A, D and E(PA) - Alternatives A, D and E(PA) would initiate between 17% and 20% increases in employment opportunities from Forest outputs and activities The increases would primarily be due to higher timber harvests and payments to counties from timber sale receipts Job opportunities for people involved in tourism and commercial fishing would also increase due to increases in recreational use of the Forest

These alternatives are similar to the four alternatives discussed above in terms of effects on lifestyles through noncommodity ties Opportunities for some personal uses of the Forest would increase, such as elk hunting, firewood gathering, and recreation in roaded portions of the Forest However, people who depend on the Forest for less consumptive uses would be less satisfied as resources such as old growth, wildlife habitat, visual quality, and undeveloped areas are reduced

Alternative F - The level of employment opportunities provided by Alternative F would be only slightly higher than the past 10 year average There would be only slightly more opportunities lumber and wood products sector. Increases in employment would be primarily from increases in county revenues and Forest Service expenditures. Opportunities for people involved in tourism and commercial fishing would increase slightly due to increases in recreational use of the Forest Lifestyles of people dependent on noncommodity uses of the Forest may change slightly For example, Alternative F would provide more fish habitat than at present, but less visual quality, elk habitat, and semiprimitive recreational opportunities.

Alternatives G and H - High level of amenity outputs associated with Alternatives G and H would maintain or increase opportunities for personal uses of the Forest such as fishing, viewing scenery and recreation associated with undeveloped areas and wildlife habitat. People who are concerned with the preservation of natural systems would find that more old growth and undeveloped areas are maintained However, employment opportunities would decrease between 25% and 45%, because of the reduction in timber harvest Opportunities for people involved in tourism and commercial fishing would increase because of increases in recreational use of the Forest

Community Organization

The activities, resource outputs, and environmental conditions that would differ among the alternatives have the potential to affect the cohesion and the infrastructure of local communities Cohesion refers to the degree of cooperation and lack of conflict in communities; their infrastructures are public and commercial facilities and services.

The effect of the alternatives on local communities would differ by the amount of conflict that may be introduced in communities, and more importantly, by the need for public and commercial facilities As discussed previously, the impact of the alternatives are primarily generated by changes in the county revenues which are tied to the timber program. As in the case of the effects of the alternatives on lifestyles, small rural communities have the potential to be affected more than larger communities

Most communities are not static, but are constantly experiencing on-going change As noted in the discussion of the effects on lifestyles, communities are subject to many influences other than the Forest, as is the area as a whole. Because only about 5% of the total employment in the eight counties surrounding the Forest is attributable to Forest outputs and activities, the changes proposed by the alternatives are well within the magnitude of change communities have experienced in the last ten years

Population Change and Crowding

In recent decades, changes in population have reflected movement of people in and out of the local area to respond to a variety of employment and environmental amenity factors By itself, the Forest does not have predictable influence on the population of the eight county area during the life of this Forest Plan. For example, the changes in employment opportunities within the 8-county area expected from the alternatives range from a 2% increase (Alternative B(Dep)) to a 2% decrease (Alternative H) These changes are within the range of employment changes inherent in the seasonal and cyclical nature of the area's economy

Cumulative Effects on Communities

The effects of Forest management and the associated outputs on local communities also depend upon the management and outputs of other ownerships within the area of influence For example, the increases in lumber and wood products employment projected for the Forest in most alternatives might not offset a decrease in employment opportunities associated with a decrease in harvest from other ownerships On the other hand, some of the decreases in employment projected for Alternatives G and H could be offset by increases in harvest on other lands. In the case of community effects dependent on other resource outputs, such as recreation opportunities, wildlife and fish habitat, and firewood supplies, changes in the output levels from one ownership would be offset to a certain extent on another class of ownership until that ownership's supply capacity was reached

Timber Supply in the Pacific Northwest - Aggregate Implications of Forest Plans (USDA Forest Service, 1989) presents estimates of available timber supplies in Washington and Oregon under the Preferred Alternative scenarios from Draft EISs This study found that for Northwest Oregon, there is the potential to increase aggregate timber availability with most of the increase coming from non-industrial and non-Forest Service Federal ownerships Timber supplies in West-Central Oregon would be relatively stable with only slightly less timber available over the next two decades as Forest Service Plans prepared under NFMA guidelines are implemented. Douglas County is expected to experience a significant decline in available timber from private industrial ownerships over the next two decades, while supplies from Forest Service and other ownerships would remain relatively stable

Consistency with Other Plans and Policies for Communities

See "Consistency With Plans And Policies Of Other Agencies" in this chapter for more information.

Assumptions Used to Predict Environmental Consequences on Communities

The major assumptions used to predict the effects of the alternatives on communities were; additional information is needed on these topics.

1. Communities are affected by changes in Forest management and the associated changes in resource outputs. Such changes are felt through economic and aesthetic ties.

2. The relationships between employment/income and Forest outputs are quantifiable and predictable. The predictions are based on a model of industrial relationships in 1972 and data of the local economy in 1977. The actual model used to predict these effects is discussed in Appendix B.

3 Resource outputs (especially timber, wildlife and fish habitat, and recreational opportunities) would be used. For example, the projected timber levels would not only be sold, but, unlike the past, that amount would also be harvested. In addition, this timber would be used by manufacturers in patterns similar to those in the past.

Incomplete or Unavailable Information on Communities

Predictions of effects were made with the most current information available. The following information used to predict those effects is either unavailable or incomplete; additional information is needed on these topics:

1. Future social and economic trends that would influence local communities For example, the effects of Forest timber supplies on local communities might by amplified or offset by changes in the national and international demand for wood products, advances in mill technology, and incentives for timber supplies from other land owners. Also, the aesthetic ties between the Forest and the communities would be influenced by demographic and economic trends of the local population

2 Future management and resource outputs on lands other than the Siuslaw National Forest

3 Community specific information on effects

4 Data on nonlinear relationships between resource outputs and jobs/income

5 Changes in the relationship between Forest outputs and jobs and income that have occurred during the latest national economic cycle

ENVIRONMENTAL CONSEQUENCES ON OTHER RESOURCES

Direct and Indirect Effects on Other Resources

Cultural Resources

Treatment of cultural resources would be the same under all alternatives. Sites would be located and protected until they have been evaluated for listing on the National Register of Historic Places. If a site is not eligible, it would be evaluated for research or interpretive value, and an appropriate plan for its treatment and/or enhancement would be prepared. If disturbance of a significant site cannot be avoided, a mitigation plan will be prepared The site will not be disturbed until the mitigation plan is approved by the State Historic Preservation Office.

The Forest Cultural Resource Management Program focuses on the identification, evaluation and eventual interpretation of sites and evidence of all types of human activities that have occurred on the forest during the last 11,000 years The management of these non-renewable resources will continue to be based on a three phase approach:

1. **Survey** - A cultural resource survey is conducted prior to every land disturbing project that takes place on the forest The purpose of the survey is to identify and document sites of past human activity on the forest

2. **Evaluation** - Identified sites are evaluated to determine if they are eligible for the National Register of Historic Places

3. **Interpretation** - Sites that have the potential to tell any part of the story of the history of the area are selected for interpretation to the public

The survey, evaluation and preservation (for eventual interpretation) of cultural resources will be the same under all alternatives. As sites are identified, mapped, and studied, plans will be developed for the eventual interpretation of a representative sample of all of the site types that occur on the Forest

At present little is known about the early inhabitants of the Coast Ranges in Oregon. The excavation of some sites that could be impacted by planned earth-disturbing activities may provide the opportunity to add substantially to our knowledge

Air Quality

Implementation of any alternative would produce smoke from slash burning that affects air quality and visibility along the coast from Tillamook to Coos Bay and in the Willamette Valley from Portland to Eugene The potential to impact air quality would be higher in the alternatives that burn more acres and produce more smoke

If the amount of logging residue produced per acre remains the same as in the past decade, Alternatives NC and A through F would produce more residue than could be burned under the State of Oregon Smoke Management Plan. This is due to the expected demand for permission to burn from all users in the air shed, not just from residue treatment on the Siuslaw National Forest

All activities on the Forest that produce smoke will comply with the State of Oregon Smoke Management Plan, which is designed to meet the requirements of the federal Clean Air Act by regulating the amount of total suspended particulates (TSPs) emitted from slash burning The Smoke Management Plan sets goals for emissions and regulates the amount and timing of burning of logging slash to reduce the potential for smoke to enter highly populated areas. The acres burned will be limited by two different smoke management constraints. One limitation is the annual production of TSP. The other is the restriction on tons of TSP produced daily.

The Smoke Management Plan, in compliance with the Clean Air Act, limits TSP production by the Forest to 2,071 tons in the year 2000. (This limit is 50 percent of the 4,142 tons produced in the years 1976 through 1979.) Research on the Siuslaw National Forest shows that approximately 1,350 pounds of TSP is produced per acre burned. In the last 5 years the forest has burned about 4,000 acres per year while burning within the Smoke Management Plan constraints. Table IV-23 displays the estimated annual average TSP that would be produced in the 1st decade for each alternative. All of the alternatives, except G and H, would harvest more acres than could be burned under the Smoke Management Plan.

Table IV-23. Estimated Annual Production of Total Suspended Particulates (TSP)

	ALTERNATIVE									
	NC	A	B	B(Dep)	C	D	E(PA)	F	G	H
Harvested Acres	9,200	6,278	5,728	6,703	5,796	5,217	5,169	4,606	2,671	1,200
Acres To Be Broadcast Burned	3,810	3,810	3,810	3,810	3,810	3,810	3,810	3,810	2,270	1,020
Tons of TSP	2,373	2,373	2,373	2,373	2,373	2,373	2,373	2,373	1,414	635

Table IV-23 shows annual averages for the decade. The number of acres burned each year will be higher at the beginning of the decade and will decline until the goal of 2,071 tons for the year 2000 is reached. Fewer acres may be burned in any year due to weather conditions

The Clean Air Act requires that daily pollution levels do not exceed a 1977-1978 baseline. The standard is called Prevention of Significant Deterioration (PSD) and is intended to protect visibility in Class I and II areas. The baseline for the Siuslaw and the estimated daily emissions for the 1990s is in Table IV-24

Table IV-24. Estimated Daily Production of TSP

	77 -78 Baseline	Alt. NC, A-F	Alt. G	Alt. H
Average number of acres burned annually	5,414	3,810	2,278	1,020
Tons of TSP produced annually	3,646	2,373	1,414	635
Average number of burning days annually	24	42	42	42
Average tons of TSP produced per burning day	152	56	34	15

The Forest will continue to follow the daily burning instructions and will meet the emissions reductions required in the Smoke Management Plan. Both the annual and daily production of TSP are expected to be less than the Smoke Management Plan and Clean Air Act limits.

The effects of smoke on the environment were addressed in the Region Six Final Environmental Impact Statement (FEIS) on Managing Competing and Unwanted Vegetation These effects include visibility reduction and potential health effects. All of the mitigation measures in the vegetation management FEIS would be followed in each of the Forest Plan alternatives

Emissions from slash burning have not been identified by the Environmental Protection Agency as hazardous, and no limits have been set for compounds in forest smoke (Sandberg et al 1979). Burning, slash disposal, air quality and related topics are the subject of ongoing and future research

Forests have a role in producing oxygen and filtering air. Relative to the entire forested area, there is very little difference among alternatives in the amount of land in a forested condition at any given time The difference would relate mostly to how much land is converted to non-forest conditions such as roads or administrative sites This difference among alternatives would be less than 1% of the total forested land over the next three decades

The amount of land to be clearcut harvested in a given year would have a very small, short-term influence on air quality The mechanism through which vegetation affects air quality is gas exchange through the leaves Consequently, changes in the amount of leaf area on the forest may have some effect on air quality. However, the rapid rate with which land revegetates in the Coast Ranges minimizes this effect The period between harvest and a return to high levels of total leaf area on a site is short, probably less than 20 years. The difference among alternatives in the amount of land harvested each year would be less than 1% of the total forested area

Forests affect carbon levels in the atmosphere by storing fixed carbon in plant tissues. Plants take up carbon when they grow and release it during respiration and when burned or decomposed Old forests are generally in balance, taking up as much carbon as is released through respiration or decomposition They have large stores of carbon in large organic matter that may be lost during conversion to young managed forests. Young forests take up more carbon than they respire, but do not store as much in decay-resistant large pieces.

The role of forests in producing oxygen and providing clean air locally and globally requires additional research.

Range

Forest production of forage range for livestock in the Coast Ranges is limited to small meadows along the streams and coast and to temporary openings created by timber harvesting Use of the forest for grazing has been, and would continue to be low. The impacts to other Forest resources from grazing is expected to be very low and no significant impacts are anticipated Opportunities for grazing vary little among alternatives, but increase somewhat with increases in timber harvest that provides transitory or temporary range Grazing opportunities are greatest in Alternatives NC and A through F; they are low in Alternatives G and H. No environmental consequences are expected from grazing. Chapter II has a discussion of the range program

Minerals

Forest mineral resources are directly affected by use and depletion of those resources. Other forest resources are directly and indirectly affected by the amount of development and extraction of minerals resources Effects include disturbance and destruction of vegetation, soil removal and erosion, sedimentation and increased turbidity of water, destruction of wildlife and fish habitat, reduction in visual quality and recreation opportunities. Other effects include increased availability of energy resources to communities in the northwest and throughout the nation, local use of common minerals, especially road rock, for economic and amenity development of other forest resources These effects vary in proportion to the amount of area available for minerals exploration and development and in proportion to the extent of actual development and use.

The amount of area available for minerals development varies by alternatives, see FEIS Chapter II, "Management of Minerals" Alternatives NC and A through D have less area (less than 62,800 acres) withdrawn from oil and gas leases. Alternatives E(PA) through H have more areas (more than 64,800 acres) withdrawn. Alternatives NC and A through D have fewer acres with moderate and high restrictions on oil and gas development; alternatives E(PA) through H have more acres with restrictions Alternatives NC and A through C have more area (more than 380,800 acres) available for common minerals extraction; alternatives D through H have less area (less than 132,700 acres) available Generally, Alternatives NC and A through D have a higher probability of effects on other resources from minerals development

Human and Community Development Activities

The Forest has several programs that provide training and employment. The largest program is the Angell Job Corps Center which provides educational and vocational training for young adults Currently, the Center has capacity for 208 enrollees. Other programs include volunteer work and part-time employment programs.

Funding for Angell Job Corps is independent of land allocations and would not be affected much by alternative The other programs are more closely related to timber and recreation outputs. Most of the alternatives provide moderate to high levels of outputs in timber and recreation, so the human and community development programs would not vary much by alternative Alternatives B and B(Departure) may have slightly more opportunities than presently available to provide timber related jobs. Alternatives G and H would have slightly lower opportunities for recreation related jobs and much lower opportunities for timber related jobs.

Minorities and Women

The primary effect of the alternatives on minorities and women would be through job opportunities These would vary in terms of Forest Service jobs and contracts for goods and services, and also, in terms of jobs locally in response to Forest outputs, payments to counties, and expenditures. (See FEIS Chapter IV section on Environmental Consequences of the Alternatives on Communities for more discussion of impacts of the alternatives on employment.)

