LAND AND RESOURCE MANAGEMENT PLAN

for the

WILLAMETTE NATIONAL FOREST

Pacific Northwest Region

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PREFACE

This Forest Land and Resource Management Plan (Forest Plan) has been prepared according to Secretary of Agriculture regulations (36 CFR 219) which are based on the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act of 1976 (NFMA). The plan has also been developed in accordance with regulations (40 CFR 1500) for implementing the National Environmental Policy Act of 1969 (NEPA). Because this plan is considered a major federal action significantly affecting the quality of human environment, a detailed statement (environmental impact statement) has been prepared as required by NEPA. The Forest Plan represents the implementation of the Preferred Alternative as identified in the Final Environmental Impact Statement (FEIS) for the Forest Plan.

If any particular provision of this Forest Plan, or the application thereof to any person or circumstances, is found to be invalid, the remainder of the Forest Plan and the application of that provision to other persons or circumstances shall not be affected.

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Chapter I

INTRODUCTION TO FOREST PLAN

PURPOSE OF THE FOREST PLAN

The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Willamette National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

The Forest Plan:

- Establishes Forest-wide multiple-use goals and objectives;
- Establishes Forest-wide standards and guidelines for future activities;
- Establishes management area direction, including management area prescriptions and standards and guidelines applying to future management activities in that management area;
- Establishes the allowable sale quantity for timber and identifies land suitable for timber management;
- Establishes monitoring and evaluation requirements;
- Establishes nonwilderness multiple-use allocations for those roadless areas that were reviewed under 36 CFR 219.17 and not recommended for wilderness designation.

The Forest Plan embodies the provisions of the National Forest Management Act, the implementing regulations, and other guiding documents. Land use determinations, prescriptions, and standards and guidelines constitute a statement of the plan's management direction; however, the projected outputs, services, and rates of implementation are dependent on the annual budgeting process.

The Forest Plan will be revised on a 10 year cycle, or at least every 15 years. It may also 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 policies, goals, or objectives would have a significant effect on Forest-level programs. The Forest Plan also may be amended.

RELATIONSHIP OF THE PLAN TO OTHER DOCUMENTS

Relationship To The Environmental Impact Statement And Record Of Decision

This Forest Plan sets forth the direction for managing the land and resources of the Forest. The Forest Plan results from extensive analyses and considerations that are addressed in the accompanying Final Environmental Impact Statement (FEIS), and Record of Decision (ROD). The planning process and the analysis procedures used to develop this Plan are described or referred to in the FEIS. The FEIS also describes other alternatives considered in the planning process. Specific activities and projects will be planned, analyzed, and implemented to carry out the direction in this Plan. Project level environmental analysis will use the data and evaluations in the Forest Plan and FEIS as its basis. Project level environmental analysis will be tiered to the FEIS accompanying this Plan.

Relationship To The Regional Guide

The Regional Guide for the Pacific Northwest Region, as amended December 8, 1988, provides direction for National Forest Plans. It includes standards and guidelines addressing the major issues and management concerns considered at the Regional level to facilitate Forest planning.

Relationship To The FEIS For Managing Competing And Unwanted Vegetation

The Forest Plan incorporates the Pacific Northwest Region's FEIS for Managing Competing and Unwanted Vegetation. In implementing the Forest Plan through project activities, the Forest will comply with the Record of Decision issued by the Regional Forester dated December 8, 1988, and the Mediated Agreement of May, 1989. Use of all vegetation management techniques is allowed only when other methods are ineffective or will unreasonably increase project costs. Emphasis must be on prevention and early treatment of unwanted vegetation and full public involvement in all aspects of project planning and implementation. Information about the vegetation management FEIS, ROD, and Mediated Agreement are available at the Forest Supervisor's Office.

Relationship To Special Area Plans

The regulations (36 CFR 219.2(b)) guiding the development of Forest Plans state that "(if), in a particular case, special area authorities require the preparation of a separate area plan, the direction in any such plan may be incorporated without modification." For this reason the Oregon Cascades Recreation Area Management Plan, as required by the Oregon Wilderness Act of 1984 (Public Law 98-328), will be incorporated unchanged in the Forest Plan. (See Appendix B)

Relationship To Other Plans

This Forest Plan serves as the single land management plan for the Willamette National Forest. All other land management plans are replaced by the direction in this Plan; see Chapter 5 for a listing of existing plans that this Forest Plan supercedes.

PLAN ORGANIZATION AND STRUCTURE

The Forest Plan is composed of five chapters, a glossary, and appendices.

Chapter I - Forest Plan Introduction - presents the purpose of the Plan, describes what it contains, describes the Forest's geographic location, and discusses the Plan's relationship to other documents.

Chapter II - Summary of the Analysis of the Management Situation - summarizes the supply and demand situation for market and nonmarket goods and services associated with the Forest. Included is a summary of the resource supply conditions and potentials for the key goods and services on the Forest.

Chapter III - Plan Response to Issues - summarizes the issues and concerns and briefly explains how each is addressed in the Forest Plan through the preferred alternative.

Chapter IV - Forest Management Direction - presents the multiple-use resource goals which the Forest has established for the planning period (next 10 to 15 years). The projected resource outputs, and activities are considered to be the objectives which the Forest should meet to implement the Plan.

Chapter IV also contains the Forest-wide and management area prescriptions for Forest Plan implementation. They apply to the everyday on-the-ground projects and cover a wide range of resources. Some are specific and others identify procedures to follow. Management area prescriptions define the types of activities that can occur within a management area. The allocations of the management areas within the Forest are shown on the alternative maps included with the FEIS.

Chapter V - Implementation of the Forest Plan - contains the monitoring program. As the Forest Plan is implemented, it will be monitored to determine if the outputs and standards and guidelines in Chapter IV are being met and if the standards and guidelines are adequate and being properly applied.

Glossary - Contains definitions of terms, and abbreviations.

Appendices - Included in the Appendices are detailed schedules of projected activities by resource and an index to this Plan.

Appendix A - Wilderness Management Direction.

Appendix B - Oregon Cascades Recreation Area.

Appendix C - Timber Sale Action Schedule.

Appendix D - Resource Action Schedules.

Appendix E - Watershed Best Management Practices (BMP's).

FOREST DESCRIPTION

The Willamette National Forest stretches for 110 miles along the western slope of the Cascades and extends from the Mt. Jefferson area east of Salem to the Calapooya Mountains northeast of Roseburg. The western edge of the Forest borders the middle and upper Willamette Valley. The Forest is within a two-hour drive from Portland, and a one-hour drive from Salem, Albany, Corvallis, Bend, and Eugene-Springfield.

The Willamette National Forest contains nearly 1.8 million acres within the proclamation boundary in Clackamas, Douglas, Jefferson, Lane, Linn, and Marion counties in Oregon. National Forest System land within the Forest boundary totals 1,675,400 acres; approximately 123,000 acres are privately owned or managed by other public agencies. Figure I-D-1 displays a breakdown of the Willamette National Forest acreage by county. The headquarters of the Willamette National Forest is the Supervisor's Office located in Eugene. The Forest is subdivided into seven Ranger Districts with offices in Oakridge, Westfir, Lowell, Blue River, McKenzie Bridge, Sweet Home and Detroit.