Forest Service policies encourage employment and contracting opportunities for everyone. Although these policies would continue under all alternatives, the number of agency and contracting jobs would vary with the funding levels on the Forest Compared to the present, more Forest jobs and contracts would be available under all alternatives except G and H

American Indian Religious Freedom

The primary use of the Forest by American Indians for religious purposes appears to have been to develop unique, individual linkages with the natural world. Although no continuing religious practices have been identified on the Forest, several sites which were once important to the area's native inhabitants are known (Beckham et al 1982). These sites include spiritual questing areas and quarries for ingredients for body paint. Protection of these sites and cooperation with Indian Tribes to identify other sites would continue under all alternatives

Urban Environment

Examples of the possible effects of activities on the urban environment are altered landscapes visible from communities, reduced air quality from slash burning and damage to roads and building from landslides resulting from road construction and timber harvesting. The level of these effects would depend mostly on the amount of timber harvesting in each alternative In all alternatives, direct effects on the urban environment from landslides and burning would be avoided However, the risk of unintentional effects would increase as the amount of timber harvest and road construction increases The effects of the alternatives on visual quality, air quality and soil stability are discussed in previous sections of this chapter.

Prime Farmlands, Wetlands and Flood Plains

There are no identified prime farmlands on the Forest Prime farmlands off the Forest would be affected by some Forest activities.

In Alternatives C, E(PA) and G it is unlikely that the increasing elk populations would increase their use of adjacent farmlands because high quality forage would be available on the Forest In the other alternatives, which would have fewer habitat improvements for elk, herds would be more likely to forage on private lands, thus increasing the possibility of damage to crops

Flood plains and wetlands would be protected in all alternatives by Management Requirements to meet Executive Orders 11990 and 11988 Roads, camp and picnic areas and facilities would not be built in these areas Standards and guidelines would protect and enhance wildlife habitat, visual quality and water quality in wetlands Most estuaries and extensive flood plains of rivers that drain the Forest are not found on National Forest land. In those areas, cumulative effects of siltation from timber harvest is a concern.

See the "Consequences of the Alternatives on Watersheds and Fish" sections of this chapter for a discussion of the cumulative effects of the alternatives Areas received in land exchanges must include as much flood plain as in areas traded away

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Short-term uses are generally those that determine the present quality of life for the public. On this Forest, short-term uses include timber harvest, recreation, and livestock grazing However, the quality of life for future generations depends on continued productivity of the lands. Activities must not significantly impair the long-term productivity.

Long-term productivity refers to the capability of the land to provide resources such as forage, timber, and water. It is assumed that maintaining soil productivity and water quality assure maintenance of long-term productivity.

Timber management activities (burning, release, weeding, thinning, sanitation, road-building and harvesting) will reduce the natural productivity of some portions of the Forest. The extent to which the long-term productivity is reduced is not known because investigations of these effects have only recently begun. However, it is known that timber management practices have the potential to reduce natural productivity if certain operating guidelines are not followed.

Standards and guidelines in all alternatives were specifically designed to meet Management Requirements (MRs) and to prevent unacceptable degradation of the soil and water resources Monitoring will determine whether the standards and guidelines are effective and are being correctly applied

Because Alternatives NC, A, B, B(Dep), C, D, E(PA), and F emphasize timber production to various degrees, they would have more potential to adversely affect long-term site productivity Alternatives G and H emphasize natural systems and would be least likely to do so.

UNAVOIDABLE ADVERSE EFFECTS

Implementation of any alternative would result in some adverse environmental effects that cannot be avoided. The Forest-wide MRs, standards and guidelines, and mitigation measures are intended to keep the extent and duration of these effects within acceptable levels, but adverse effects cannot be completely eliminated. The following adverse environmental consequences would be associated to some extent with all alternatives:

1. Short-term reduction in air quality from dust, smoke, and automobile emissions resulting from timber management and recreational use

2. Disruption of prehistoric or historic evidence of human occupancy on the Forest

3. Localized reduction in long-term site productivity from burning of logging slash

4. Acceleration of natural rates of landslides and sediment by soil disturbing activities associated with timber harvest and road-building.

5. Reduction in the scenic quality of the forested landscape as a result of timber harvest, road construction, and slash burning.

6. Temporary increase in fire hazard from waste material left on the ground during and after harvesting operations.

7. Contamination of water sources due to increased human use of the Forest.

8. Displacement of wildlife when their habitat is disturbed by timber management activities, facility development, or recreation.

9 Reduction of fish habitat from undisturbed levels in streams adjacent to and downstream from areas being harvested.

10. Decrease in habitat for wildlife species dependent on deciduous mix.

11. Decrease in snag habitat for cavity dependent wildlife due to timber harvesting and firewood cutting

12. Damage to soils from compaction by logging equipment

IRREVERSIBLE RESOURCE COMMITMENTS

Irreversible commitments of resources are actions which disturb either a nonrenewable resource (e.g , cultural resources, rock quarries) or another resource to the point that it can only be renewed over 100 years or more. Measures to protect resources that could be irreversibly affected by other resource uses were incorporated into the standards and guidelines of the Forest Plan. Following is a summary of the major irreversible commitments of resources on the Forest

The construction of arterial and collector roads to provide access to the Forest is an irreversible commitment of the soil resource because of the long time needed for a road to revert to natural conditions The extraction of gravel and rock used for road construction and reconstruction is similar Alternatives A, B, and B(Dep) would have the highest timber outputs and therefore the most irreversible commitment of soil resources due to roads Alternatives G and H would have the least

Extraction of minerals is an irreversible commitment since the minerals are no longer available for use The same is true for oil and gas extraction

The use of fossil fuels to manage the Forest is an irreversible resource commitment Alternatives with more activities [NC, A, B, B(Dep), C, D, and E(PA)] would cause higher consumption of fossil fuels

Management activities and practices can cause irreversible losses in soil productivity. For example, poor roadbuilding or harvesting practices can accelerate the naturally high rates of dry ravel and landslides; poor burning practices can destroy humus and nutrients and reduce water infiltration Standards and guidelines in the Forest Plan are designed to prevent these kinds of irreversible losses

Harvest of old-growth stands is considered an irreversible loss since, on the average, it takes a stand at least 175 years to develop old-growth characteristics.

The loss of natural landforms due to mining, rock pits, cut-and-fill roads, and construction on side slopes is an irreversible scenic effect.

Opportunities for research on natural systems are also irreversibly lost once natural stands are harvested

IRRETRIEVABLE COMMITMENT OF RESOURCES

An **irretrievable commitment** is the loss of opportunities for production or use of a renewable resource for a period of time Almost all Forest activities produce varying degrees of irretrievable resource commitments. These commitments parallel the environmental impacts for each resource discussed earlier in this chapter. The difference between levels of various resources under a given alternative and the higher levels that could be otherwise produced also represents an irretrievable commitment of resources. The difference in output levels is the opportunity cost or lost production These commitments are irretrievable because the opportunities are foregone. They are not irreversible since they could be reversed by changing management direction. Irretrievable resource commitments are summarized below.

Timber Management

Loss of timber volume production in areas where timber management is prohibited or restricted

Watershed and Fish Management

Reduction of fish habitat and water quality below natural levels where timber production is favored over protection of stream systems.

Wildlife

Loss of some habitat due to harvest or roading that discourages habitat use Some wildlife species are reduced and others increased depending on the kind of habitat affected. Harvest of old-growth stands is an irretrievable commitment of those stands for timber instead of maintaining them for a wider range of uses.

Recreation

Loss of one type of recreational opportunity when replaced by another type. For example, developed recreational activities are lost when areas are used for dispersed or undeveloped recreation Undeveloped recreational opportunities are lost in areas managed for timber.

Visual Resources

Loss of "natural" scenic quality where intensive, even-aged timber management is practiced

Cost-Efficiency

Loss of cost-efficiency when resource objectives do not maximize the net monetary value

CONDITIONS UNCHANGED BY ALTERNATIVES

There are some conditions on the Forest which would not be affected by implementation of any alternative

The natural tendency of unstable soils to erode (landslides and surface soil erosion) would continue in all alternatives.

The quality of deciduous mix habitat would decline over the next few decades Most is now mature, and the relatively short-lived red alder will begin to deteriorate

The amount of old-growth stands on the Forest is limited Timber harvesting has been a factor, but the primary limiting condition was 19th century wildfires Most timber stands on the Forest are 90 to 120 years old - too young to have old growth characteristics

The amount of fish habitat would decrease in some decades in all alternatives except H because it takes an average of 65 years before large woody debris is produced by riparian areas clearcut between the early 1940's and the present (see FEIS, Chapter III).

CONSISTENCY WITH OTHER PLANS AND POLICIES

1980 Resource Planning Act (RPA)

Timber

Alternative NC would meet the 1980 RPA program timber sale target of 80 MMCF per year However, with its proposed future timber management practices it is doubtful that that RPA level could be maintained in the future Alternative B(Dep) is the only other alternative designed specifically to meet the RPA target, but it would be successful only in the 1st decade The only way to meet both RPA timber targets and NFMA requirements is with a temporary departure from a nondeclining-flow harvest schedule

Budgets

None of the alternatives would require the budgets proposed in the 1980 RPA program The RPA budget is $35 million for the 1st decade and $37 million for the remaining decades The costs to operate the Forest for the 1st decade would range from $15 million for Alternative H to $31 million for Alternative B(Dep). The primary reason that the costs would be significantly less than the RPA budget is that the alternatives would have smaller timber harvest and road-building programs, which are the major components of the budget

Fish Habitat Improvements

None of the alternatives could supply the fish resource improvement levels proposed in the 1980 RPA program The RPA targets for fish improvement (expressed in terms of pounds of anadromous fish to be produced per year by habitat improvements) range from 147,000 for the 1st decade to 403,000 for the 3rd through 5th decades Total anadromous fish produced per year on the Forest (without improvements) during the 1st decade would range from 692,000 pounds in Alternative NC to 861,000 pounds in Alternative H Respective values for the 5th decade would be 264,000 and 934,000 pounds In a given year then, the RPA targets require projects that would improve fish production by 17-150% of what the habitat could otherwise support. These output levels are unrealistically high and could not be met for a variety of biological and logistical reasons (See FEIS, Chapter III, "Fish" for an explanation) The highest level of habitat enhancement projects, in Alternative G, could increase fish production by 30% over 50 years.

Resident Trout and Anadromous Fish

The national RPA goals for fish habitat are a 20% increase in habitat capability for resident trout and a 30% increase in habitat capability for anadromous fish (USDA Forest Service 1980a) Since these goals have not been allocated to Regions and National Forests, the Forest does not have a specific RPA goal. However, the fish outputs for Alternative E (PA) would help meet the national goals (see Table II-39A).

Wildlife Habitat Improvements

The goals for habitat improvements on the Forest are 3,600 acres in 1986, which decreases to 1,500 acres in 2030 (USDA Forest Service 1984a). None of the alternatives would follow this trend (See Table II-39A for the number of acres improved).

Alternatives A, B, B(Dep), C, E(PA), F, and G would improve a few acres in the 1st decade and then progressively more acreage through 2030 Alternatives F and G would have goals similar to RPA during the-50 year period; Alternatives A, B, B(Dep), C, and E(PA) would have much higher goals than RPA.

Alternative E(Dep) would improve less acres in 2000 than in 1986 and 2030 Alternative D would improve a few acres of habitat in 1986, increase until about 2000, and then decrease to a low level in 2030. Alternative H has much lower targets than RPA and would improve about the same number of acres each of the next 50 years

Dead and Defective Trees, Roosevelt Elk, and Blacktail Deer

The national RPA goals for cavity nesting birds are to maintain habitat capability at the 1980 level Goals for Roosevelt elk and blacktail deer are to increase habitat capability by 18% and 25%, respectively (USDA Forest Service 1984a). Since these goals have not been allocated to Regions and National Forests, the Forest does not have a specific RPA goal However, the levels of dead and defective trees, elk, and deer for Alternative E(PA) (See Table II-39A) would help meet the national goals

Range

The RPA goal for the Forest is 3,000 AUMs in 1986, which would increase to 8,000 in 2030 (USDA Forest Service 1984a). All alternatives plan to provide 2,000 AUMs for each of the next 50 years, so none would meet the RPA goals.

Production of all other resources would be able to meet or exceed the 1980 RPA targets See Table IV-25

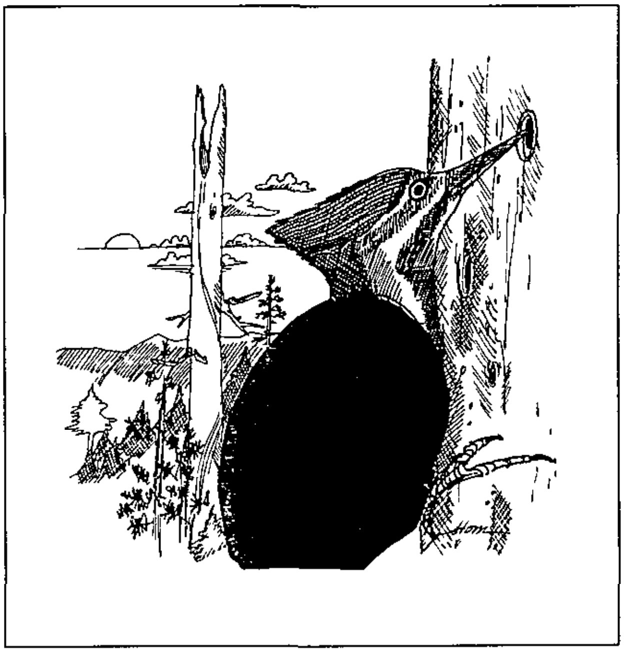


Table IV-25. 1980 RPA Annual Program Outputs, Activities, and Costs

PROGRAM OUTPUTS, ACTIVITIES, AND COSTS	UNIT	1986 - 1990	1991 - 2000	2001 - 2010	2011 - 2020	2021 - 2030
RECREATION						
Developed Recreation Use (Including Visuals)	MRVDs	1,000	1,000	1,000	1,000	1,000
Dispersed Recreation Use (Including Wildlife and Fish)	MRVDs	820	850	870	880	890
Trail Construction/Reconstruction	Miles	0	0	0	0	1
WILDLIFE AND FISH						
Habitat Improvement	Acres	3,639	3,098	2,496	1,564	1,534
Anadromous Fish Improvement	M Pounds	147 0	302 4	403 2	403 2	403 2
RANGE						
Grazing Use (Livestock)	MAUMs	3	3	5	5	8
TIMBER						
Programmed Sales Offered	MMCF	97	97	97	97	97
Reforestation	Acres	8,550	8,800	9,100	9,840	9,840
Stand Improvement	Acres	13,520	13,910	14,040	14,300	14,560
WATER						
Meeting Water Quality Goals	MMAcre-ft	3 115	3 325	3 465	3 465	3 465
MINERALS						
Leases and Permits	Operating Plans	860	950	1,080	1,270	1,300
HUMAN AND COMMUNITY DEVELOPMENT						
Human Resource Programs	Enrollee Years	14	14	14	14	14
PROTECTION						
Fire Management	$$ Per MAcres	3,762	3,762	3,759	3,735	3,668
Fuelbreaks and Fuel Treatment	MAcres	0	0	0	0	0
LANDS						
Land Purchase and Acquisition (Excluding Exchange)	Acres	500	100	75	50	50
SOILS						
Soils and Water Resource Improvement	Acres	300	100	50	50	50
FACILITIES						
Road Construction/Reconstruction (Arterial, Collector)	Miles	10 4	11 7	13 4	13 4	13 4
RETURNS TO GOVERNMENT	MM $$	52 3	52 3	53 0	53 5	54 8