The Cascade Range in Oregon is geologically divided into two physiographic provinces based on similarity of land structures, features, and geomorphic history. These provinces are the High (recent) Cascades and the Western (old) Cascades. Elevations range from 900 feet along the Santiam River to over 10,000 feet at the summits of Mt. Jefferson and the Three Sisters. Most of the Forest lies within an elevation range of 2,000 to 4,000 feet above sea level. Lands of the Forest are contained in both provinces and consequently exhibit a wide variety of geologic and topographic features.

Two-thirds of the Willamette National Forest lies within the Western Cascades and contains some of the most productive forest land in the United States. The slopes are blanketed with conifers, primarily Douglas-fir. The Forest contributes significantly to the local and regional economy.

Access into and through the Forest is provided by more than 200 miles of County, State, and Federal highways. To facilitate protection, management and use, approximately 6,530 miles miles of permanent forest roads have been constructed and are being maintained. A major railroad traverses the Forest and five electric power transmission corridors have been established.

There are 1,360 miles of trails on the Forest. A number of these are low-elevation, easy-access trails for year-round hiking pleasure. Three very scenic low-elevation trails have been designated National Recreation Trails. They are the McKenzie River Trail, Fall Creek Trail, and South Breitenbush Gorge Trail. The Fall Creek and McKenzie River Trails are within 50 miles of Eugene and the South Breitenbush Gorge Trail is 60 miles from Salem.

The Willamette National Forest has eight Wildernesses totaling 380,805 acres. These areas, which include low elevation sites as well as major mountain peaks in the Cascades, are popular with hikers, backpackers, and mountain climbers. These Wildernesses have been set aside by Congress to preserve their primitive character, natural landscape, flora, and fauna. Other dedicated areas include an Experimental Forest, the Oregon Cascades Recreation Area, Special Interest Areas, and Research Natural Areas.

Two developed ski areas, Hoodoo and Willamette Pass Ski Areas, operate under special use permits from the Willamette National Forest. There are two snowmobile areas on the Forest. One is located near the Willamette Pass on Waldo Lake road and the other is located near Big Lake just off the Santiam Pass on Highway 20. Cross-country skiing is another popular winter sport, and many Forest roads and trails lend themselves to this activity.

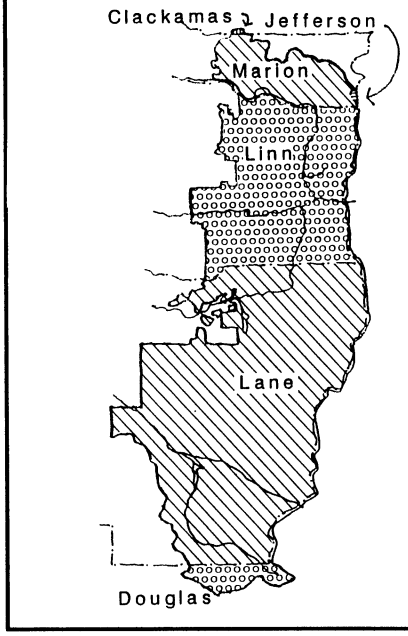
Rainfall on the Willamette National Forest varies from 40 to more than 150 inches a year, much of it in snow which blankets the higher Cascades each year. The water from the rain and melting snow is intercepted by several reservoirs for flood control, irrigation, and hydroelectric power. The reservoirs also provide many recreation opportunities including boating, water skiing, swimming, and fishing. Many cities and communities in the Willamette Basin get municipal and industrial water from rivers originating in the Willamette National Forest. There are over 23,000 surface acres of water on the Forest. In addition, there are nearly 400 lakes and 2,700 miles of perennial rivers and streams.

Recreation opportunities on the Forest are numerous. The Forest provides recreation opportunities during all seasons of the year and at a full range of elevations. There are 82 campgrounds and picnic grounds containing 1,386 units. These units are composed of a table, fireplace, and a tent site or trailer parking place. Nearly all campgrounds have water and either pit, vault, or flush toilets.

Nearly 300 wildlife species inhabit the Forest including both game and nongame species. The species commonly hunted are mule deer, black-tailed deer, Roosevelt elk, black bear, cougar, grouse, quail, and waterfowl. Other notable species such as hawks, eagles, owls, herons, coyotes, and beavers as well as many smaller bird, reptilian, amphibian, and mammal species, are present.

Both resident and anadromous fish species are found in the Forest's waters. The most important resident species are cutthroat and rainbow trout. Cutthroat are most common in the smaller streams, and rainbow usually are found in the lakes and larger streams. The two species of anadromous fish using the streams are steelhead trout and chinook salmon. Their use is restricted to approximately 80 miles of streams in the Little North Santiam, South Santiam, Calapooya and McKenzie River drainages, and Winberry and Fall Creeks.

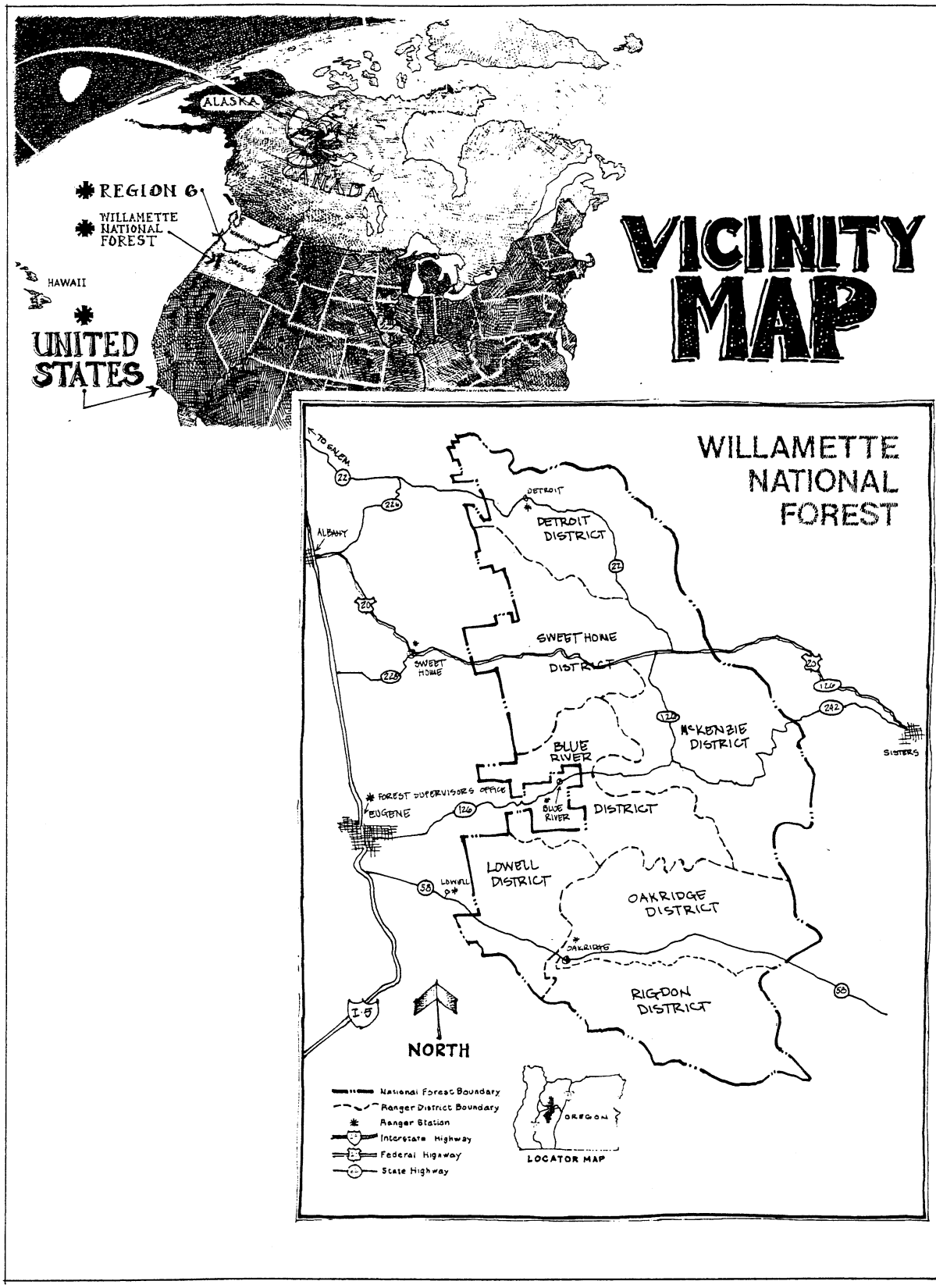
Figure I-1. Acreage By County



County	WNF Acres In County	% Of WNF By County	Non-National Forest Acres	Acres Within Forest Boundary
Lane	1,021,941	34.8%	59,233	1,081,174
Linn	465,613	31.7%	56,013	521,626
Marion	136,064	18.1%	8,084	144,148
Douglas	50,296	1.6%	0	50,296
Clackamas	853	0.07%	0	853
Jefferson	640	0.06%	0	640
TOTAL	1,675,407		123,330	1,798,737

Source: Data base LYR06D (Administrative Boundaries).

Figure I-2.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CHAPTER II

SUMMARY OF THE ANALYSIS OF THE MANAGEMENT SITUATION

INTRODUCTION

The primary issues which guided the development of the Forest Plan revolve around the management of the timber, fish and wildlife, old growth, water, roadless, scenic, and recreation resources. Analysis of issues, supply and demand projections; and the Forest's current direction indicated a need to establish or change management direction of the Willamette National Forest.

This Chapter summarizes the supply and demand situation for the key goods and services associated with the Forest. Included is a summary matrix of the resource supply conditions and potentials for several of the Resources Planning Act (RPA) planning periods. Production levels attainable under current management direction are displayed. Displays also include projections of demand for goods and services where available. The key factors which indicated a need to establish or change direction are described, followed by a list of information that would be desirable to have prior to the preparation of the next Forest Land and Resource Management Plan.

RESOURCE AND ECONOMIC POTENTIALS

Benchmarks were developed to help define the resource and economic potentials of the Forest, while meeting legal requirements. Legal requirements include those pertaining to the Management Requirements (MRs) needed to maintain viable populations of fish and wildlife species, to protect water quality, maintain soil productivity, and to the maximum size and dispersion of harvest units.

The benchmarks used to estimate the biological and economic potential of the Forest are described as follows:

- **No Action:** This benchmark specifies the management of the Forest most likely to be implemented in the future if current direction is followed (Alternative A). This benchmark includes MRs, and was rerun between the DEIS and FEIS to reflect changes in data and assumptions.

- **Minimum Level:** This benchmark specifies the minimum level of management which would be needed to maintain the Forest as part of the National Forest System. This benchmark indicates the production potential for some of the resources associated with no-harvest allocations.

- **Maximum Present Net Value:** This benchmark specifies the management of the Forest which will maximize the present net value of those resources that have an established market price. Market priced outputs include timber and developed recreation. This benchmark includes MRs, and was rerun between the DEIS and FEIS to reflect changes in data and assumptions.

- **Maximum Timber:** This benchmark defines the highest potential timber harvest production levels for the Forest, subject to legal requirements for other resources and nondeclining even flow policy. This benchmark was rerun between the DEIS and FEIS to reflect changes in data and assumptions.

- **Maximum Recreation:** This benchmark determines the maximum capability of the Forest to provide a mix of dispersed and developed recreation opportunities.

Table II-1 displays a summary of the average annual outputs, effects and economic consequences associated with the current management direction, Alternative A, No Action, Alternative W, the Preferred Alternative, estimated demand levels, and various resource maximization benchmarks which indicate the production potential. Estimates for the outputs associated with all of the benchmarks are contained in Appendix B of the FEIS.

Table II-1. Supply and Demand Projections for Major Issues[1]

Output, Effects, Activity, or Cost	Unit of Measure	Decade	Alt. A Current Direction	Demand Projection	Production Potential	Alt. W Preferred Alternative
Developed Recreation Use	MRVDs	1	1,625	2,056	2,538	2,056
		5	2,101	4,481	6,573	3,073
Nonwilderness Dispersed Recreation Use						
Semiprimitive Nonmotorized Use	MRVDs	1	28	70	125	52
		5	42	148	125	52
Semiprimitive Motorized Use	MRVDs	1	39	64	67	64
		5	40	141	67	76
Wilderness Recreation Use	MRVDs	1	267	413	342	346
		5	438	904	342	342
Wild and Scenic Rivers						
Designated Rivers	Number	-	2	-	12	2
Study Rivers	Number	-	2	-	0	2
Eligible Rivers	Number	-	8	-	0	8
Roadless Lands						
Amount of Total Inventory Remaining	M Acres	-	60	-	172	92
Old-Growth/Mature Timber Retained	M Acres	1	528	-	595	533
		5	337	-	595	365
Visual Quality Objectives						
Preservation	M Acres	-	547	-	390	591
Retention	M Acres	-	78	-	232	119
Partial Retention	M Acres	-	150	-	489	172
Modification	M Acres	-	-	-	484	143
Maximum Modification	M Acres	-	895	-	81	651
Timber Supply[2] [3]						
Allowable Sale Quantity (Net)	MMBF	1	608	667	673	491
		5	532	695	630	440
Allowable Sale Quantity (Net)	MMCF	1	110	122	122	87
		5	110	128	122	87
Lands Suitable for Timber Production	M Acres	-	874.3	-	928.0	774.6
Water Yield	M AC-FT	1-5	8,900	-	-	8,900
Fish and Wildlife						
Spotted Owl Habitat Areas	Number	-	59	-	204	59
Pileated Woodpeckers (Unique Sites)	Number	-	97	-	826	97
Pine Marten (Unique Sites)	Number	-	100	-	1,941	100
Big-Game Use	M WFUDs	1	117	-	-	145
		5	125	-	-	168
Smolt Habitat Capability	M Smolt	1	410	-	-	438
		5	536	-	-	572
Economics						
Payments to Counties	Million $	1	30.6	-	36.7	25.3
		5	32.6	-	-	29.4
Changes in Jobs[4]	Number	1	53	-	2,084	-6
PNV (15 Decade Total)	Million $	-	3,180	-	3,780	2,860

[1]Average Annual outputs and effects by benchmark for selected decades. Demand projections are included where available.
[2]Timber demand based on RPA.
[3]Board foot/cubic foot ratios vary by size class and account for variability of board foot volumes.
[4]Changes in jobs are relative to an average level of outputs over the base period of 1977-1985.