National Clean Air Act

The National Clean Air Act delegates the responsibility for clean air to the states In Oregon, the responsibility is under the authority of the State Forester who administers the Oregon Smoke Management Plan All alternatives would comply with this Plan

Oregon Department of Forestry

The Oregon State Board of Forestry in its Forestry Program for Oregon (FPFO) has developed objectives for timber production for each National Forest, BLM, State, and private timberland ownerships These target levels related to timber production must not be confused with the state of Oregon objectives reflected in the Governor's response to the Draft Forest Plan. Objectives guiding the Governor's response include concerns for Oregon's forest environment, wildlife protection, jobs, and timber production. An equitable balance among these often conflicting resources is the principal goal

Table IV-26 was designed to assess the compatibility of selected alternatives with the ODF's objectives by showing the relationship among them, past sale and harvest levels, and the Forestry Program For Oregon. These objectives may not be appropriate for National Forest management, given the mandate for equal consideration of all resources under the Multiple Use Sustained Yield Act and National Forest Management Act

Table IV-26. Selected Alternatives, Sales and Harvest, and FPFO Objective

	MMBF/ Year	MMCF/Year
FPFO Timber Harvest Objective (1)	N/A	86 3
ACTUAL SALES (average 1979-1988) (2)	350	64 8
ACTUAL HARVEST (average 1979-1988) (2)	302	55 9
ACTUAL SALES (average 1984-1988) (2)	325	60 2
ACTUAL HARVEST (average 1984-1988) (2)	348	64 4
ALTERNATIVE B(Dep) (To meet FPFO obj) (3)(4)	445	82 4
ALTERNATIVE A (4)	368	68 2
ALTERNATIVE E(PA) (4)	343	63 6
TR PLAN (potential yield) (5)	438	92 5

(1) FPFO objectives are total volume including salvage
(2) Past sales and harvest include both chargeable and non-chargeable volume
(3) This is the forest planning alternative that comes closest to meeting the objectives of the FPFO
(4) The forest planning alternative volumes are 1st decade Timber Sale Program Quantity (TSPQ) that include both chargeable and non-chargeable volume
(5) The potential yield is the net chargeable volume from the Timber Resource Plan and is not directly comparable to Forest Plan TSPQ

Of the alternatives developed by the Siuslaw, none would be capable of achieving all of the FPFO objectives. Although Alternative B(Dep) was intended to achieve these objectives, it does not meet the expected target level, even during the 1st decade departure None of the other alternatives come close to meeting the target level in any decade

Alternative E(PA) does not meet the FPFO objectives. The suitable land base for Alternative E(PA) is not sufficient to support the timber harvest level envisioned in the FPFO plan even if a departure from non-declining flow were to be considered The suitable land base has decreased since the FPFO was prepared due to a combination of factors: new inventories were developed for unstable soil areas, habitat requirements for several wildlife species such as the spotted owl and the bald eagle have increased, allocations have been made for undeveloped land management and special area management in response to public interest; and, other areas have been established where timber harvest is precluded in order to resolve other planning issues.

Oregon Department of Fish and Wildlife

Fish

The goals of the Oregon Department of Fish and Wildlife (ODFW) for fish habitat on the Siuslaw National Forest (June 24, 1983 letter from D Lantz to T. Vander Heide) are expressed in terms of smolt production for coho and chinook salmon, steelhead, and searun cutthroat trout The Coho Salmon Habitat Capability Index (CSHCI) desired by ODFW ranges from 1578 during the 1st decade to 1960 during the 3rd through 5th decades Although the lower CSHCIs projected for the alternatives do not reflect mitigation or improvements, the ODFW goals would require full rehabilitation of habitat and removal of all barriers, a level of management not proposed in any alternative. The highest level of habitat would correspond to a CSHCI of 1120 during the 5th decade under Alternative H.

Wildlife

The goals of ODFW for wildlife habitat (from the same letter as for fish) are expressed according to species

Bald Eagle

The ODFW goal was 70 nest sites. All alternatives meet the final Bald Eagle Recovery Plan requirement of 23 sites. Several alternatives (A, F, G, and H) would contain habitat in areas designated for other resource management which would also meet Bald Eagle needs, thereby meeting the ODFW goal

The ODFW requested that all important feeding areas be identified and protected All alternatives would manage any sites found during Forest activities to assure continued use by eagles, but would not specifically attempt to find all the sites

Spotted Owl

Maintenance of all verified pairs of owls and additional interconnecting sites is the goal of ODFW Alternatives F, G, and H would meet or exceed this goal.

The ODFW desires that the quantity and quality of the habitat be improved to provide 2200 acres of old growth per pair All alternatives would have 2000 acres of the oldest available habitat per site unless that much habitat was not present within 1.5 miles of the nest site.

Mature Deciduous Mix Guild

The Forest would need to provide at least 50,000 acres of mature deciduous habitat to meet the ODFW goals All alternatives meet this goal in the 1st decade. By the 5th decade, some alternatives will not meet the goal See "Environmental Consequences on Vegetation" in this Chapter.

Riparian Habitat

The goals of ODFW are at least 4,800 acres of mature riparian habitat, with the remainder of the riparian zone protected from harvest. All alternatives would meet the mature habitat goal. The level of protection for the riparian zone is 22% in Alternative NC, 37% in Alternatives B, B(Dep), and C, 75% in Alternatives A and E(PA), and 100% in Alternatives D, F, G, and H.

Grass-Forb Habitat

All alternatives would provide more than the 12,000 acres of habitat requested by ODFW

Mature Conifer Habitat

The ODFW recommends that there be 50,000 acres of mature conifer habitat on the Forest, some of which could develop into old growth. All alternatives would provide at least this much mature conifer habitat through the 5th decade.

Dead and Defective Trees

The ODFW recommends enough habitat to support at least 50% of the natural levels of dependent wildlife populations in the 1st decade increasing to 70% by the 5th decade. All alternatives meet ODFW goals in the 1st decade. Alternatives G and H are the only alternatives that would meet or exceed ODFW goals in the 5th decade.

Roosevelt Elk

ODFW recommends that elk population increase from 5,000 in the 1st decade to 10,400 in the 5th decade Alternative C is the only alternative that would include enough habitat improvements and clearcutting to provide these levels.

Snowy Plover

ODFW goals for snowy plover are to maintain and improve habitat on the Forest and to prevent unnecessary disturbance of nesting birds. All alternatives would maintain and improve the habitat, but some disturbance of plovers may still occur.

Peregrine Falcon, Aleutian Canada Goose, Brown Pelican

The goal of ODFW is to maintain and improve habitat for these species. This would be done to the extent possible in all alternatives

Black Bear and Furbearers

The ODFW would like there to be enough harvestable animals to meet hunting demand. The Forest has not determined hunting demand and uses ODFW for population estimates. Information on bears and furbearers is improving as more specific information is collected The Forest anticipates meeting the ODFW goal of maintaining a huntable population

Blacktail Deer

The ODFW wants to maintain the deer population at about 31,600. Most high quality forage for deer is found in clearcuts less than 10 years old. The ODFW goal could not be met in the long term because of a lack of forage Alternative C would maintain populations at or above ODFW targets for 4 decades and Alternatives A, B(Dep), C, D, E(PA), F, and G would meet or exceed the goals in the 1st decade. Alternatives B and F would never meet the goals of ODFW but would meet more than 95% of the goal through the 1st decade

Special Habitats

All alternatives would meet ODFW goals by maintaining special habitats and transition zones between these and surrounding areas

Oregon Department of Environmental Quality

All alternatives would be compatible with the Oregon Department of Environmental Quality Water Quality Management Program Regulations which implement this program are specified in the Oregon Administrative Rules, Chapter 340. The Management Requirements for watershed protection are based on these regulations, and would minimize adverse effects on water quality in accordance with OAR 340-41-026 (which describes the general policies and guidelines intended to protect water quality)

A Memorandum Of Understanding between the Pacific Northwest Region of the Forest Service and the state of Oregon Department of Environmental Quality (FSM 1561--21, R6 Supplement) confirms that Forest practices will meet the criteria for Best Management Practices which are required by the Clean Water Act (PL 97-500).

All alternatives would be compatible with existing Basin Programs formulated by the State Water Policy Review Board under ORS 536 300

Wildlife Recovery Plans

Bald Eagle

Inclusion of at least 34 active or potential nest sites in all DEIS alternatives was based on a March 1985 draft Bald Eagle Recovery Plan The final Bald Eagle Recovery Plan (1986) required the Forest to provide 23 sites of at least 125 acres to meet the recovery goal All FEIS alternatives provide 23 sites, some alternatives provide additional habitat that could be used by bald eagles

The recovery plan requires that all important feeding areas be identified and protected. All alternatives would manage any sites found during Forest activities to assure continued use by eagles, but would not specifically attempt to find all the sites

Peregrine Falcon, Aleutian Canada Goose, Brown Pelican

Standards and guidelines in all alternatives, which give priority to habitat of such threatened and endangered species, would meet or exceed the requirements of the species' recovery plans

Silverspot Butterfly

The Forest has an approved plan for implementation of the recovery plan. This would be followed to identify habitat and manage this species in all alternatives

City and County Plans

The state of Oregon instituted a statewide land use planning program in 1973 with the enactment of Senate Bill 100 (subsequently amended and now codified Oregon Revised Statutes Chapter 197). This bill also established a state commission, the Land Conservation and Development Commission (LCDC), to carry out this program The LCDC was directed to develop and adopt statewide standards, called goals, for the management of lands, air, and water resources by cities, counties, special districts, and state agencies. The LCDC has, to date, adopted 19 goals Each alternative has been evaluated to determine the degree of compliance with the goals. The results are portrayed in Table IV-27

City and county comprehensive plans and land use regulations must comply with all provisions of applicable statewide goals. When a city or county believes its plan complies with the goals, the plan is submitted to LCDC for review. If the plan complies, it is acknowledged by the LCDC as meeting the statewide standards The policies of the LCDC are administered by the Department of Land Conservation and Development. The Department is responsible for working with all of the cities and counties in the state to ensure that the statewide goals are correctly applied

All of the cities and counties which include Siuslaw National Forest land have either completed comprehensive plans which have been acknowledged by the LCDC or are submitting revised plans for the LCDC's reconsideration after remand of LCDC acknowledgement orders from the Oregon Court of Appeals These plans have been reviewed by the Forest Service and the plan designations and land use regulations for lands which are adjacent to or intermingled with Forest lands have been inspected for compatibility with the actions proposed in the alternatives. In most instances, county plan designations for adjacent and intermingled nonfederal land are for forestry or agriculture, which allow a wide variety of uses and activities. The uses and activities proposed in the alternatives are generally compatible with farm and forest zones, although incompatibility might arise at certain intensities allowed under a particular alternative. These situations will be identified and analyzed at the site specific level.

Most conflicts that have been identified result from management proposed in the Forest plan alternatives that is more restrictive than designations for the adjacent nonfederal lands While this does not mean the alternative is inconsistent with the county plan, there is a potential for conflict with on-the-ground management. These situations will also be identified and analyzed as a part of site-specific planning

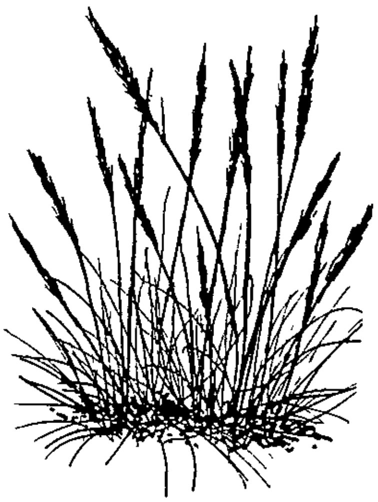


Table IV-27. LCDC Goals and Discussion

LCDC STATE-WIDE GOAL	DISCUSSION
1 Citizen Involvement	The Forest Service's land management planning process and the National Environmental Policy Act process both provide for public involvement Public involvement was specifically requested in determining Issues, Concerns, and Opportunities Several public meetings have been held A series of newsletters have been sent to a mailing list of over 1,000 names This DEIS is another involvement process The Final EIS will also be available for public review and comment
2 Land Use Planning	Forest Planning has taken place within a comprehensive planning process authorized by the National Forest Management Act of 1976 The analysis of alternatives contained in this EIS resulted from the implementation of the Forest Service planning process
3 Agricultural Lands	The majority of public lands in the planning area are not suitable for intensive agriculture None of the alternatives would have any significant effects on the availability of land for agricultural purposes
4 Forest Lands	Forest lands in the planning area will be managed for a variety of uses All of the alternatives would maintain forest lands for forest uses
5 Open Spaces, Scenic and Historic Areas, and Natural Resources	Inventories were conducted to identify significant scenic, historic, and natural resources The alternatives contain different amounts of these for the inventoried areas Alternatives B, B(Dep), C, and D would contain the least protection while Alternatives A, E(PA), F, G, and H would contain increasingly more protection for scenic and other special areas
6 Air, Water, and Land Resources Quality	All alternatives contain provisions to maintain quality of air, water, and land The amounts of protection provided above minimum levels would increase in Alternatives C through H and would be highest in Alternative H
7 Areas Subject to Natural Hazards and Disasters	Federal Executive Order 11988 contains requirements for floodplain management All alternatives would contain provisions to control activities on areas subject to landsliding or mass soil movement Fire protection measures would be contained in all alternatives
8 Recreation Needs	All alternatives would meet the demand for developed recreation projected in the State comprehensive outdoor recreation plan All alternatives would provide a diverse mix of recreational opportunities Alternatives F, G, and H would provide more nonmotorized recreational opportunities

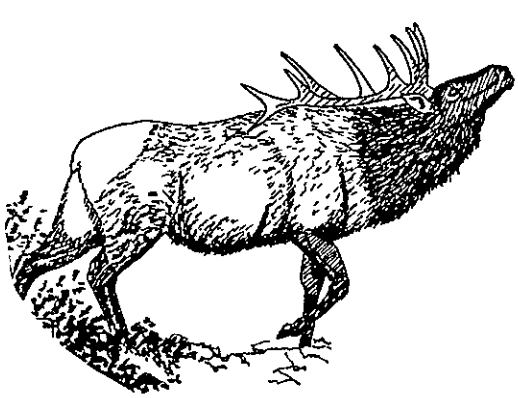


Table IV-27 Cont. LCDC Goals and Discussion

LCDC STATE-WIDE GOAL	DISCUSSION
9 Economy of the state	All alternatives would contribute to the economy of the state of Oregon Alternatives A through E, which would maintain or increase the amount of wood available for sale compared to levels harvested from the Forest in recent years, would maintain or improve economic activity Alternatives F, G, and H, which would make less wood available than has been harvested recently, would result in some decline in economic activity dependent upon wood products However, alternatives which stress amenity values would strengthen the diverse nature of the economy.
10 Housing	None of the alternatives would have any significant effect on the achievement of this goal
11 Public Facilities and Services	None of the alternatives would have a significant effect on the availability of public facilities and services
12 Transportation	All of the alternatives would support the establishment of a safe, convenient, and economic transportation system
13 Energy Conservation	The Forest Service has a comprehensive program of energy conservation All of the alternatives would support that program and would allow the utilization of available biomass as an alternate energy source
14 Urbanization	None of the alternatives would have any significant effects on the orderly transition from rural to urban land use
15. Willamette Greenway	None of the alternatives would affect the Willamette Greenway
16 Estuarine Resources	The alternatives would affect estuarine resources by preventing unacceptably high levels of sediment in Forest streams that feed the coastal estuaries
17 Coastal Shorelands	The alternatives would affect coastal shorelands by encouraging recreation on and around them Most Forest developed recreation sites are near the shorelands
18 Beaches and Dunes	The alternatives would have effects on beaches and dunes similar to those described for Coastal Shorelands (above)
19 Ocean Resources	The alternatives would affect anadromous fish resources by ensuring at least minimum levels of fish habitat on the Forest

The Oregon Coastal Management Program

The Federal Coastal Zone Management Act of 1972 (CZMA), as amended, established a program to encourage states to adopt coastal management programs which would meet national standards A section of the CZMA requires that "Each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs" [Subsection 307(c)(1)] Although Federal lands are excluded from the boundaries of the coastal zone, the "directly affecting" provision requires federal agencies to examine their activities for offsite effects. A direct effect may be either a primary, secondary, or cumulative effect on the coastal zone

The LCDC has administered the Oregon Coastal Management Program (OCMP) since 1975 The federal government officially recognized and approved that program in 1977 The policies of the OCMP include the 19 statewide planning goals, all acknowledged city and county comprehensive plans and land use regulations and the statutory authorities of a variety of state agencies. These statutory authorities are included in the appendix of the OCMP document Federal activities directly affecting the coastal zone must be consistent "to the maximum extent practicable" with all applicable and mandatory OCMP policies, but advisory policies need only be considered The term "to the maximum extent practicable" means that a federal agency's activities must be consistent with federally approved state coastal zone policies whenever the agency has discretion under federal law to abide with state policies The CZMA does not, however, impose a higher duty on federal agencies than a state requires of its own agencies

Oregon Revised Statutes 197.180 requires state agencies to undertake their activities in compliance with the goals and in a manner compatible with acknowledged plans and land use regulations. So, if an examination of the activities included in the alternatives reveals compliance with the goals, compatibility with acknowledged city and county comprehensive plans and land use regulations, and conformance with the various state agency statutory authorities within the OCMP appendix, consistency with the OCMP would be demonstrated.