RESOURCE DEMAND PROJECTIONS

Economists consider "demand" to be a schedule of quantities of an output that users are willing to take at a range of prices at a given time and given conditions of sale. The term "demand" is used in this section to identify a certain level of consumption at a particular point in time.

Few definitive studies have been made and sparse data is available to assess demand in the sense of the word used for Forest planning. Therefore, the assessment of both current and anticipated future use levels has been based on recent historical trends and some futuring expressions from various industries, organizations and the public. Although estimates of demand are projected over several decades, these projections, like any projections, are expected to be less accurate in the distant future than in the near future.

SUPPLY AND DEMAND RELATIONSHIPS

Supply and demand relationships for some of the key forest resources are discussed below. These discussions incorporate the results of the benchmark analysis displayed in Table II-1. Where appropriate, reference is made to RPA targets or other agency or state goals.

Recreation

The Forest provides a wide range of outdoor recreation opportunities. Opportunities include a number of developed recreation sites, such as campgrounds, ski areas and boat launch ramps, but the primary recreation emphasis on the Forest is on the management of dispersed recreation opportunities. Over time, dispersed recreation experiences can be provided by maintaining a variety of landscape settings, each with distinct attributes of physical character, environmental conditions, and human influences.

All of the benchmarks supplied various levels of dispersed and developed opportunities from semiprimitive nonmotorized to roaded modified settings. The extent to which each benchmark provides for semiprimitive motorized and nonmotorized recreation opportunities is illustrated in Table II-1. This is displayed by projections of recreation visitor use.

The Maximum Recreation Benchmark provided the highest amount of recreation potential. This was accomplished in part by maintaining all developed, undeveloped and special interest areas, developing enough new recreation sites to meet demand through the year 2040, meeting all of the recommended visual quality objectives and providing sufficient capital investments for trail and dispersed camp construction. Included in this Benchmark were recommendations for the Mt. Hagan Roadless Area to be designated Wilderness, and for the McKenzie River to be included as a Wild and Scenic Recreation River.

Current use of semiprimitive motorized and nonmotorized recreation opportunities on the Forest is estimated to be 112,400 recreation visitor days (RVDs) annually. The future demand for these recreation opportunities is based on a review of Forest recreation use data and several studies: the River Basins Commission study; the Bonneville Power Administration's projected population growth rates for the Pacific Northwest and the State Comprehensive Outdoor Recreation Plan (SCORP) for Oregon.

User demand for semiprimitive motorized and nonmotorized recreation is expected to be 289,000 RVDs by 2040. Both the Maximum Present Net Value and the Maximum Timber benchmarks would provide 6% of this demand and the No Action Benchmark would provide 28% in 2040. Alternative W

would provide about 44%. The Maximum Recreation Benchmark is projected at about 55% and the Minimum Level Benchmark would provide even more opportunities, resulting in about 94% of user demand. In the Minimum Level Benchmark, Roaded Modified acreages shift to the Roaded Natural class by the end of the fifth decade. Given significant deterioration of local roads, some areas of the Forest would therefore provide additional semiprimitive motorized and nonmotorized opportunities over time.

The opportunity for Wilderness use and primitive recreation experience is provided through the management of established areas and/or the establishment of new areas. Current use is approximately 345,000 RVDs annually and user demand for Wilderness opportunities is expected to be about 905,500 RVDs by the year 2040. Except for the Minimum Level Benchmark which supplies about 24% of the fifth decade demand, the benchmarks all provide between 42 and 55% of demand.

User demand for developed recreation opportunities is expected to be 4,481,300 RVDs by the year 2040. Use of existing developed sites on the Forest is expected to exceed existing practical capacity at this time. Of the nine site types, two are supplied primarily by the private sector: resort hotel/lodges, and private organization sites. The demand for organization sites can be met from the potential supply in the Forest regardless of whether they are managed by the public or private sector. Although there are enough potential resort hotel/lodge sites in the Forest to meet future demand, it is difficult to predict if economic conditions will exist to make future investments in these sites attractive. The Maximum Recreation Benchmark would provide about 82% of anticipated demand, while all of the other benchmarks would provide between 47 and 76%. Alternative W would provide about 69%.

Old Growth

Old-growth stands on the Forest provide a living connection with the past and an important reference to the natural successional process of the forest environment. Old growth provides key wildlife and plant habitat, and is an important component of many recreational settings. Old-growth wood is of high value for timber products, and its harvest has been of major importance to the wood products industry in the Pacific Northwest for many decades.

There are approximately 594,800 acres of old-growth stands currently on the Forest. This accounts for about 40% of the forested landbase (36% of the total Forest). Although there is agreement that some representation of old-growth timber should be retained, there is a wide disparity of opinion about how much will be needed in the future. Because of this, Table II-1 shows the potential old growth in decades one and five, and the changes for Alternatives A and W, but there is no representation of demand.

Allocations that provide for the preservation of old-growth stands include wilderness, roadless areas, riparian areas, old-growth groves, and wildlife habitat areas for Management Indicator Species (MIS). Under the No Action Benchmark, 528,000 acres would be retained in the first decade and a minimum of 337,000 acres would be retained in the fifth decade. Alternative W maintains 533,000 and 365,000 acres of old growth in the first and fifth decades.

Roadless Lands

Prior to the Oregon Wilderness Act of 1984, 295,137 acres of unroaded lands on the Forest were inventoried. As a result of that Act, 84,930 acres received wilderness classification. The remaining 210,207 of lands in an undeveloped condition were released for multiple use. Since 1984 38,200 acres of roadless lands have been affected by ongoing management activities. Current roadless land totals

172,007 acres. The demand for roadless lands is expressed in part by demand estimates for semiprimitive nonmotorized recreation and Wilderness use.

Table II-1 displays the proportion of the total roadless inventory maintained. The Minimum Level and Maximum Recreation Benchmarks show the production potential at 100% of the roadless inventory, while the Current Direction maintains about 35%, and Alternative W maintains 53%.