In summary, the CZMA requires that the stricter standards, either state or federal, be used to govern what activities may be allowed, but state standards are only applicable when a federal agency chooses to support or conduct an activity directly affecting the coastal zone The CZMA does not require federal agencies to initiate activities to be consistent with more permissive state policies

Portions of Oregon's coastal zone in Tillamook, Lincoln, Lane, Douglas, and Coos counties may be directly affected by activities such as silviculture, road construction, fish and wildlife habitat improvement, recreation development, land acquisition, and mineral resource development. These activities can affect water quality, water quantity, living resources of water, water aesthetics, and water surface area (page 17 of the Oregon Coastal Management Program) The alternatives would include all of the above activities and effects on the environment, which are discussed in earlier sections of this chapter.

The comprehensive plans and land use regulations of the five counties have been acknowledged by the LCDC as meeting the requirements of the goals These plans have been reviewed by the Forest Service The effects predicted for the alternatives have been compared with the county plans and have been found to be consistent at the programmatic level. Since the county plans have been found by LCDC to comply with the goals, consistency with the the goals is assumed (to the extent LCDC required these plans to comply with the goals in the first place)

The LCDC has left some provisions of the statewide planning goals to be administered by state agencies rather than local governments These provisions are discussed below

The Forest Practices Act administered by the Oregon Department of Forestry (Goals 5 and 17 and ORS 527.610 ato 527.730)

All Forest practices used to implement the alternatives will meet or exceed the Forest Practices Act

Fish and Wildlife policies administered by the Oregon Department of Fish and Wildlife (Goals 16, 17, and 18 and ORS 496.012 to 496.162 and ORS 506.105 to 506.201)

Alternatives have been formulated to respond to goals proposed by ODFW The goals are sometimes mutually exclusive, so one alternative cannot maximize achievement of all ODFW goals All alternatives contain provisions to provide for the habitat needs of species identified on the state of Oregon Threatened and Endangered Species List

Air and Water Pollution Control statutes administered by the Oregon Department of Environmental Quality (Goal 6 and ORS 468.275 to 468.345 and ORS 468.700 to 468.775)

The Forest Service complies with these requirements by obtaining permits and providing data as needed. For example, any slash burning conducted as a part of implementing an alternative will be authorized by DEQ Pollution control facilities will be operated according to DEQ standards and new facilities would be approved by DEQ before construction

***Regulation of Mining and Drilling administered* by the Department of Geology and Mineral Industries (ORS Chapters 516, 517, and 520)**

Forest Service operations are conducted in compliance with Department of Geology and Mineral Industries rules. Forest Service permitted operations are required to obtain necessary permits before they commence

Fill and Removal administered by the Division of State Lands (Goals 16, 17, and 18 and ORS Chapters 274, 517, and 541)

Any fill and removal operations conducted by the Forest will meet permit requirements of the DSL

Ocean Shore Regulation and Scenic Waterways administered by the Parks and Recreation Division (Goals 16, 17, and 18 and ORS Chapter 340)

Any activities in the Ocean Shore zone or affecting State Scenic Waterways will be coordinated with the Parks and Recreation Division

Regulation of water withdrawals administered by the Department of Water Resources (ORS Chapters 536 and 543)

Forest Service water use will comply with applicable Department of Water Resource requirements

Site specific actions may have to be examined in more detail before a final determination of consistency with the OCMP can be made. Project implementing actions will be examined to determine if they have the potential to directly affect Oregon's Coastal Zone. If the directly affecting test is met, a site specific consistency determination will be made This determination will address the goals, the acknowledged plans, and the statutory authorities This approach is consistent with the OCMP (page 44 of the Program)

ENERGY REQUIREMENTS OF ALTERNATIVES

The alternatives would vary in terms of energy use and production, although it is not possible at this time to specifically quantify the energy requirements The estimated energy consumption of each alternatives is based upon energy used for timber harvest, administration, road construction, and road reconstruction. Fuelwood production parallels overall timber production in the alternatives. Energy consumption related to timber production would account for the vast majority of the use

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Acronyms

ACRONYMS

AMS	Analysis of the Management Situation
ASQ	Allowable Sale Quantity
AUMs	Animal Unit Months
BF	Board Feet
BLM	Bureau of Land Management
BMP	Best Management Practice
BPA	Bonneville Power Administration
BTU	British Thermal Unit
CC	Clearcut
CCC	Civilian Conservation Corps
CEQ	Council on Environmental Quality
CF	Cubic Feet
CFR	Code of Federal Regulations
CHEF	Cascade Head Experimental Forest
CHSRA	Cascade Head Scenic-Research Area
CMAI	Culmination of Mean Annual Increment
COPE	Coastal Oregon Productivity Enhancement
CSHCI	Coho Smolt Habitat Capability Index
CZMA	Coastal Zone Management Act
DBH	Diameter Breast Height
DEIS	Draft Environmental Impact Statement
(DEP)	Departure
DFSIM	Douglas-fir Growth and Yield Simulator
DM	Deciduous Mix

ACRONYMS

EIS	Environmental Impact Statement
EA	Environmental Assessment
FEIS	Final Environmental Impact Statement
FIOA	Freedom of Information Act
FERC	Federal Energy Regulatory Commission
FORPLAN	Forest Planning Model (Primary analytical tool used)
FPFO	Forestry Program for Oregon
FSH	Forest Service Handbook
FSM	Forest Service Manual
HCI	Habitat Capability Index
ICO	Issues, Concerns, and Opportunity
IDT	Interdisciplinary Team
LCDC	Land Conservation and Development Commission
LTSYC	Long-term sustained yield capacity
LTA	Landtype Association
M	Thousand
MA	Management Area
MM	Million
MMM	Billion
MMRs	Minimum Management Requirements
MOM	Mature and Over-Mature
MR	Management Requirement
MRVD	Thousand Recreation Visitor Days
MUPRB	Multiple Use Plan Resource
NC	No Change
NDF	Non-declining Flow

NEPA	National Environmental Policy Act of 1969
NFL	National Forest land
NFMA	National Forest Management Act of 1976
NPB	Net Public Benefits
NRA	National Recreation Area
NRI	Nationwide Rivers Inventory
NRHP	National Register of Historic Places
NTUs	Naphthalene Turbidity Units
OAR	Oregon Administrative Rule
OCMP	Oregon Coastal Management Program
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ODNRA	Oregon Dunes National Recreation Area
ONHP	Oregon Natural Heritage Program
ORC	Oregon Rivers Council
ORS	Oregon Revised Statute
ORV	Off-road Vehicle
(PA)	Preferred Alternative
PL	Public Law
PAOT	Persons at One Time
PNV	Present Net Value
PNW	Pacific Northwest
R	Rural (ROS category)
RARE II	Roadless Area Review and Evaluation II
RAM	Resources Allocation Model
RD	Ranger District

RMO	Road Management Objective
RN	Roaded Natural (ROS category)
RNA	Research Natural Area
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resources Planning Act of 1976
RVD	Recreation Visitor Day
S&G	Standard and Guideline
SCORP	State Comprehensive Outdoor Recreation Plan
SEIS	Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide, Spotted Owl Guidelines
SHPO	State Historic Preservation Office
SIA	Special Interest Area
SMU	Streamside Management Unit
SOHA	Spotted Owl Habitat Area
SPM	Semiprimitive Motorized (ROS Category)
SPNM	Semiprimitive Nonmotorized (ROS Category)
SRI	Soil Resource Inventory
STO	Siuslaw Timber Operations
SVLAs	Stability Vegetation Leave Area
T&E	Threatened and Endangered
TE&S	Threatened, Endangered and Sensitive
TRP	Timber Resource Plan (1979)
TSP	Total Suspended Particulates
TSPQ	Timber Sale Program Quantity
USDA	United States Department of Agriculture

USDI	United States Department of Interior
VIS	Visitor Information Services
VMS	Visual Management System
VQO	Visual Quality Objective
WFUD	Wildlife-fish User Days
W&S	Wild and Scenic

Glossary

GLOSSARY

A

Accelerated Erosion - Any increase in the natural rate of an erosion process such as landsliding, stream channel scour, or dry ravel. Accelerated erosion can be caused by management activities that, 1) alter the natural erosion resisting forces (root strength, interparticle binding), 2) alter the flow of ground or surface water, or 3) change the natural arrangement of soil or rock materials.

Acquired Lands - Lands added to the National Forest system by purchase, transfer, or donation under authority of the Weeks Law or related acts. Also, lands obtained by the Forest Service by exchange for other acquired lands.

Acre-foot - A measure of water or sediment volume, equal to an amount of material which would cover one acre to a depth of one foot (i e , 43,560 cubic feet or 325,851 gallons)

Activity - A measure, course of action, or treatment undertaken that directly or indirectly produces, enhances, or maintains forest and rangeland outputs, or achieves administrative or environmental quality objectives. (FSM 1309, Management Information Handbook) An activity can generate multiple outputs

Activity Fuels - Fuels generated or altered by a management activity.

Administrative Unit - An area under the administration of one line officer, such as a District Ranger, Forest Supervisor, or Regional Forester

Airshed - A geographical area that, because of topography, meteorology, and climate, shares the same air

Allocation - See *Resource Allocation*

Allowable Sale Quantity (ASQ) - The quantity of timber that may be sold from the area of suitable land covered by the forest plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity." (36 CFR 219.3)

All Terrain Vehicle (ATV) - A vehicle characterized by its ability to negotiate most kinds of terrain by virtue of traction devices such as wide tracts, large, low-pressure rubber tires, and/or four-wheel drive

Alternative - One of several policies, plans, or projects proposed for decision making.

Amenity - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses Amenity value is typically used in land management planning to describe those resource properties for which monetary values are not or cannot be established (such as clean air, or scenic quality)

Anadromous Fish - Those species of fish that mature in the sea and migrate into streams to spawn Salmon, steelhead, and searun cutthroat trout are examples.

Analysis Area - A delineated area of land subject to analysis of (1) responses to proposed management practices, rangeland outputs and environmental quality objectives, and (2) economic and social impacts

Analysis of the Management Situation (AMS) - A determination of the ability of the planning area to supply goods and services in response to society's demand for those goods and services

Animal Unit Months (AUMs) - Amount of feed or forage required by one mature (1000 pound) cow or the equivalent for one month (based upon average forage consumption of 26 lbs dry matter per day)

Appropriated Funds - Monies authorized by an act of Congress which permit Federal agencies to incur obligations and to make payments out of the U S. Treasury for specified purposes.

Aquatic Ecosystems - Stream channels, lakes, marshes or ponds, and the plants and animals they support

Arterial Roads - Primary travel routes that provide service to a large land area, and which usually connect with public highways, or other Forest Service arterial roads

Assigned Values - Monetary values given to nonmarket resources, based on estimates for market transactions. For example, the benefits of dispersed recreation are given as values for their production

B

Background - The visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. (See "Foreground" and "Middleground.")

Benchmark - Reference points that define the bounds within which feasible management alternatives can be developed Benchmarks may be defined by resource output or economic measures

Benefit (Value) - Inclusive terms used to quantify the results of a proposed activity, project or program expressed in monetary of nonmonetary terms.

Best Management Practices - A practice or combination of practices that is determined by a State (or designated area-wide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (Federal Register, Volume 40, No 230 dated 11/28/75)

Big Game - Those species of large animals normally managed for sport hunting. In the Coast Range these include deer, elk, and bear

Biological Growth Potential - The average net growth attainable in a fully stocked natural forest stand (36 CFR 219 3)

Biomass - The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or of all the species in a biotic community (community biomass).

Board Foot - A unit of measurement represented by a board one foot square and one inch thick

Board Foot/Cubic Foot Conversion Ratio - A specific factor by species that is applied to the FORPLAN cubic foot outputs to give board foot estimates The number of board feet per cubic foot of volume varies with tree species, diameter, height, and form factors Both board foot and cubic foot volumes can be determined for timber stands.

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

Brush - A growth of shrubs or small trees usually of a type undesirable to livestock or timber management

Built Environment - Areas altered by human activity (e g roads, harvest units, buildings) in contrast to the natural environment

Buyback and Defaulted Timber Sales - In 1984, the Federal Timber Contract Payment Modification Act was enacted by Congress. It allowed private companies to return timber sales not economical to harvest after payment of a fee to the government The sales returned under the conditions of this Act are known as "buyback" sales A timber sale is considered "defaulted" if it is not in compliance with the terms of the contract by the contract termination date. Defaulted sales are also returned to the government.

C

Cable Logging - Methods used to skid or pull logs to a central landing or collection area by a cable connected to a remote power source

Canopy - The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth

Capability - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at given levels of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils and geology, as well as the application of management practices, such as silviculture or protection from fire, insects and disease (36 CFR 219.3)

Capability Area - Geographic delineations used to describe characteristics of the land and resources in integrated forest planning Capability areas may be synonymous with ecological land units, ecosystems or land response units

Capital Investment - An input that increases the stock of natural or manmade resources (assets) needed to maintain or increase the flow of outputs in the future. Benefits resulting from capital investments are normally recouped in excess of 1 year.

Coho Smolt - *Young coho salmon which are ready to migrate to the sea*

Carrying Capacity - 1 (recreation): The number of people that can occupy an area for a given social and experience goal, 2 (wildlife): The maximum number of animals an area can support through the least favorable environmental conditions that occur during a given period of the year, 3 (range): The maximum stocking rate possible without damaging the vegetation or related resources Carrying capacity may vary from year to year on the same area due to fluctuating forage production.

Cavity - The hollow excavated in trees by birds or other animals. They are used for roosting and reproduction by many birds and mammals

Channel or Stream Scour - Erosion of the channel bottom caused by high flows of water, loss of channel stability, or debris torrents.

Chargeable Timber Volume - The timber removed from regulated forest land that contributes to meeting the annual sustained-yield capacity.

Clearcutting - The harvesting at one time of all trees on an area for the purpose of creating a new, even-aged stand The area harvested may be a patch, strip, or stand large enough to be mapped or recorded as a separate class in planning for sustained yield

Climax - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition

Climax Species - Those species that dominate a climax stand in either numbers per unit area or biomass

Coastal Douglas-Fir Zone - The area west of the crest of the Cascade Mountain Range in the States of Oregon and Washington.

Code of Federal Regulations (CFR) - A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government

Coho Smolt - Young coho salmon which are ready to migrate to the sea.

Collector roads - Roads that serve small land areas and are usually connected to National Forest arterial roads or public highways. They collect traffic from local roads and terminal facilities. Collector roads are maintained for continuous use

Commercial Forest Land - Land that is producing, or is capable of producing, crops of industrial wood and (1) has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service; (2) land where existing technology and knowledge is available to ensure timber production without irreversible damage to soil productivity or watershed conditions; and (3) land where existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be obtained within 5 years after final harvesting

Commercial Thinning - Any type of tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting

Commodity - A transportable resource product with commercial value; all resource products that are articles of commerce.

Common Variety Mineral Materials - Mineral materials such as rock and gravel commonly available in most locales that may be sold by the Federal government as determined by Federal statutes and regulations.

Community Cohesion - The degree of unity and cooperation within a community in working toward shared goals and solutions to problems

Community Stability - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change

Compaction - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density

Concern - A point, matter, or question raised by management that must be addressed in the planning process

Congressionally Classified and Designated Areas - Areas that require congressional enactment for their establishment, such as National Wildernesses, National Wild and Scenic Rivers, and National Recreation Areas

Consumptive Use - Those uses of a resource that reduce its supply.

Conversion Period - The duration of a change from one silvicultural system to another or from one tree species to another

Core Area - An area (as related to the spotted owl) encompassing at least 300 contiguous acres of old growth suitable for nesting and reproduction The area consists of a pair's territory, in part, the nest site, and principal roost areas

Corridor - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries

Cost - Capital Investment - The cost of manmade structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods

Costs - Minimum funds needed to achieve the standards and guidelines in the management prescriptions

Costs, direct - Costs that directly contributes to the production of the primary outputs of an activity, project, or program

Costs, economic - Total fixed and variable costs for inputs, including costs incurred by other public parties and, if appropriate, opportunity cost and cost savings.

Costs, investment - The cost of creating or enhancing assets, including cost of administrative or common-use transport facilities and resource management investments

Costs, operational - The cost of planning and managing existing resources and assets

Costs, opportunity - The value of a resource's foregone net benefits in its most economically efficient alternative use

Costs, variable - Costs that vary with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered

Cost Effective - Achieving specified outputs or objectives under given conditions for the least cost.

Cost Efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs including environmental, economic, or social impacts are not assigned monetary values but are achieved at specified levels in the least cost manner. Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and rates-of-return may be appropriate. (36 CFR 219 3)

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters. (Abstracted from the National Environmental Policy Act of 1969, as Amended.)

Created Opening - Openings in the Forest created by the silvicultural practices of clearcutting, seed tree cutting, group selection cutting, or the final shelterwood regeneration cut.

Cubic Foot (CF) - The amount of timber equivalent to a piece of wood having dimensions of one foot by one foot by one foot.

Culmination of Mean Annual Increment - The point in the life of a tree in which the average annual growth in volume (as measured by the periodic annual increment) is equal to, or less than the average growth in volume over the life of the tree (as measured by the mean annual increment). This measurement represents the point at which the annual growth rate begins to slow as compared to the average rate of growth during all previous years

Cultural Resources - The remains of sites, structures, or objects used by humans in the near (historical) or distant (archaeological) past.

Cumulative Impact (Effect) - The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7)

D

Debris Slide - A shallow landslide of soil, rock, and organic material that occurs on steep slopes under the influence of intense rainfall

Debris Torrent - A large debris slide that is charged with water and confined to a steep stream channel Debris torrents may travel several thousand feet

Decision Criteria - Essentially the rules or standards used to evaluate alternatives. They are measurements of indicators that are designed to assist a decision maker in identifying a preferred choice from an array of possible alternatives

Decision Maker - One of four line officer positions within the Forest Service. These include District Rangers, Forest Supervisors, Regional Foresters, and the Chief of the Forest Service (or an alternate or deputy having designated authority) Each position has well defined limits of authority with the District Ranger having the least and the Chief having the most.

Decision Variable - A component of an alternative in which activities and their costs, outputs, and benefits are identified and used for analysis and decision making. All activities and costs necessary to accomplish the outputs and benefits are included FSH 1309 11 contains decision variable definitions and codes.

Demand - The amount of an output that users are willing to take at a specified price, time period, and condition of sale.

Demand Analysis - A study of the factors affecting the schedule of demand for an output, including the price-quantity relationship if applicable.

Departure - A schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future.

Designated Area (Air Quality) - Those areas delineated in the Oregon and Washington Smoke Management Plans as principal population centers of air-quality concern

Desirable Residual Vegetation - The remaining vegetation after application of harvest cutting methods that meets management area objectives. The vegetation may be trees, shrubs, grass, or a combination

Developed Recreation - Recreation that requires facilities that, in turn, result in concentrated use of an area An example of a developed recreation site is a campground; facilities might include roads, parking lots, picnic tables, toilets, drinking water, and buildings

Diameter at Breast Height (DBH) - The diameter of a tree measured 4 feet 6 inches above the ground

Discount Rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits

Discounting - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common point in time, usually the present, for comparison

Dispersion Evaluation Area (Air Quality) - An area of land defined by topographic features, such as stream drainages, that are typically 2,000 to 5,000 acres in size, but do not exceed 10,000 acres

Dispersed Recreation - A general term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-county skiing, and recreation in primitive environments

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan (36 CFR 219 3)

Douglas-Fir Type - An association of tree species in which Douglas-fir is recognized as one of the principal seral species.

Draft Environmental Impact Statement (DEIS) - The draft statement of environmental effects which is required for major federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review

Dry Ravel - The slow to very rapid gravity driven movement of dry soil Dry ravel usually occurs when the organic materials in the surface few inches of the soil are severely altered by fire. Dry ravel is most likely where soils are medium to coarse textured and slopes are over 60% gradient.

Duff - Organic matter in various stages of decomposition on the floor of the forest

E

Ecosystem - A complete, interacting system of organisms considered together with their environment; for example a marsh, a segment of stream, or a lake.

Effects - Environmental consequences as a result of a proposed action Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Effects and impacts as used in this statement are synonymous Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508.8).

Endangered Species - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range. Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act.

Ending Inventory Constrain - The standing volume left in the inventory at the end of the planning horizon. The constraint insures that there is enough standing inventory at the end of the planning horizon to perpetuate long-term sustained yield capacity harvest levels on a nondeclining flow basis.

Enhance - The altering of any natural feature or organism to improve its ability to produce benefits Examples are. changes in the genetic makeup of commercial species of trees to increase growth; blasting of rock waterfalls that prevent migration of fish to upstream areas, and fertilization of soils.

Environmental Analysis - An analysis of alternative actions and their predictable short- and long-term environmental effects, incorporating the physical, biological, economic, social, and environmental design arts and their interactions.

Estuary - A semi-closed body of water which has a free connection with the open sea The sea water in an estuary is measurably diluted with fresh water from streams, rivers, or ground water.

Environmental Assessment - A concise public document, sometimes used to comply with the regulations implementing the National Environmental Policy Act (40 CFR 1508 9)

Environmental Impact Statement (EIS) - A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal

Even-aged Management - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes throughout the forest area) The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age. Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands (36 CFR 219 3)

Existing Condition - Representation of a resource condition, level of resource output, or environmental effect that exists within a defined area for a specified period of time as defined in the text

Existing Utility Corridor - A strip of land containing one or more existing linear utility rights-of-way, which is or will be designated in Forest planning in order to facilitate future authorization of additional utility rights-of-way.

Extensive Forest Management - A low investment level of management on regulated timberlands that requires initial harvest, regeneration, and final harvest Some precommercial thinning may be done to prevent stagnation and disease buildup

F

Final Environmental Impact Statement (FEIS) - The final version of the statement of environmental effects required for major federal actions under section 102 of the National Environmental Policy Act. It is a revision of the draft environmental impact statement to include public and agency responses to the draft

Floodplain - The lowland and relatively flat areas adjoining inland and coastal waters including, at a minimum, those areas subject to a 1-percent or greater chance of flooding in any given year (100-year recurrence).

Forage - All browse and nonwoody plants available to livestock or wildlife for grazing or harvested for feed

Foreground - A term used in visual management to describe the stand of trees immediately adjacent to a high-value scenic area, recreation facility, or forest highway (See "Background," "Middleground ")

Forest Land - Land at least 10 percent occupied by forest trees of any size or formerly having had such tree cover and not currently developed for nonforest use. (36 CFR 219 3) Also see non-forest land

Forest Program - A forest program is the summary or aggregation of project or activity information that makes up an integrated (multifunctional) course of action for a given level of funding on a National forest that is consistent with the Forest plan

Forest Residues (Logging Slash) - The unused portions of sawtimber and poletimber trees cut or killed by logging

Forest Type - A classification of forest land based upon the tree species presently forming a plurality of basal area stocking in live trees

FORPLAN - A linear programming system used for developing and analyzing forest planning activities

Free-to-grow - A term used by silviculturists to indicate that trees are free of growth restraints, the most common of which is competing over-topping vegetation.

Fuel Management - The practice of planning and executing the treatment or control of living or dead vegetative materials in accordance with fire management direction.

Fuel Treatment - The rearrangement or disposal of natural fuels or fuels generated by management activity, such as slash left from logging to reduce fire hazard

G

Goal - A concise statement that describes a desired condition to be achieved sometime in the future It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed. (36 CFR 219.3)

Goods and Services - The various outputs, including on-site uses, produced from forest and rangeland resources. (36 CFR 219.3)

Guild - A group of plants or animals that demonstrate a similar ecological inter-relationship; a group of species that have a similar mode of life (e g aly bird species that use cavities in snags for nesting.)

H

Habitat - The place where a plant or animal naturally or normally lives and grows

Habitat Capability - The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population It is measured in terms of potential population numbers

Habitat Capability Index - An indirect measure of the quality and quantity of habitat for a specific species, or group of species. The index is usually a range that is based on the predicted number of animals that could theoretically occupy the habitat available given a certain set of management prescriptions

Habitat Capability Model - A model which depicts the relationship of a species to a variety of habitat factors which provide for quantitative predictions of a species response (animal numbers) to habitat change.

Habitat Diversity - Distribution and abundance of plant and wildlife habitats within a given area Also, the mix of the component parts found within a particular habitat, e g , in a salmonid habitat, the pools, riffles, cover, etc.

Habitat Improvement - Practices that increase the value or utilization of a particular habitat over what it is naturally Examples include fish ladders over impassible waterfalls, and development of permanent meadows on timber or brush lands.

Habitat Restoration - Practices that restore a particular habitat to its natural or near natural condition following degradation of that habitat Examples include rock or log structures in streams where landslides have destroyed fish habitat, and creation of snags in basins where the natural snags have been lost through harvest, fire, or wind.

Hardwood - Broad-leaved and deciduous trees.

Harvest Cutting Method - A combination of interrelated actions whereby forests are tended, harvested, and replaced The combination of management practices used to manipulate the vegetation results in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged.

Headwalls - Upper sideslope concave slopes that are often the most active erosion surfaces in a stream system

Herbaceous - An adjective describing seed-producing plants that do not develop persistent woody tissue, but die down to ground level at the end of the growing season.

Hiding Cover - Cover used by animals to hide from predators, and/or provide a sense of security For elk, any vegetation capable of hiding 90% of a standing adult elk at 200 feet or less

High Risk Landtype - A Soil Resource Inventory mapping unit that has more than an 80% probability of experiencing (on the average) one or more landslides larger than 290 cubic yards within 40 acres that are clearcut and burned

High Risk Slope - Any forested slope that would be considered likely (more than approximately a 50% chance) to experience a landslide as a consequence of the destabilizing effects of clearcut harvest activities

Hydrologic - Pertaining to the quantity, quality, and timing of water yield.

I

Impact - See effect.

Implan - A computer-based system used by the Forest Service for constructing nonsurvey input-output models to measure economic input.

Indicator Species - Species identified in a planning process that are used to monitor the effects of planned management activities on habitat of wildlife and fish because its welfare is presumed to be an indicator of the welfare of other species using the same habitat A species whose condition can be used to assess the impacts of management actions on a particular area

Individual Domestic Watershed - Any watershed which provides water for human consumption not meeting the criteria listed in the definition of a Municipal Watershed

Integrated Pest Management - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resources values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pesthost system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable (36 CFR 219 3)

Intensive Forest Management - A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest

Interdisciplinary Approach - Integrating the concepts from two or more areas of knowledge and skills to focus on the same task, problem, or subject

Interdisciplinary Team (ID Team) - A group, each with specific training in one or more disciplines, assembled to solve a problem or perform a task The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve complex resource problems

Intermingled Ownerships - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies

Intermittent Stream - A stream that runs water in most months, but does not run water during the dry season during most years.

Irretrievable - Applies to losses of production, harvest, or use of renewable natural resources. For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sport site If the use is changed, timber production can be resumed The production lost is irretrievable.

Irreversible - Applies primarily to the extractive use of nonrenewable resources, such as minerals or cultural resources, or to those factors, such as in-place soil development, that are renewable only over long time periods Irreversible also includes loss of future options.

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process

L

Land and Water Conservation Fund (L&WCF) - Funds collected from sales of surplus Government real property, motorboat fuels taxes, recreation use fees, etc which are available to purchase and develop certain qualifying lands for recreational purposes.

Landform - An area of land defined by its particular shape that has resulted from a specific combination of bedrock, soils, erosion processes, vegetation, and climate.