Wild And Scenic Rivers

The Oregon Omnibus Wild and Scenic Rivers Act of 1988 designated the McKenzie and the North Fork of the Middle Fork of the Willamette Rivers as included in the National Wild and Scenic Rivers System (55.0 miles and 17,459 acres) and designated the Blue and the South Fork of the McKenzie Rivers (34.2 miles and 10,944 acres) as National Study Rivers. In addition to management of two designated rivers and suitability determinations of two National Study Rivers, the Forest provides interim protection and management of eight other rivers determined eligible (157.4 miles and 51,940 acres) for Wild and Scenic River Status. Determination of river suitability and potential inclusion in the National Wild and Scenic Rivers System is an ongoing process.

Scenic Quality

Scenic resource management and maintenance of pleasant visual experiences for forest users is provided primarily through the allocation of lands within viewshed corridors, and through the designation of dispersed recreation settings and travelways to retention and partial retention Visual Quality Objectives.

In areas visible from major Federal and State highways, heavily used forest roads and trails, and destination type recreation areas and sites, 48% of the Forest has been inventoried and classified as highly sensitive to change; 25% as moderately sensitive; and 27% with low sensitivity.

Both the Minimum Level and Maximum Recreation benchmarks would retain almost 100% of the current 407,500 retention and partial retention inventoried acres. The No Action Benchmark would maintain about 45% and Alternative W about 71%.

Demand for scenic quality on the Forest is primarily based on demand for uses and activities where scenic quality is an integral aspect of the user experience. Tabulation of public comment data in 1981 for the Forest documented that 33% of the respondents felt that scenic quality on the Forest is very important, 49% fairly important, and 15% unimportant.

Timber

The dominant tree species on the Forest are Douglas-fir, western hemlock, Pacific silver fir and mountain hemlock. A number of other conifer species are locally common including subalpine fir, grand fir, noble fir, incense cedar, Alaska cedar, Englemann spruce, white bark pine, lodgepole pine, sugar pine, western white pine, ponderosa pine, and western red cedar. Hardwood species make up less than 0.2% of the standing volume on the Forest. The most common species are bigleaf maple, black cottonwood, golden chinkapin, red alder, and Pacific madrone.

Commercial forest land suitable for timber management covers approximately 1,032,000 acres or about 62% of the Forest. Under the 1977 Plan, timber produced and sold from the Forest supplied about 15% of the timber production from National Forests in Region 6 (Oregon and Washington). This represents about 8% of the production from the entire National Forest System.

The Maximum Timber and Maximum PNV Benchmarks utilized the most land suitable for timber production at 928,000 acres, representing the production potential. The No Action Benchmark utilized 874,300 acres and Alternative W used 774,600 acres.

The amount of timber that may be sold from suitable lands is called the Allowable Sale Quantity (ASQ). The maximum amount of timber that could be offered for sale without departure from nondeclining even flow with MRs, is 122 MMCF (673 MMBF) per year for the Maximum Timber Benchmark. The ASQ for the No Action Benchmark for the first decade is 110 MMCF (608 MMBF), and for Alternative W is 87 MMCF (491 MMBF). The demand projection is based on RPA data, starting at 122 MMCF (667 MMBF) and increasing to 128 MMCF (695 MMBF) by the fifth decade.

Water

The abundance of forested watersheds on the Forest has produced consistent amounts of water, generally of very high quality. Demand for this water occurs both on and off the Forest, as nonconsumptive instream habitat and recreational uses, and as consumptive fish hatchery, domestic, irrigation, industrial and hydropower use. The on-forest demand for nonconsumptive, instream uses exceeds the demand for direct consumptive uses.

Total water yield from the forest is estimated at 9.8 million acre feet/year (Hubbard et al. 1983). Approximately 85% of the discharge occurs between November 1 and March 31. Local, temporary variations in the timing and amount of water yield may occur where the ability of the vegetation to transpire and intercept moisture is altered. All of the benchmarks generated water yields within approximately 3% of the natural levels. Most of the increased yield occurs during the autumn and winter months when water supply exceeds demand.

The nonconsumptive demand for high quality water will continue and increase into the future as the demand for recreation increases. Because of the importance of the instream uses the State of Oregon Water Resources Department has restricted use of some waters on the Forest to recreational, instream, and low consumptive uses, and has established minimum perennial flows for the majority of these streams, and several others. These waters include the Little North Santiam River and Henline Creek above their confluence, Wiley Creek, Breitenbush River, Calapooia River above Biggs Creek, North Santiam above Tunnels Creek, Middle Santiam above Green Peter Reservoir, Quartzville Creek above Panther Creek, South Santiam above Trout Creek, McKenzie River, Salt and Salmon Creeks and their tributaries, all natural lakes above 2000 feet elevation.

No benchmarks were made to assess changes in water quality, but generally water quality decreases as the number of acres harvested and the miles of road built increases.

Fish And Wildlife

The Forest provides a broad diversity of ecosystems which supports a wide range of fish and wildlife species. Over 290 species are present on the Forest. Active cooperation between the Forest and the Oregon Department of Fish and Wildlife (ODFW) is important to wildlife programs. While the Forest is responsible for providing and improving habitat, the ODFW is responsible for managing wildlife population numbers.

All of the benchmarks maintained sufficient amounts and types of habitat to sustain viable populations of all fish and wildlife. Seven birds and mammals, and three groups of birds and fish have been selected as Management Indicator Species (MIS) to represent the habitat needs for the fish and wildlife species

on the Forest. Habitat areas for the MIS were maintained at MR levels in all of the benchmarks. These included unique habitat areas for spotted owls, pileated woodpeckers, and marten as indicated in Table II-1.

Roosevelt elk, black-tailed deer, mule deer, black bear and cougar are all big game animals located within the Forest. The ODFW estimates that 6,800 Roosevelt elk and 38,000 black-tailed deer and mule deer live on the Forest. Expected populations for deer and elk varied somewhat relative to the amount of available and suitable habitat provided by the benchmarks.

Projected demand curves for hunting use on the Forest were developed from River Basin Commission estimates. Over 90 million wildlife and fish user days (WFUDs) are projected for the year 1990, rising to over 150 million WFUDs by 2030. All of the benchmark estimates indicate that the demand for big game hunting opportunities will exceed the maximum supply over the RPA planning period. See Table II-1 for big game use projections by decade.

Fishing opportunities on the Forest range from fishing high mountain lakes to large and small streams and reservoirs. There are several species of trout found in Forest waters including rainbow trout, bull trout, brook trout, brown trout and kokanee. Anadromous fish such as winter-run steelhead and spring-run chinook are native to the Forest, and spawn in some Forest streams. Most of the sport catch is in the lower river sections of the Willamette and the Columbia Rivers below the Forest boundary.

The demand for fishing was reviewed for trout, steelhead and salmon based on catch estimates and stocking programs. Projected demand curves were developed from River Basin Commission estimates. Fishing use is expected to be close to 300 million WFUDs in 1990, rising to almost 500 million by 2030. Only the Maximum Recreation Benchmark would meet or exceed the demand for resident and anadromous fishing opportunities over the RPA planning period. Projections show that demand would generally exceed supply in the other benchmarks, particularly for anadromous fish. See Table II-1 for anadromous and resident fish use projections by decade.