Lands Not Appropriate for Timber Production - Includes lands that· 1) are proposed for resource uses that preclude timber production, such as Wilderness; 2) have other management objectives that limit timber production to the point where management requirements set forth in CFR 219 27 cannot be met; or, 3) are not cost efficient over the planning horizon in meeting forest objectives including timber production (36 CFR 219.14 (c))

Lands Not Suited (Unsuitable) for Timber Production - Includes lands that: 1) are not forest land as defined in CFR 219 3; 2) are likely, given current technology, to suffer irreversible resource damage to soils productivity, or watershed conditions; 3) cannot be adequately restocked as provided in 36 CFR 219 27(c)(3); or, 4) have been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service In addition, Forest lands other than those that have been identified as not suited for timber production shall be reviewed and assessed prior to formulation of alternatives to determine the costs and benefits of a range of management intensities for timber production (36 CFR 219 14(a)(b))

Lands Suitable for Timber Production - Includes all lands not classified as either Not Suited or Not Appropriate for Timber Production

Landtype - A delineation of the Forest mapped in the *Siuslaw National Forest Soil Resource Inventory* that has a defined arrangement of specific landforms that reacts to management activities in generally predictable ways Landtypes range from 60 to 600 acres in size

Landtype Association - A group of landtypes that make up a large portion of the Forest The landtypes in the associations are sufficiently homogeneous to be considered as a whole for modeling the future outputs and effects of planned management activities Landtype Associations do not usually follow watershed boundaries and are defined on the basis of general similarities in geology, climate, landform and vegetation Landtype Associations on the Forest range in size from 14,000 to 93,000 acres

Leasable Minerals - Valuable mineral deposits such as oil that may be extracted under lease from the Federal government as determined by Federal statutes and regulations

Lifestyle - The characteristic way people live, indicated by consumption patterns, work, leisure, and other activities.

Locatable minerals - Valuable mineral deposits, such as gold bearing ore, upon which mining claims may be filed as determined by Federal statutes and regulations

Logging Residues - See *Slash*.

Long-term Sustained Yield Capacity - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple use objectives

Low Risk Landtype - A Soil Resource Inventory mapping unit that has less than an 80% probability of experiencing (on the average) one or more landslides larger than 290 cubic yards within 40 acres that are clearcut and burned.

Low Risk Slope - Any forested slope that would be considered unlikely (less than approximately a 50% chance) to experience a landslide as a consequence of the destabilizing effects of clearcut harvest activities.

M

Management Area - An area with similar management objectives and a common management prescription.

Management Concern - An issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process (36 CFR 219 3)

Management Direction - A statement of multiple-use and other goals and objectives, the associated management prescriptions, and standards and guidelines for attaining them (36 CFR 219 3)

Management Indicator Species - Species identified in a planning process that are used to monitor the effects of planned management activities on habitat of wildlife and fish because its welfare is presumed to be an indicator of the welfare of other species using the same habitat A species whose condition can be used to assess the impacts of management actions on a particular area.

Management Intensity - The management practices or combination of management practices and associated costs designed to obtain different levels of goods and services (36 CFR 219 3)

Management Practice - A specific activity, measure, course of action, or treatment.

Management Prescription - The management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives. In FORPLAN, the combination of a management emphasis and associated management intensities with a variety of timing choices for implementation

Management Requirement (MR) - Minimum standards for accomplishing National Forest System goals and objectives MRs are intended to protect resources including riparian areas, wildlife and fish habitats, soil productivity and water quality and vegetation communities Management requirements apply to all activities including vegetation manipulation, silvicultural practices, and construction projects

Mature Cover - Cover for deer and elk that provides hiding and thermal cover characteristics as well as supplemental forage. This cover condition generally occurs when timber stands reach approximately 70 years of age, the dominant trees average 21 inches d.b h. or greater, and the average crown closure is 70 percent or greater

Middleground - The visible terrain beyond the foreground where individual trees are still visible, but do not stand out distinctly from the stand. (See "Foreground" and "Background.")

Management Requirements - Requirements for land management activities necessary to meet all applicable laws and regulations.

Maximum Modification - See *Visual Quality Objective.*

Middle Ground - A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer

Mitigation - Practices intended to reduce the adverse effects of certain management activities Mitigation includes (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (d) reducing or elimination the impact over time by preservation and maintenance operations during the life of the action; and, (e) compensating for the impact by replacing or providing substitute resources or environments. (40 CFR Part 1508 20)

Modification - See *Visual Quality Objective*

Multiple Use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions, that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output (36 CFR part 219 3)

Municipal Watershed - A watershed which provides water for human consumption, where Forest Service management could have a significant effect on the quality of water at the intake point, and that provides water utilized by a community or any other water system that regularly serves: 1) at least 25 people on at least 60 days in a year, or 2) at least 15 service connections In addition to cities, this includes campgrounds, residential developments, and restaurants

N

Net Cash Flow - The difference between the annual receipts of an alternative and costs required to implement that alternative

National Environmental Policy Act (NEPA) of 1969 - An Act to declare a National policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, Agriculture Handbook No 453, USDA, Forest Service, 359 pp)

National Forest Land and Resource Management Plan - A Plan which "... shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner "

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Regional Guides and Forest Plans, and the preparation of regulations to guide them.

Net Receipts - Receipts minus costs.

Net Public Benefits - An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principles of multiple-use and sustained-yield. (36 CFR 219 3)

Nitrogen-Fixing (Nitrogen Fixation) - Conversion of atmospheric nitrogen by plants such as red alder into combined forms (primarily ammonia) that, following additional chemical processes, provide nitrogen to plants as a necessary and often growth limiting nutrient

No Change Alternative (Alternative NC) - A supplemental Alternative added at the direction of the Chief to the ten alternatives described in the DEIS The No Change Alternative provides information about the 1979 Siuslaw Timber Resource Plan (TRP) in the form of an alternative to the Proposed Forest Plan Major changes in information about Forest resources since the development of the TRP make direct comparison between the No Change Alternative and Alternatives developed in the DEIS difficult or impossible.

Non-cash Benefit - Benefits that resource users are willing to pay for or what current market prices indicate they should pay above any fees paid to the Forest Service

Nonchargeable Timber Volume - All volume not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity

Nonconsumptive Use - That use of a resource that does not reduce its supply; for example, nonconsumptive uses of water include hydroelectric power generation, boating, swimming, and fishing.

Nondeclining Flow - A policy governing the volume of timber removed from a National Forest, which states that the volume planned for removal in each succeeding decade will equal or exceed that volume planned for removal in the previous decade. Regulated by the Base Sale Schedule

Nongame - Species of animals not managed for sport hunting.

Nonforest - Lands less than 10 percent occupied by forest cover of any size and not formerly having had such tree cover, or currently being developed for non-forest use Lands developed for non-forest use include areas for crops, improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road clearing and powerline clearing of any width (36 CFR 219.3)

Nonmarket - Products derived from National Forest resources that do not have a well-established market value, for example, recreation, wilderness, wildlife.

O

Objective - A concise, time-specific statement of measurable planned results that respond to preestablished goals An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals (36 CFR 219 3)

Off-Road Vehicle (ORV) - Two, three, or four wheeled motorized vehicles designed for use off of constructed roads

Old-growth Habitat - Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs

Old-growth Stand - Vegetation community dominated by an overstory of old-growth conifer trees Understory vegetation is sparse, and dominated by shade tolerant species such as huckleberry, Oregon grape, and swordfern.

Old-growth Trees - Trees that have the age and growth characteristics of trees in an old-growth stand, but are too few in number or too scattered to be considered part of an old-growth stand

Operational Costs - Those costs required to operate programs, administer the activities involved, and maintain capital improvement

Opportunity - A proposal that is considered in developing alternatives, projects or programs where an option exists to invest profitably to improve or maintain a condition

Opportunity Costs - The economic and resource values that are foregone in order to meet an objective

Optimal Cover - The most preferred cover condition by deer and elk It has the following characteristics 1) four layers vegetation layers including an overstory canopy, a sub-canopy, a shrub layer, and a herbaceous layer; 2) an overstory canopy which can intercept and hold a substantial amount of snow yet has dispersed, small (less than 1/8 acre) openings This cover type provides hiding and thermal cover characteristics as well as supplemental forage during adverse weather This condition generally occurs when timber stands reach approximately 120 years of age, the dominant trees are greater than 21 inches d.b h , and the crown closure exceeds 70 percent.

Output - A good, service, or on-site use that is produced from forest and rangeland resources See FSH 1309 11 for forest and rangeland outputs codes and units measure Examples: N06-Softwood Sawtimber Production MBF; X80-Increased Water Yield - Acre Feet; W01-Primitive Recreation Use RVDs.

P

Partial Cut - A variety of silvicultural practices where a portion of the stand is removed and a portion is left

Partial Retention - See *Visual Quality Objective*

Perennial Stream - Stream that runs water in every month during most years.

Persons at One Time (POAT) - A recreation capacity measurement term indicating the number of people who can use a facility or area at one time

Pests - Any animal or plant that, during some portion of its life cycle, inhibits the establishment or growth of some other species of plant or animal favored by man.

Planning Horizon - The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (36 CFR Part 219 3)

Planning Period - One decade The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits (36 CFR Part 219 3)

Potential Yield - (This term is in reference to the 1979 Timber Resource Plan only.) Optimum sustained yield of timber harvest volume attainable with intensive forestry on available commercial forest land (forest lands able to produce 20 cubic feet of timber per acer per year or more) while considering the interrelationship with other forest resources and uses. Intensive forestry includes planting only with genetically superior stock, precommercial thinning, commercial thinning and release from competition with noncommercial species. Programmable net salvage volume and volume from marginally economical lands are also included

Present Net Value (PNV) - A value that represents the dollar difference between the discounted value of all outputs to which monetary values are assigned and the discounted costs of managing the Forest for the next 150 years

Professional Judgment - Theoretical statement of conditions, or interrelationships involving natural features or phenomenon based on experience rather than rigorous research, by a person trained in the science and current state of the art of the particular field for which the statement applies (e g habitat requirements of species not studied in detail, as stated by a wildlife biologist)

Program - Sets of activities or projects with specific objectives, defined in terms of specific results and responsibilities for accomplishments

Programmed harvest - The amount of timber on the Forest that is scheduled for harvesting. The programmed harvest is based on current demand, funding, and multiple-use considerations.

Program Element - An individual Forest Service area of responsibility, which in combination with other elements, comprises the statutory or Executive directed mission of the Forest Service. Specific Forest Service program elements are defined in the Management Information Handbook (FSH 1309 11)

Project - An organized effort to achieve an objective identified by location, activities, outputs, effects, and time period and responsibilities for execution.

Public Involvement - A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) informing the public about Forest Service activities, plans, and decisions, and (2) encouraging public understanding about and participation in the planning processes which lead to final decision making.

Public Issue - A subject or question of widespread public interest relating to Management of the National Forest System (36 CFR 219.3)

Public Participation Activities - Meetings, conferences, seminars, workshops, tours, written comments, survey questionnaires, and similar activities designed or held to obtain comments from the general public and specific publics

R

Range - Land producing native forage for animal consumption, and lands that are revegetated naturally or artifically to provide forage that is managed like native vegetation

Raptors - Predatory birds, such as falcons, hawks, eagles, or owls

Real Dollar Value - A monetary value which compensates for the effects of inflation (36 CFR 219 3)

Receipts - Those priced benefits for which money will actually be paid to the Forest Service: recreation fees, timber harvest, mineral leases and special use fees.

Record of Decision - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the selected alternative have been adopted, and if not, why not

Recreation Capacity - The number of people that can take advantage of the supply of a recreation opportunity during an established use period without substantially diminishing the quality of the recreation experience or the biophysical resources

Recreation Information Management (RIM) - A computer-oriented system that organizes and manages information concerning recreation use, occupancy, and management of National Forest lands

Recreation Opportunity Spectrum (ROS) - Land delineations that identify a variety of recreation experience opportunities categorized into six classes on a continuum from primitive to urban. Each class is defined in terms of the degree to which it satisfies certain recreation experience needs, based on the extent to which the natural environment has been modified, the type of facilities provided, the degree of outdoor skills needed to enjoy the area, and the relative density of recreation use. The six classes are:

1. **Primitive** - Area is characterized by an essentially unmodified natural environment of fairly large size Interaction between users is very low and evidence of other users is minimal The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted

2. **Semiprimitive Nonmotorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size Interaction between users is low, but there is often evidence of other users The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis Use of such roads is restricted to minimize impacts on recreational experience opportunities

3. **Semiprimitive Motorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size Concentration of users is low, but there is often evidence of other users The area is managed in such a way that minimum on-site controls and restrictions use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted

4. **Roaded Natural** - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man Such evidence usually harmonizes with the natural environment. Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment Conventional motorized use is allowed and incorporated into construction standards and design of facilities

5. **Rural** - Area is characterized by a natural environment that has been substantially modified by development of structures, vegetative manipulation, or pastoral agricultural development. Resource modification and utilization practices may be used to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities Moderate user densities are present away from developed sites Facilities for intensified motorized use and parking are available

6. **Urban** - Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements Renewable resource modification and utilization practices are often used to enhance specific recreation activities Vegetative cover is often exotic and manicured Sights and sounds of humans are predominant on site Large numbers of users can be expected both on site and in nearby areas Facilities for highly intensified motor use and parking are available with forms of mass transmit often available to carry people throughout the site

Recreation Visitor Days (RVDs) - Twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons

Regeneration - The actual seedling and saplings existing in a stand; or the act of establishing young trees naturally or artificially.

Regulations - Administrative rules, implementing laws Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which cover management of the Forest Service.

Release - Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is overtopping or closely surrounding them.

Renewable Resources - Resources that are possible to use indefinitely, when the use rate does not exceed the ability to renew the supply.

Residual Stand - The trees remaining standing after some event such as selection cutting.

Region - A Forest Service administrative unit The Siuslaw National Forest is a part of the Pacific Northwest Region which includes all National Forests in Oregon and Washington. See FSM 1221 3 for organizational definitions.

Regional Guide - A document written by the Regional Forester that establishes regional standards and guidelines as required by 36 CFR Part 219.9(a) for a Region Consistent with resource capabilities, the Regional Guide reflects goals and objectives of the RPA Program For planning purposes, the Regional Guide displays tentative resource objectives from the RPA Program It also provides for general coordination of National Forest System, State and Private Forestry and Research programs The Chief approves the Regional Guide.

Regulated Stands - Stands which contribute to the calculated base timber sale schedule or departure

Renewable Resources Assessment - An appraisal of the Nation's renewable resources that recognizes their vital importance and the necessity for long-term planning and associated program development The Assessment meets the requirements of Section 3 of the Resources Planning Act and includes analyses of present and anticipated uses, demands, and supplies of the renewable resources, a description of Forest Service programs and responsibilities; and a discussion of policy considerations, laws, and regulations

Research Natural Area - An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes In the Forest Service, RNAs are areas designated to ensure representative samples of as many of the major naturally occurring plant communities as possible

Resource Allocation - The action of apportioning the supply of a resource to specific uses or to particular persons or organizations

Resource Element - A major endeavor which fulfills statutory or Executive requirements and indicates a collection of activities from the various operating programs required to accomplish the Forest Service mission There are seven resource elements:

1. **Recreation** - The resources which provide outdoor recreational opportunities for the Nation Included are development of new knowledge, and technical assistance

2. **Wilderness** - The Nation's wilderness resource This element includes lands designated for preservation and protection in their natural condition for the National Wilderness Preservation System.

3. **Wildlife and Fish** - The resources which are directed toward protection and improvements of wildlife and fish populations and habitats. Coordination with State agencies is a key element Included are technical assistance and development of new knowledge.

4. **Range** - The resources needed to manage, protect, and develop forest and range lands for grazing. The element encompasses activities on both National Forest and private forest and range lands, and the research needed to effectively consider management alternatives.

5. **Timber** - The resources needed to grow wood and to make it available to the Nation on a continuing basis. This element includes activities needed to protect, manage, harvest, and utilize wood and wood-related products

6. **Water** - The administration and enhancement of water resources in a manner consistent with other resource values This element includes watershed and river basin planning and development in cooperation with States and other agencies, and research designed to gain further knowledge.

7. **Minerals** - The administration of exploration and development of minerals in a manner consistent with other resource values on National Forest lands. This element also includes research and cooperative activities to enhance reclamation of mined lands

Resource Management Plan - A plan developed prior to the Forest Plan that outlined the activities and projects for a particular resource element independently of considerations for other resources Such Plans will be superseded by the Forest Plan.

Returns to Counties - The portion of receipts derived from Forest Service resource management that is distributed to State and county governments such as the Forest Service 25 percent fund payments

Riparian Area - A geographically delineated area directly influenced by water with distinctive resource values and characteristics that is comprised of aquatic and riparian ecosystems This includes floodplains, wetlands, and all areas within a horizontal distance of approximately 100 feet from the normal line of high water of a stream channel or from the shoreline of a standing body of water

Riparian Ecosystem - A transition between the aquatic ecosystem, and the adjacent upland terrestrial ecosystem Identified by soil characteristics and distinctive vegetation communities that require free or unbound water

Roadless Area - Areas studied during the Roadless Area Review and Evaluation process (RARE II) which are roadless and at least 5,000 acres in size

Road Management Objective (RMO) - Documentation of resource needs, management concerns, design, operation, maintenance, and anticipated life of a proposed road RMOs are determined by interdisciplinary teams on the Ranger Districts

Rotation - The planned number of years between the formation of a generation of trees and their harvest at a specified stage of maturity

S

Sale Schedule - The quantity of timber planned for sale by time period, from the area of suitable land covered by a Forest plan The first period, usually a decade, of the selected sale schedule provides the allowable sale quantity Future periods are shown to establish that long-term sustained yield will be achieved and maintained. For planning purposes, the sale schedule and the allowable sale quantity are synonymous for all periods or decades over the planning horizon. (36 CFR 219.3)

Salvage Cutting - Intermediate cutting made to remove trees that are dead or in imminent danger of being killed by injurious agents

Sawtimber - Trees containing at least one 12-foot sawlog or two noncontiguous 8-foot logs, and meeting regional specifications for freedom from defect Softwood trees must be at least 9 inches in diameter and hardwood trees 11 inches in diameter at breast height.

Scoping - The process by which the Forest Service determines the extent of analysis necessary for an informed decision on a proposed action

Sea-run - see anadromous

Second Growth - Forest growth that has come up naturally after some drastic interference (for example, wholesale cutting, serious fire, or insect attack) with the previous forest growth.

Sediment - Boulders, gravels, sands, silts, and clays (often with inclusions of organic materials) that have been eroded from an upslope area, and are either moving through a stream system, or have been deposited in a stream bed, lake, marsh, wetland, or estuary.

Semiprimitive Motorized ROS Class - See "Recreation Opportunity Spectrum."

Semiprimitive Nonmotorized ROS Class - See "Recreation Opportunity Spectrum "

Sensitive Species - Those species that have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent their being placed on Federal or State lists

Sensitivity Analysis - A determination of the consequences of varying the level of one or several factors while holding other factors constant

Seral - A biotic community that is a developmental, transitory stage in an ecological succession

Silvicultural System - A management process whereby forests are tended, harvested, and replaced, resulting in a forest of distinctive form. Systems are classified according to the method of carrying out the removal of the mature crop and provide for regeneration and according to the type of forest thereby produced (36 CFR 219 3)

Silviculture - The art and science of controlling the establishment, composition, and growth of forests.

Site Preparation - Manipulation of vegetation or soil prior to planting or seeding The manipulation follows harvest, wildfire, or construction in order to encourage the growth of favored species. Site preparation may include the application of herbicides; burning, or cutting of living vegetation that competes with the favored species; tilling the soil; or burning of organic debris (usually logging slash) that makes planting or seeding difficult.

Site Productivity - Productive capability of specific areas of land which is a result of soil characteristics such as water-holding capacity and available nutrients, and climate.

Skyline Logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

Slash - The residue left on the ground after timber cutting and/or storms, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

Small Game - Birds and small mammals typically hunted or trapped.

Snag - A standing dead tree.

Socio-economic - Pertaining to, or signifying the combination or interaction of, social and economic factors

Softwoods - Coniferous trees, usually evergreen, having needles or scale-like leaves

Soil Surveys - Systematic examinations of soils in the field and in laboratories; their description and classification; the mapping of kinds of soil; the interpretation according to their adaptability for various crops, or for other purposes; and their productivity under different management systems

Special Interest Areas - Formally designated areas managed to make recreation opportunities available for the understanding of the earth and its geological, historical, archeological, botanical, and memorial features.

Stand (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age arrangement, and condition as to be distinguishable from the forest in adjoining areas

Standards and Guidelines - Practices needed to achieve desired conditions or levels of environmental quality.

Stocking - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land

Stream Blockage - Accumulation of soil, rock, and organic material deposited in a stream channel by landslides that prevent fish from moving upstream.

Stream Buffer - Vegetation left along a stream channel to protect the channel or water from the effects of logging, road building, or other management activity (see vegetation leave area)

Stream Class - Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses Four classes are defined·

Class I - Perennial or intermittent streams that: provide a source of water for domestic use; are used by large numbers of fish for spawning, rearing or migration; and/or are major tributaries to other Class I streams

Class II - Perennial or intermittent streams that. are used by moderate though significant numbers of fish for spawning, rearing or migration; and/or may be tributaries to Class I streams or other Class II streams.

Class III - All other perennial streams not meeting higher class criteria.

Class IV - All other intermittent streams not meeting higher class criteria

Streamside Management Unit (SMU) - An area of varying width adjacent to a stream where practices that might affect water quality, fish, and other aquatic resources are modified to meet water quality goals for each class of stream. The width of this area will vary with the management goals for each class of stream, characteristics of the stream and surrounding terrain, and the type and extent of the planned activity

Stream Structure - The arrangement of logs, boulders, and meanders which modify the flow of water, thereby causing the formation of pools and gravel bars in streams Generally, there is a direct relationship between complexity of structure and fish habitat. Complex structure is also an indication of watershed stability.

Submerchantable Volume - The estimated timber volume that does not meet the utilization standards in the Regional Guide, but which could be utilized for products other than sawtimber It is considered "nonchargeable" against planned allowable sale quantity goals.

Substantive Comment - A comment that provides factual information, professional opinion, or informed judgement germane to the action being proposed.

Succession - The progressive development of vegetation toward its highest ecological expression, the climax community; replacement of one plant community by another

Successional Stage - A stage or recognizable conditions of a plant community that occurs during its development from bare ground to climax; for example, coniferous forests in the Coast Range progress through six recognized stages. grass-forb; shrub-seedling; pole-sapling, young, mature; old growth.

Suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined be an analysis of the economic and environmental consequences and the alternative uses foregone A unit of land may be suitable for a variety of individual or combined management practices (See "Lands Not Suitable for Timber Production", and "Lands Not Appropriate for Timber Production")

Supply - The amount of an output that producers are willing to provide at the specified price, time period, and condition of sale.

Suppression - The action of extinguishing or confining a fire.

Sustained-Yield of Products and Services - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land. (36 CFR 219.3)

T

Tentatively Suitable Forest Land - Forest land that is producing or is capable of producing crops of industrial wood and: (a) has not been withdrawn by Congress, the Secretary, or the CHief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions, (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that is is possible to restock adequately within 5 years after final harvest; and (d) adequate information is available to project responses to timber management activities.

Thermal Cover - Cover used by animals to lessen the effects of weather; for elk, a stand of coniferous trees 40 feet or more tall with an average crown closure of 70 percent or more

Threatened Species - Those plants or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future.

Tiering - Refers to the coverage of general matters in broader environmental impact statements (such as national program or policy statements) with subsequent narrower statements or environmental analyses (such as regional or basin-wide program statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. (40 CFR Part 1508.28)

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

Timber Production - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use For planning purposes, the term "timber production" does not include production of fuel wood (36 CFR 219.3)

a

Timber Resource Plan - A functional plan completed in 1979 which established a sale volume to be sold each year based upon an analysis of the most recent resource inventories This plan was an integrated plan which attempted to consider implications to other resources on the Forest. Also known as the Timber Management (TM) Plan.

Timber Sale Program Quantity - The volume of timber planned for sale during the first decade of the planning horizon. It includes the allowable sale quantity (chargeable volume) and any additional material (nonchargeable volume) planned for sale Expressed as the average for the first decade.

Timber Stand Improvement - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving growing conditions for the remaining trees.

Total Suspended Particulates (TSP) - Any finely divided material (solid or liquid) that is airborne with an aerodynamic diameter smaller than a few hundred micrometers Predictions of TSP are made to estimate potential hazard to human health that could result from slash burning

Tradeoff - The reduction or limitation of one or more resource benefits in favor of increasing or improving some other benefits Some amount of tradeoff is necessary when resource benefits are not totally compatible. (e g. - timber harvest and fish habitat both may compete for the condition of the natural vegetation cover)

Turbidity - The degree of opaqueness, or cloudiness produced in water by suspended particulate matter, either organic or inorganic. Measured by light filtration or transmission and expressed in Jackson Turbidity Units (JTU's)

U

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

Undeveloped Area - Portion of the National Forest that is essentially unroaded.

Uneven-aged Management - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. (36 CFR 219.3)

Utility and Transportation Corridors - A strip of land designated for the transportation of energy, commodities, and communications

Utilization Standards - Standards guiding the use and removal of timber, which is measured in terms of diameter at breast height, top diameter inside the bark (top diameter inside bark), and percent "soundness" of the wood

V

Vegetation Leave Area - Area of land in which vegetation is left undisturbed in order to provide shade and organic debris to streams, or to prevent the acceleration of natural erosion processes. No regulated timber harvest is planned in these areas

Viable Population - A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area.

Viewshed - Portion of the Forest that is seen from a major travel route, or high use location

Visual Quality Objectives (VQOs) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape.

1. **Preservation** - Human activities do not change the natural appearance.

2 **Retention** - Human activities are not evident to the casual Forest visitor.

3. **Partial Retention** - Human activity may be evident, but must remain subordinate to the characteristic landscape.

4. **Modification** - Human Activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color, and texture It should appear as a natural occurrence when viewed in foreground or middleground

5. **Maximum Modification** - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background

6 **Enhancement** - A short-term management alterative which is done with the express purpose of increasing positive visual variety where little variety now exists.

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

W

Watershed - Portion of the Forest in which all surface water drains to a common point Watersheds can range from a few tens of acres that drain a single small intermittent stream, to many thousands of acres for a stream that drains hundreds of connected intermittent and perennial streams

Wetlands - Areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction (Executive Order 11990).

Wild and Scenic Rivers - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the Legislature of the State or States through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories:

1. **Wild River Areas** - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America

2. **Scenic River Areas** - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads

3. **Recreation River Areas** - 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.

Wilderness - Areas designated by congressional action under the 1964 Wilderness Act. Wilderness isfined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest

Wildfire - Any forest fire that is not a prescribed fire

Wildlife and Fish User Day (WFUD) - Twelve visitor hours which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

Windfall - A tree, including the roots, blown down by the wind, or the stem or other parts (such as branches, foliage, or fruit) broken off or blown down by the wind.

Woody Material - Organic materials necessary for stream channel stability and maintenance of watershed condition It includes large logs and root wads

Y

Yarding - The moving of logs from where they were cut to a central concentration area or landing

Yield Tables - Tables that estimate the level of outputs that would result from implementing a particular activity. Usually referred to in conjunction with FORPLAN (or other linear models) input or output. Yield tables can be developed for timber volumes, range production, soil and water outputs, and other resources

List of Preparers

LIST OF PREPARERS

PRIMARY PREPARERS

RICK ALEXANDER

Position	Assistant Planner
Education:	B S. Interdisciplinary Social Sciences, 1968, San Francisco State University M S Forest Ecology, 1980, Oregon State University
Experience:	Twenty years in timber management and silviculture in the Washington Cascades and Oregon Coast Ranges. Acting timber planner with the Siuslaw IDT in 1986 and assistant planner since 1987 Assisted with silviculture input and review for the DEIS; writing, editing, printing and distribution of the Supplement, writing, editing and publishing the FEIS and Forest Plan

BRYAN ARMEL

Position:	Operations Research Analyst
Education.	B S. Forest Management, 1982, Virginia Tech
Experience:	Three years as a cooperative education student on the Jefferson National Forest in Virginia Two years as an Operations Research Analyst with the Forest Service Land Management Planning Unit in Fort Collins, Colorado. Member of Siuslaw IDT from 1984 to 1986 with responsibility for data base management and FORPLAN analysis.

LINDA BLUBAUGH

Position·	Operations Research Analyst
Education:	B S. Forest Management, Science, and Mathematics, 1979, Colorado State University
Experience·	Six years in timber management on the Black Hills National Forest, and 2 years in land management planning on the Hiawatha National Forest Member of Siuslaw IDT 1986-1987, responsible for database update and FORPLAN analysis, coordinated writing of draft Forest Plan

PREPARERS

KAREN BUCKINGHAM

Position: Wildlife Biologist, Planning

Education: B.S. Zoology, 1983, California State Polytechnic University
M S Zoology, 1986, California State Polytechnic University

Experience: Twelve years experience as a wildlife biologist with the Forest Service and Bureau of Land Management Member of IDT since 1988 with responsibility for providing input on wildlife resources for the Supplement and preparation on the Final Plan and EIS.

GEORGE BUSH

Position: Forest Soil Scientist

Education: B S Forest Management, 1967, Washington State University

Experience: Twenty-two years in soil science with the Forest Service on 7 National Forests in California and the Pacific Northwest Region Member of the IDT since 1979. Primarily responsible for providing soils and watershed input for the Forest Plan Analyzed the effects of the alternatives on soil stability, watershed condition, and soil productivity

LAURA CEPERLEY

Position Forest Economist

Education. B S Zoology, 1975, Duke University
M.S. Forestry, 1978, University of Washington

Experience: Forest Service experience has been in Forest Planning on the Nezperce National Forest in Idaho (2 years), Bitterroot National Forest in Montana (3 years), and Siuslaw National Forest (2 years) Member of IDT 1984-1986. Provided economic data and analysis for DEIS and draft Forest Plan

MICHAEL CLADY

Position: Forest Fishery Biologist

Education· B S Fisheries, 1964, University of Michigan
Ph D Fisheries, 1970, University of Michigan

Experience: Twenty years in fisheries research and management with the Michigan Department of Natural Resources, Oregon Game Commission, Cornell University, U S. Fish and Wildlife Service at Oklahoma State University, and Forest Service Member of the Siuslaw IDT since 1983. Provided fisheries input and assisted with writing and editing of the DEIS, Supplement and FEIS.

SALLY COLLINS

Position: Assistant Planner

Education: B S. Recreation, 1976, University of Colorado
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Experience: Six years with the Bureau of Land Management in Colorado, serving as wilderness specialist, environmental coordinator, and the oil and gas program coordinator. Three years of Forest Service land management planning experience as a member of the Siuslaw IDT 1983-1987 Primary duties as assistant planner were coordinating the writing, editing, and final preparation of the DEIS.