Economics

The Forest resources play an important social and economic role locally, regionally, and nationally. Many communities rely heavily on the employment and income generated from the extraction of products, primarily timber, from the Forest. A measure of economic stability is derived from a sustained supply of timber being available for harvest, even though supply is not the only determinant of stable markets. Income and employment are also derived from people traveling through communities on their way to use the Forest for recreation and other purposes. There is a growing awareness of tourism's importance as a source of future economic activity for communities in and adjacent to the Willamette Valley.

The Forest lies primarily in Lane, Linn, and Marion counties, and also extends south into Douglas County, east into Jefferson County, and north into Clackamas County. These counties receive monies equivalent to 25% of the total revenues derived from the gross timber receipts in lieu of taxes that could be generated on National Forest land. The counties also receive 25% of the total revenues derived from other resource uses on the Forest, including campground receipts and grazing fees. For the 51,000 acres of Oregon and California (O&C) Railroad grant lands administered by the Forest, 50% of total revenues is distributed to the counties having these lands.

Potential payments to counties in the first decade range as high as 36.6 million dollars annually in the Maximum PNV Benchmark, and as low as zero in the Minimum Level Benchmark. The No Action Benchmark estimates an annual 30.0 million dollar payment to counties in the first decade, which

increases to 32.6 million dollars annually by the fifth decade. Alternative W estimates 25.3 and 29.4 million dollars respectively for the first and fifth decade payments to counties. Timber receipts comprise more than 99% of the amount returned to the Federal treasury and to the counties.

Generally, changes in jobs vary directly with the level of timber harvest, although variations in projected recreation visits modify this pattern. The maximum increase from the base level (13,257 jobs, established for the period 1980-1989) is 2,084 jobs in the first decade for the Maximum PNV Benchmark. No Action and Alternative W show an increase of 53 and a decrease of 6 jobs respectively, from the base. Appendix B includes a detailed breakdown of jobs by the various categories.

Present Net Value (PNV) variations also follow the basic pattern of varying directly with the level of timber harvest, modified by the level of recreation benefits. The Maximum PNV Benchmark has the highest PNV (3.78 billion dollars), and the Minimum Level Benchmark has the lowest PNV (0.86 billion dollars) of the benchmarks. No Action and Alternative W generate a PNV of 3.18 and 2.86 billion dollars respectively.

NEED TO ESTABLISH OR CHANGE DIRECTION

Based on the analysis of the management situation, a need was identified to establish or change management direction of the Forest. Some of the considerations related to this are:

- New areas of the Forest have been recently added to the National Wilderness Preservation System, through the Oregon Wilderness Act of 1984 and the Wild and Scenic River System through the Oregon Omnibus Wild and Scenic Rivers Act of 1988.
- There is a need to determine the management of the remaining undeveloped and unroaded portions of the Forest.
- The determination of Management Requirements for resource management has been directed by the National Forest Management Act (NFMA).
- The timber inventory on the Forest has been updated.
- The delineation of available and suited lands for timber management has been determined, based on NFMA.
- Increased public focus on the management of old growth.
- Changes in timber management practices, e.g., genetics, fertilization, less commercial thinning.
- Some changes have occurred in public expectations regarding the role of the timber industry in the local economic base of western Oregon.

INFORMATION NEEDS

This section lists the information, inventory, and research needs that have been identified for the Forest. This information recognizes gaps in data, or scientific knowledge, that would be desirable to fill prior to preparation of the next Forest Land and Resource Management Plan. The concept used to

organize and develop these needs recognizes that biological, physical and social ecosystems are the foundation of the planning process.

This ecosystem perspective has been used to develop a comprehensive framework for identifying and organizing information, inventory, and research needs. This framework is intended to encourage integrated research approaches that address interdisciplinary needs rather than the traditional functional approach. The ecosystem approach has been taken to meet planning needs.

Of the many ecosystems found on the Forest, several were identified as having particular current importance in forest planning. Old growth and riparian/aquatic ecosystems are examples where more information would be desirable to test planning assumptions as future plans are developed. Human visitors in the forest are an integral part of these ecosystems, and their needs and expectations should be considered in forest planning.

Information needed to address these concerns fall into six general categories. This is not a complete list, and may expand as changing conditions, monitoring, and evaluation indicate additional needs.

Interactions/Processes - This category includes information leading to a better understanding of interactions within and between ecosystems, effects of one resource on others, and the physical, biological, social and political processes that influence these interactions and resources.

- Clarify wildlife and fish (especially MIS) reactions to patterns of habitat created or altered by management activities and natural succession.
- Assess the relationships between the hydrologic recovery concept, peak flows, and channel stability as a result of rain-on-snow flood events.
- Improve knowledge of distribution and habitat requirements of the northern spotted owl and other species (plant and animal) associated with old growth.
- Determine the effects of vertebrate species on other ecosystem components (e.g., effects of insectivorous birds on forest insect populations).
- Develop an understanding of ecosystem response to global atmospheric warming.
- Clarify relationships between old-growth characteristics and ecological and visual diversity, and maintenance of natural gene pools.
- Assess the effects of landscape patterns of timber harvest and road construction on plant and animal diversity, and stability of special habitat areas like Research Natural Areas.
- Identify more precisely the ecological conditions that result in growth of unwanted trees and brush, to provide information for prevention and control of these species.
- Identify the appropriate number and distribution of spotted owl habitat areas needed to ensure the viability of the species.
- Improve total tree biomass information that is needed to evaluate harvest practices.

Long-Term Productivity - This section includes studies leading to better understanding of ecosystem needs in order to maintain various aspects of long-term productivity.

- Determine the amount of in-stream large woody debris necessary to maintain stream channel stability and productivity of fish habitat.
- Determine the effects of harvest practices and removing biomass on long-term productivity.
- Determine the effects of forest fragmentation on ecosystem integrity and function, including viability of vertebrate species.
- Further assess the effects of burning and compaction on soils and long-term site productivity.
- Determine the effects of management practices on the incidence and severity of pathogens and insects as they affect long-term productivity.

Cumulative Effects - This section includes studies to examine the cumulative effects of naturally occurring and human-induced activities on various aspects of selected ecosystems and resources.

- Improve knowledge of cumulative effects of timber management practices on water quality, stream stability, wildlife habitat and other resources.
- Identify the effects of changing habitat patterns on management indicator species.
- Develop criteria to predict when recreational user patterns change as a result of intensive forestry practices.

Management Strategies and Techniques - Studies are identified that are needed to improve understanding of resource responses to prescribed management actions, to develop or improve inventories and monitoring techniques, and to enhance resource protection. Information is also needed to evaluate effects of certain management strategies for a variety of resources.