GREG COX

Position: Forest Economist

Education: B S Forest Management, 1976, Stephen F Austin State University;
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Experience: Six years of Forest Service experience as a forest economist and IDT leader in land management planning Member of the Siuslaw IDT from 1980 to 1984. Responsible for developing economic and budget data and conducting economic analysis for the DEIS and Forest Plan

CARL FROUNFELKER

Position: Forest Wildlife Biologist

Education: B.S Wildlife Management, 1972, University of Wisconsin
M S Wildlife Management, 1976, University of Idaho

Experience: 12 years as wildlife biologist with the Forest Service Two years as wildlife biologist on the Prescott National Forest Plan, 2 years with the Flathead National Forest Plan, and 6 years with the Helena National Forest Plan Started as a new member of the Siuslaw National Forest IDT in May 1989.

AL GRAPEL

Position: Forest Landscape Architect, Forest Recreation Planner

Education: Bachelor of Landscape Architecture, 1962, State University of New York

Experience: Twenty-three years with the Forest Service - primarily working in landscape architecture, visual resource management, and recreation planning. Forest Service experience has been on 6 Forests in 3 Regions, including the George Washington National Forest in Virginia, the Eldorado and Inyo National Forests in California, the Snoqualmie National Forest in Washington, and the Siskiyou and Siuslaw National Forests in Oregon Member of the IDT since 1979 Responsible for input on recreation, visual, and wilderness resources for the DEIS, Supplement, FEIS and Forest Plan. Acting IDT Team Leader in 1987 to oversee preparation and publication of Supplement

NANCY GRAYBEAL

Position: Timber Planner

Education: B A History, 1970, Stanford University
M.S. Forest Science, 1973, Colorado State University

Experience: Twelve years in timber management with the Forest Service in the Pacific Northwest and California Worked on the Siskiyou, Sequoia, Olympic, Colville, and Deschutes National Forests. Timber planner on the Siuslaw IDT from 1980 to 1986. Responsibilities included yield table development and the assessment of FORPLAN timber results.

LINDA GROSS

Position Sociologist

Education: B A. Political Science, 1973, Southern Oregon State College

Experience: Ten years in forest management and land management planning on the Siuslaw and Deschutes National Forests. Member of the Siuslaw IDT from 1979 to 1984 with responsibility for socio-economic data collection, IMPLAN model development, and social impact analysis.

JIM GRUBB

Position: Mapping System/Data Base Coordinator

Education: B A Chemistry, 1975, California State University-Sacramento

Experience: Seven years in computer systems operation and management with the Forest Service on the Siuslaw National Forest. Member of Siuslaw IDT from 1979 to 1983 with responsibility for data base design, mapping system design and implementation, and data base preparation

RICH HAGESTEDT

Position: Operations Research Analyst

Education· B S. Forest Management, 1976, Oregon State University
M S. Forest Management, 1979, Oregon State University

Experience: Seven years in land management planning with the Forest Service on the Mt. Hood, Sante Fe, and Siuslaw National Forests. Member of Siuslaw IDT from 1981 to 1985. Primarily responsible for the FORPLAN model, including model formulation and interpretation. Also coordinated resource mapping, data base construction, and other resource modelling efforts

LISA NORRIS

Position	Forest Wildlife Biologist
Education:	B S. Wildlife Science, 1977, Oregon State University
Experience·	Ten years of fish and wildlife management experience with the BLM, Oregon Department of Fish and Wildlife and the Forest Service. Member of the Siuslaw IDT 1986-1987 with responsibility for wildlife evaluations in the DEIS and Forest Plan

MIT PARSONS

Position·	Forest Fishery Biologist
Education:	B S Wildlife Biology, 1966, University of Montana M Ed , 1972; Ed D, 1975, Adult Education, Montana State University
Experience	Five years in fisheries management on the Siuslaw National Forest and 3 years in fisheries research and development with the Wildlife and Fish Ecology Unit, Fort Collins, Colorado. Provided fisheries and wildlife input between 1979 and 1983 as member of the Siuslaw IDT

CHARLES PHILLIPS

Position·	Forest Wildlife Biologist
Education.	B.S. Zoology, 1967, Southern Oregon College
Experience:	Eighteen years of Forest Service experience on the Fremont and Siuslaw National Forests. Member of the Siuslaw IDT from 1979 to 1986 Primarily responsible for providing recommendations on wildlife management to the forest planning process Developed models to assess the effects of alternatives on wildlife, sensitive plants, and range.

HARRIET PLUMLEY

Position:	Forest Planner/ID Team Leader
Education:	B A Biology, 1966, Antioch College, OH M L.A., 1975, and Ph.D., 1981, State University of New York
Experience.	Six years with the Backcountry Research Project at Northeastern Forest Experiment Station. Five years in forest planning on the Lincoln NF as Operations Research Analyst and Assist. Planner Planning Team Leader for two years on the Siuslaw National Forest

RICH REEVES

Position: Forest Planner/ID Team Leader

Experience: Eight years in highway and civil engineering as District Engineer on 2 districts on the Siskiyou National Forest. In transportation planning for 2 years, Planning Team Leader on 4 Unit plans and 2 special study areas for 7 years; and Planning and Environmental Coordination Staff Officer for 2 years, all on the Umatilla National Forest. Siuslaw NF Planning Team Leader from 1981 to 1986 during the preparation of the Analysis of Management Situation, development of Alternatives and preparation of the DEIS and Draft Forest Plan.

JIM REIM

Position: Forest Hydrologist/Watershed Management Specialist

Education: B S Forest Management, 1972, University of Minnesota

Experience: One year erosion control work with the Peace Corps in Morocco Four years as a forester with Idaho Panhandle and Siuslaw National Forests. Ten years as a Forest Hydrologist and IDT member with the Umpqua, Chequamegon, and Siuslaw National Forests. Siuslaw NF IDT member from 1984 to 1987 Responsible for information regarding water quality, water uses, and hydrologic analysis. Coordinated development of the Forest Plan Monitoring Program.

JOHN ROLAND

Position: Forest Economist

Education: B.S. Forestry, 1973, M.S. Economics, 1982, University of Idaho.

Experience: Six years in timber management and three years as Forest Analyst/Economist on the Tahoe National Forest Member of Siuslaw IDT since 1987. Provided economic analysis and input to models for Supplement, FEIS and Forest Plan.

TONY VANDER HEIDE

Position: Lands and Land Management Planning Staff Officer

Education: B S Forestry, 1965, Michigan Technological University
M S Forest Economics, 1976, Michigan State University

Experience: Nine years in forest watershed management on the San Isabel, Roosevelt, and Black Hills National Forests Three years in the Washington, D.C. Office of the Forest Service, working in computer systems coordination and land management planning. As planning staff officer since 1979 has primary responsibility for preparation of the DEIS, Supplement, FEIS and Forest Plan

CALVIN WETTSTEIN

Position:	Timber Planner
Education.	B S. Forestry, 1973, Rutgers University M S Forestry, 1976, Northern Arizona University
Experience	Thirteen years with the Forest Service in the Southwest and Alaska Regions. Member of IDT since 1987 with responsibility for inventory and yield table analysis, timber input to FORPLAN model, and analysis of FORPLAN results.

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The Siuslaw National Forest Management Team - from 1979 to today

Siuslaw Ranger District employees - from 1979 to today

Other individuals, agencies, and organizations too numerous to name

Recipients

PLANNING DOCUMENT RECIPIENTS

Copies of the planning documents were sent to the following agencies, organizations, and persons

FEDERAL OFFICIALS AND AGENCIES

Legislators

Hon Les AuCoin
Hon Peter deFazio
Hon Mark Hatfield
Hon Bob Packwood
Hon Denny Smith

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Advisory Council on Historic Preservation
Argonne National Laboratory
Assistant U S Attorney
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Department of Agriculture
- Agricultural Research Service
- Animal and Plant Health Inspection Service
- Office of Equal Opportunity
- Office of General Counsel
- Rural Electrification Administration
- Soil Conservation Service

Department of Commerce
- NOAA Ecology and Conservation Division
- National Marine Fisheries Service

Department of Defense
- Army Engineering and Housing Support Center
- Chief of Navy Operations
- Corps of Engineers
- Deputy Assistant Secretary of Defense (Environment)
- Deputy Assistant Secretary of the Air Force (Environmental Safety)
- Explosives Safety Board

Department of Energy
Department of Human and Health Services
Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management

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- Occupational Safety & Health

- Department of Transportation
    - Policy and International Affairs
    - Pipeline Safety
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- Federal Highway Administration
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    - Rogue River National Forest
    - Siskiyou National Forest
    - Umatilla National Forest
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    - Wenatchee National Forest
    - Willamette National Forest
    - Winema National Forest
    - PNW Forestry Sciences Lab
    - Regional Forester, Alaska Region
    - Regional Forester, California Region
    - Regional Forester, Eastern Region
    - Regional Forester, Intermountain Region
    - Regional Forester, Northern Region
    - Regional Forester, Pacific Northwest Region
    - Regional Forester, Rocky Mountain Region
    - Regional Forester, Southern Region
    - Regional Forester, Southwestern Region
    - Rocky Mountain Experiment Station
    - RPA Interactions Project

INDIAN TRIBES

Confederated Grand Ronde Tribes
Confederated Treaty Tribes of Tansy Point
Council of Confederated Tribes
Lower Umpqua Confederated Tribes
Native American Indian Heritage Association
Siletz Confederated Tribes
Umpqua Indian Tribe, Cow Creek Band

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Department of Economic Development
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Geology
Department of Land Conservation & Development
Employment Division
Hatfield Marine Science Center
Labor Commissioner
Legislative Committee on Indian Services
Public Utility Commission
State Parks and Recreation
State Police
State Recreation Planner

OFFICIALS AND AGENCIES, OTHER STATES

Michigan Department of Natural Resources
Washington Department of Natural Resources

COLLEGES AND UNIVERSITIES

Center for Urban Studies, Portland
Fresno City College
University of California, Berkely
Lane Community College
Oregon State University
Rogue Community College
SW Oregon Community College
Texas A & M University
University of Oregon
Washington State University
University of Wyoming
Willamette University

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City Manager, Coos Bay
City Manager, Florence
City Manager, Lincoln City
City Manager, Reedsport
Clatsop-Tillamook Intergovernmental Council
Coos Bay-North Bend Water Board
Coos County Planning Department
Council of Governments
- Coos County
- Coos-Curry
- Clatsop-Tillamook
- Curry County
- Lane
- Lane County Service
- Mid-Willamette Valley
- Oregon District 4
- Umpqua Regional

County Commissioners
- Benton County
- Coos County
- Douglas County
- Josephine County
- Lane County
- Lincoln County
- Polk County
- Tillamook County
- Yamhill County

Douglas County Planning Commission
Douglas County Planning Department
Dunes City Council
K-GB-LB Water District
Lane County Planning Commission
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LCDC Coordinator, Douglas County
LCDC Coordinator, Polk County
Lincoln County Planning Commission
Mayor
- Albany
- Corvallis
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- Monroe
- North Bend
- Philomath
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- Springfield
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- Toledo
- Yachats

Neskowin Regional Water District
Pacific City Water District
Polk Soil and Water District
Port of Coos Bay
Port of Siuslaw
Port of Umpqua
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Superintendent, Mapleton School District
SW Lincoln Water District
Vic Affolter, Tillamook County
Watershed Manager, City of Corvallis

LIBRARIES

- Albany
- Alsea
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- BLM Coos Bay
- Colorado State University
- Coos Bay
- Corvallis
- Dallas
- Douglas County
    - Reedsport
    - Roseburg
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- Florence
- Lane County
- LCDC
- Lewis and Clark College
- Lincoln County
- Linfield College
- McMinnville
- Multnomah County
- Newberg
- Newport
- North Bend
- Oregon State University
- Portland
    - Albina
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    - Capitol Hill
    - Gregory Heights
    - Gresham
    - Hillsdale
    - Holgate
    - Hollywood
    - Midland
    - North Portland
    - Rockwood
    - Saint Johns
    - Sellwood
    - Woodstock
- Portland Bureau of Planning
- Portland State University
- Reedsport
- Salem
- Sheridan
- Siletz
- Siuslaw (Florence)
- Springfield
- State of Oregon
- Tillamook
- Toledo
- University of Minnesota
- University of Oregon
- University of Portland
- Waldport
- WestForNet, Berkely
- WestForNet, Seattle
- West Slope

ORGANIZATIONS

1000 Friends of Oregon
American Fisheries Society
American Forestry Association
American Forestry Council
American Motorcyclist Association
Associated Oregon Loggers
Association of O&C Counties
Association of Oregon Counties
Chamber of Commerce
- Bay Area (Coos Bay)
- Eugene
- Florence
- Lincoln City
- Newport
- Tillamook
- Yachats

Citizens Task Force
Concerned Coastal Citizens
Douglas County Museum
Eugene Natural History Society
Florence Audubon Society
Friends of the Earth
Industrial Forestry Association
LCAS
League of Conservation Voters
Mazamas
Mountain States Legal Foundation
National Audubon Society
National Forest Association
National Forest Products Association
National Wildlife Federation
Native Plant Society of Oregon
Natural Resources Defense Council
NCASI
Northwest Forestry Association
Northwest Mining Association
Northwest Steelheader's Association
NPPC
Oregon Environmental Council
Oregon Equestrian Trails
Oregon Forest Industries Council
Oregon Natural Resources Council
Oregon Rivers Association
Oregon Trout Unlimited
Oregon Water Resources Congress
Pacific Northwest Four-Wheel Drive Association
River Network
Sierra Club
- Legal Defense Fund
- Many Rivers Group
- Marys Peak Chapter
- Seattle

Siskiyou Task Force
Siuslaw Task Force
Siuslaw Timber Operators
Society of American Foresters
- Oregon
- Marys Peak Chapter

Southern Oregon Timber Industry Association
Spirit Lake Gun Club
Terra Trackers
The Nature Conservancy
The Tillamook Recycling Team
The Wilderness Society
Tillamook Economic Action Team
Urban League of Portland
Virginia Four-Wheel Drive Association
Western Forest Industries Association
Western Lane Sportsman's Council
Western Wood Products Association
Wildlife & Fish Societies
Wildlife Management Institute

BUSINESSES

Alder Hill Associates
Alsea Veneer Inc.
Astoria Plywood Company
Bayview Manufacturing Company
Black & Company
Bohemia Inc
Boise Cascade Corporation
Boise Cascade Timber Company
Brand S Corporation
Breslauer-Jacobson
Cascade Holistic Economic Consultants
Catch The Wind Kite Shop
Champion International Inc
Dallas Logging Supply
Davidson Industries Inc.
Diamond B Lumber Company
Diamond Wood Products Inc.
Don Baack and Associates
Douglas Timber Operators Inc
Environmental Impact Services
Environmental Law
Erickson Hardwoods Company
Forest Engineering Inc
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Starker Forests Inc
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Swanson Superior Forest Products
Sylvan Systems
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The Research Group
The Murphy Company
The Newport Hostel
Tillamook Public Utility District
Timber Data
Times Mirror Land & Timber Company
Total Tree Logging
Trillium Natural Food Store
Weyerhaeuser Company
Willamette Industries Inc
Woolley Enterprises Inc
WTD Inc.

MEDIA

Echo Northwest
Forest Watch
Gazette Times
MIT Technology Review
Register Guard
Oregonian
Oregon Wildlife
Our National Forest

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