- Evaluate the effects of planting genetically-selected stock on stand growth and yield, and pathogen and insect population dynamics.
- Identify specific sites and situations where natural regeneration can be a successful management option.
- Improve effectiveness of using fire to manage vegetation when necessary and as an alternative to herbicide use.
- Develop effective techniques for reforesting areas of harsh microclimates, gravelly soils, and/or competing vegetation.
- Determine the results of alternative timber management strategies on wood product properties, net value recovery, and the competitiveness of the timber industry in national and international markets.
- Evaluate alternatives for managing old-growth forests and for maintaining habitat characteristics (e.g., snags, green trees and logs) in young managed stands.
- Develop and refine monitoring techniques to improve procedures for using habitat information to make inferences about populations, and designing cost-effective sampling schemes that provide information about both habitats and populations with appropriate reliability.

- Improve understanding of the effects of fertilization on timber yields, water quality and soils.
- Further assess the response of elk to spatial distribution and size of timber harvest units, forage enhancement projects, and human activities.
- Assess the results of stream rehabilitation projects on fish population dynamics and stream hydrology.
- Determine the amount, sizes and characteristics of timber in riparian areas needed to provide for in-stream large woody debris recruitment.
- Determine the thresholds of sediment production above which negative effects on water quality and fish habitat occur.
- Establish a baseline inventory and population trends for martens and pileated woodpeckers. Also dispersal patterns, behavior and habitat needs for all management indicator species.
- Identify specific cover/forage needs for deer and elk.
- Develop information for modeling predictive capability regarding the location of prehistoric cultural resources.
- Refine information regarding the location of mineral and energy related resources, and probabilities of development.

Social-Economic Analysis - Additional studies are needed to increase our understanding of the economic and social effects of many planned wildland activities.

- Evaluate the social and economic impacts of various alternative harvest plans and the aggregate implications of the harvest plans for larger areas.
- Assess the tangible and intangible factors affecting carrying capacity for wilderness and other recreation settings, to determine the practical maximum capacities.
- Evaluate user need and expectations for recreation opportunities.

Wildland-Community Relations - The relations and interactions between wildlands and the human communities within and near them need to be better understood.

- Determine potential effects of increased human densities in and near the Forest on recreational use, water quality, T&E species protection, timing and location of harvest activities, road construction and use, cultural resource protection, etc., and develop strategies to respond to these relationships.

CHAPTER III

PLAN RESPONSE TO ISSUES

INTRODUCTION

This chapter briefly presents the response of the Forest Plan to planning issues identified in the scoping process. An early step in development of this plan was the identification of issues, concerns and opportunities (ICOs) related to management of the Willamette National Forest. The ICOs were developed through citizen participation, including public meetings, interagency coordination, personal contacts with individuals and groups, and comments on the DEIS and Proposed Forest Plan. Appendix A in the FEIS describes the process used to summarize public input on the original ICOs. Chapter I of the FEIS describes how the ICOs have been clarified since the publication of the draft documents.

In 1981, a list of 18 issues was approved by the Regional Forester as being important in guiding the development of the Forest Plan. While all of these issues were considered in the analysis of the alternatives in the FEIS, the degree of response to seven major issues was most important in the selection of the Preferred Alternative, on which this Forest Plan is based. The seven major issues on the Forest are: Dispersed Recreation; Old growth; Roadless Lands; Scenic Quality; Timber Supply; Water; and Wildlife, Fish and Plant Habitat. Following is a brief summary of the response to each major issue as a result of the land allocations and standards and guidelines included in the Forest Plan, which is an extension of Alternative W, the Preferred Alternative in the FEIS. This Forest Plan represents a balance among the demands for resource use and protection. Table III-1 shows a comparison between this Forest Plan and the 1977 Plan for quantitative responses to some indicators of the issues.

Dispersed Recreation

How will the Forest provide a variety of recreation experiences?

Demand for a wide variety of recreation opportunities is expected to remain high. People are interested in maintaining a wide variety of options for recreation activities. There is concern about whether roaded and unroaded dispersed recreation opportunities will increase or decrease under the Forest Plan.

The full variety of Recreation Opportunity Spectrum (ROS) Classes will be available, although the demand anticipated in the year 2040 will only be met in the Roaded Modified Class. Semiprimitive opportunities will be slightly increased over the 1977 Plan direction, with 40% of the potential Semiprimitive ROS class opportunities maintained--11% as motorized and 29% as nonmotorized.

This Forest Plan allocates 121,809 acres for semiprimitive motorized and nonmotorized recreation opportunities. Areas available for semiprimitive nonmotorized recreation use total 85,761 acres while areas available for semiprimitive motorized recreation use total 36,048 acres of Forest land. The Oregon Cascades Recreation Area is managed to provide for motorized use over the entire area during winter, and on designated trails during snow free periods.

While 6% of the Forest is restricted to a specified season of use and/or type of off-road vehicle (ORV), 37% is closed to ORVs, and 57% is open to use by off-road vehicles. This represents a 4% decrease of ORV area use opportunities over current direction.

In addition to retaining all existing non-Wilderness trails, the Forest Plan provides for construction of 60 miles of new trail during the coming decade, which will be a moderate increase over the current plan.

Old Growth

How much of the existing old growth should be preserved?

Old growth and mature stands have provided the majority of the timber harvest from the Forest for several decades. The amount of old growth to be harvested during the next 10 to 15 years is of strong interest to many people. Part of the public sees a need to preserve old growth for its benefits to wildlife habitat and ecosystem diversity, and its recreational and aesthetic values. Another segment of the public recommends continuing the historic harvest levels and converting the old-growth stands to more vigorously growing second growth stands to support future timber production needs.

The Forest has about 594,800 acres which meet the Pacific Northwest Region definition of old growth. In the Forest Plan the old-growth stands are distributed as follows: wilderness = 17%, unsuited soils = 7%, no-harvest allocations = 25%, and areas with scheduled timber harvest = 51%. This Forest Plan schedules harvest on about 61,000 acres of old growth during the first decade, and averages about 46,000 acres of old growth per decade for the first five decades. After five decades, there would be a balance of about 365,000 acres, which represents the minimum amount of old growth in this Forest Plan. Over time, the stands of large mature, small sawtimber, poles and others will gradually take on the characteristics of old growth. The potential amount of old growth is about 730,000 acres, if all the forested acres in no-harvest allocations reach that condition. However, catastrophic events such as fire, wind, insects and disease will keep the Forest below the potential level.

Roadless Lands

How will the Forest manage roadless lands?

There are 172,007 acres in 31 inventoried roadless areas that are currently unroaded and undeveloped. These were released for multiple-use management under the Oregon Wilderness Act of 1984. Some people feel that these inventoried roadless areas should be left undeveloped, retaining an option for future designation as Wilderness. Roading would provide access for management of resources, including timber harvest, and would allow the enjoyment of scenic and recreational values associated with motorized access.

Significant portions of 13 inventoried roadless areas will be maintained in a roadless condition under this Forest Plan. There will be about 92,100 acres, 53% of the inventoried roadless acreage, maintained in an undeveloped condition. That is an increase of 18% over the amount that would be retained under the direction in the 1977 Plan which would have maintained 59,800 acres (35%) in an undeveloped condition.

Scenic Quality

What emphasis will be given to scenic quality?

The visual quality of the Forest landscape is of concern to adjacent landowners, travelers and Forest visitors. Many people have expressed the opinion that they do not want to see evidence of timber harvesting from major highways, homesites, and popular recreation sites. Other people favor utilization of resources and feel that Visual Quality Objectives (VQO) should play a subordinate role in planning resource managment activities.

Approximately 26% of the Forest is allocated to management area prescriptions that propose maintaining a moderate level of scenic quality (retention, partial retention, and modification) in major viewshed corridors. The foreground areas of all State and Federal highways, major Forest roads, and selected trails and use areas will be managed to ensure that landscape alterations will not be evident (retention). The amount of Forest land to be managed under a VQO of Maximum Modification in this Plan is 39%, as opposed to 53% under the 1977 Plan. Lands managed for a Preservation VQO under this Plan is 35%, a 3% increase over the 1977 Plan.

Timber Supply

What emphasis will the Forest place on providing timber in this decade?

Since the wood products industry is one of the three major components of the economy of the State of Oregon, concern about the timber supply from the Forest is high. Demands for and concerns about other resources have potential for changing the amount of timber available for harvest. Many members of the public are concerned that the current harvest level, under the Allowable Sale Quantity (ASQ) determined in the 1977 Land and Resource Management Plan, has been too high and that other resources may be adversely affected. Others feel that the level should be maintained or increased to avoid adverse effects on the economy of local communities.

From the total Forest landbase of 1,675,407 acres, about 62% (1,032,138) is considered tentatively suitable for timber management. About 75% of that, or 774,600 acres are suitable for timber production in this Forest Plan. The average annual Timber Sale Program Quantity (gross) will be about 604 million board feet, as compared to the 800 million board feet which is allowed under the latest update of the 1977 Plan. The Allowable Sale Quantity (net) will be 491 million board feet (87 million cubic feet) annually during the first decade, and would be 440 million board feet (87 million cubic feet) in the fifth decade, if the Forest Plan were to be continued into the future. (Although the amount of board feet is lower in the fifth decade because of the conversion rate related to the size of the trees being harvested, the amount of cubic feet stays the same.)

Water Quality And Quantity

What emphasis should the Forest place on water quality and quantity?

The purity and abundance of waters on the Forest is very important to the public. The importance of water from the Forest for recreation, fisheries, and domestic and municipal use are well recognized locally and nationally. The primary public concerns are that road construction and timber harvest may result in long term effects of increasing suspended sediment, (turbidity), water temperature, chemicals and bacterial contaminations. A closely related concern is that management practices may result in decreasing the stability of the streams, wetlands, lakes and riparian ecosystem, with a related

decrease in the high quality of water, fish and wildlife habitat, travel corridors, diversity of plant and animal species, and human recreation use.

This Forest Plan responds to the high level of concern for water and riparian resources by requiring strict application of Best Management Practices, including retaining live trees along wetlands and Class IV streams where needed, scheduling no harvest in riparian areas along Class I, II and II streams and adjacent to lakes, accounting for the potential for adverse cumulative effects in the scheduling of timber harvests, proposing watershed improvement projects to stabilize existing high risk conditions, and by implementing a comprehensive program to monitor water quality and related aquatic habitat. These measures result in a majority of the forest in a category of "Low Risk" of adverse effects as shown in Table III-1.

Wildlife, Fish, And Plant Habitat

What emphasis should the Forest place on providing habitat?

The Forest is very diverse in terms of plant habitat and the variety and richness of wildlife habitat. Maintaining ecological diversity is important for the survival of resident plant, fish, and animal species. Public interest in continuing these populations is high, for prevention of species extinction, viewing enjoyment, hunting and fishing, and photographic opportunities. Conflicts center around balancing the amount of Forest land necessary to support all native species with the demand for production of commercial goods and services.

Fish and wildlife habitat will be managed at, or above, Management Requirement (MR) levels. Sensitive plant species will be maintained through Forest standards and guidelines. In addition to areas purposely maintained for wildlife at MR levels, comparable habitat will be available to wildlife because of compatible management for other resources.

Suitable habitat will be provided for 59 verified pairs of spotted owls; an additional 15 pairs are verified in areas allocated to no-harvest prescriptions. These 74 spotted owl habitat areas (SOHAs) represent an increase of 4 SOHAs over the number which would be maintained under the No-Action Alternative (A). The SOHAs maintain habitat for species dependent on old-growth forest. Old-growth habitat for the marten and pileated woodpecker will include the MR levels of 100 areas (500 acres each) and 38 areas (1,000 acres each), respectively.

Optimal thermal cover will be provided on an estimated 140,000 acres of winter range. Elk populations would increase by 28% from the No Action Alternative in the first decade, and increase by 41% at the end of the fifth decade. There will be a mix of forage and cover for elk and deer as timber is harvested.

Table III-1. Quantitative Indicators of Response to Major Forest Issues

Issue Indicator	Unit of Measure	1977[1] Plan	Forest Plan
Dispersed Recreation			
Lands Allocated to Semiprimitive Nonmotorized	Thousand Acres	72	86
Lands Allocated to Semiprimitive Motorized	Thousand Acres	23	36
Lands Allocated to Special Interest Areas	Thousand Acres	2	31
Trail Construction in the First Decade	Miles	0	60
Old Growth			
Amount of Old Growth Retained at End of First Decade	Thousand Acres	528	533
Roadless Lands			
Roadless Acres Allocated to Nondevelopment	Thousand Acres	60	92
Scenic Quality			
Lands Allocated to a Retention VQO	Thousand Acres	78	119
Lands Allocated to a Partial Retention VQO	Thousand Acres	150	172
Lands Allocated to a Modification VQO	Thousand Acres	5	143
Timber Supply			
Allowable Sale Quantity in the First Decade	Million Board Feet[2]	608	491
Allowable Sale Quantity in the First Decade	Million Cubic Feet[2]	110	87
Long-Term Sustained Yield	Million Cubic Feet	114	95
Water			
Forest Area with a "High" Risk Watershed Impact Rating in the First Decade[3]	Percent	28	0
Forest Areas with a "Moderate" Risk Watershed Impact Rating in the First Decade[3]	Percent	25	0
Forest Area with a "Low" Risk Watershed Impact Rating in the First Decade[3]	Percent	47	100
Erosion in the First Decade (Debris Slides)	Thousands of Cubic Yards[2]	80.3	34.0
Wildlife, Fish, and Plant Habitat			
Land Managed as Spotted Owl Habitat Areas	Number of Areas	59	59
Elk Populations in the First Decade	Thousands of Elk	4.2	6.1
Deer Populations in the First Decade	Thousands of Deer	17.7	24.9

[1]Willamette National Forest Multiple Use Land Management and Timber Management Plan; Final Environmental Statement, 1977; with Minimum Management Requirements; figures based on the No-Action Alternative, A, as analyzed in the FEIS.
[2]Units are average annual for the Decade specified.
[3]See Chapter IV, Draft EIS, Water for further explanation.