Forest Grove District

Implementation Plan

March 2003

This implementation plan describes the management approaches and activities that Forest Grove District will pursue in order to carry out the *Northwest Oregon State Forests Management Plan* and the *Western Oregon State Forests Habitat Conservation Plan* (HCP).

The *Forest Grove* District *Implementation Plan* (and earlier drafts) guides forest management for all forest resources on Forest Grove District from July 1, 2001 through June 30, 2011.

The main headings in this plan are listed below. A detailed table of contents begins on the next page.

District Overview 4
Management Activities 17
Landscape Design Overview 36
Management Basins 39
Expected Outputs and Habitat Achievements 63
Appendix A 67
Appendix B 78
Map Section 80

Forest Grove Table of Contents

District Overview 4
- Land Ownership 4
- Forest Land Management Classification System 5
- History 6
- Physical Elements 6
  - Geology and Soils 6
  - Topography 7
  - Water 7
  - Climate 7
  - Natural Disturbances 8
- Biological Elements 8
  - Vegetation 8
  - Insects and Disease 8
  - Fish and Wildlife 9
- Human Uses 10
  - Forest Management 10
  - Roads 10
  - Recreation 13
  - Scenic 14
- Forest Stand Structures: Current Condition 15

Management Activities 17
- Current Condition Analysis 17
  - Stand Structures Interaction 17
  - Hardwoods 18
  - Regeneration 18
  - Closed Single Canopy 19
  - Understory 19
  - Layered 20
  - Older Forest Structure 20
  - Non-Silviculturally Capable 20
- Management Activities in Each Stand Type 21
  - Regeneration Stands 21
  - Closed Single Canopy Stands 21
  - Understory Stands 22
  - Layered Stands 23
  - Older Forest Structure Stands 24
- Proposed Management Activities 25
  - Silvicultural Activities 25
  - Roads 26
  - Recreation 29
  - Aquatic Resources — Stream Enhancement Projects 31
  - Cultural Resources 31
  - Energy and Mineral Resources 32
  - Lands and Access 32

Scenic Resources 32
Plants 33
Special Forest Products 35
Landscape Design Overview 36
Management Basins 39
Management Basins Overview 39
Basin Descriptions 39
Bell Mountain Basin 39
East District Isolated Tracts Basin 41
Gales Creek Basin 42
Larch Mountain Basin 44
McGregor Basin 46
Rogers Basin 48
Scoggins Creek Basin 51
Sunday Creek Basin 52
Upper Salmonberry Basin 54
Wheeler Basin 56
Wilark Basin 59
Information Summary for All Management Basins 61
Expected Outputs and Habitat Achievements 63
Structure Targets, Timber and Habitat 63
FY 2003 Sale Plan and Existing Sales 66
Recreation Outputs 66
Appendix A 67
Determining Levels of Harvest and Other Silvicultural Activities 67
Appendix B 78
References 78
Map Section 80

District Overview

Land Ownership

The Forest Grove District has 117,342 acres, and makes up roughly the eastern one-third of the Tillamook State Forest. See the district overview map in the **Map Section**. Most of the acres are in Tillamook and Washington counties, but there are also a significant number of acres in Clatsop, Columbia, and Yamhill counties. The acreage breakdown by county is shown in Table 4-1 below.

Within the district, 116,715 acres are Board of Forestry (BOF) lands, 589 acres are Common School lands (CSL), 21 acres are deed restricted, and 17 acres are administrative sites.

Forest lands adjacent to the northern, eastern, and southern boundaries of the district are mostly privately owned industrial forest lands and interspersed with scattered tracts of Bureau of Land Management and privately owned non-industrial forest lands.

Table 4-1. Forest Grove District Acres, by County and Ownership

County	Board of Forestry	Common School	Consolidated Deeds	Administrative Sites	Total Acres
Tillamook	53,812	197	21	0	54,030
Washington	48,089	238	0	5	48,332
Clatsop	7,890	0	0	0	7,890
Columbia	6,413	77	0	12	6503
Yamhill	511	76	0	0	587
Total Acres	**116,715**	**589**	**21**	**17**	**117,342**

As part of its stewardship commitment, the Department of Forestry has also committed to voluntary measures in the *Oregon Plan for Salmon and Watersheds*, including road and fish passage improvements. Additional standards and guidelines are found in manuals such as the *Draft Recreation Design Standards and Management Guidelines* (ODF, 1999) and in the Department of Forestry's *Forest Roads Manual* (ODF, July 2000).

Much of the success of state forest management will depend on: district implementation of the forest management plan concepts; timely changes in strategies, approaches, and prescriptions in accordance with new knowledge gained through monitoring and watershed assessments; and continued involvement by the public and stakeholders.

Forest Land Management Classification System

The Forest Grove District's initial draft of the revised LMCS is shown in Table 4-2 and Table 4-3. Table 4-2 below shows the classified acres in each of the three stewardship classes. Table 4-3 shows the acres in both the Focused Stewardship and Special Stewardship subclasses.

Table 4-2. Forest Grove District Acres, by Stewardship Class and Fund

Classification	Board of Forestry	Common School	Consolidated Deeds	Administrative Sites	Total Acres
Special	20,564	47	52	14	36,325
Focused	103,679	320	28	0	104,027
General	20,564	47	52	14	20,677

Table 4-3. Forest Grove District Acres, Focused and Special Stewardship Subclasses

	Acres Focused	Acres Special
Administrative Sites	0	88
Aquatic and Riparian Habitat	30,278	11,821
Cultural Resources	64	16
Deeds	0	21
Domestic Water Use	3,563	0
Easements	0	3
Energy and Minerals	0	42
Operationally Limited	0	10,208
Plants	0	9
Recreation	18,828	148
Research/Monitoring	491	203
Transmission	0	256
Visual	9,331	0
Wildlife Habitat	41,472	3,262

History

In the northern one-third of the district, natural regeneration grew back on a large, contiguous area of the forest after extensive railroad logging and forest fires during the 1930s. These stands developed into a dense coniferous forest consisting of Douglas-fir, true fir, western hemlock, and western redcedar, with Douglas-fir being the predominant species. Several thousand acres of these stands were commercially thinned in the late 1970s and early 1980s. About five percent of the area was poorly stocked, and during this same time period, that portion was clearcut and replanted with Douglas-fir and other conifers, which resulted in well-stocked stands.

The stands in the southern two-thirds of the district lie within the Tillamook Burn, and were created through major reforestation projects in the 1950s, 1960s, and early 1970s, which resulted in densely stocked stands of Douglas-fir. The Tillamook Burn was a series of catastrophic fires in 1933, 1939, and 1945. Before these fires, private timber companies owned most of these lands. Much of the area was accessed with railroad grades used for transporting logs during the pre-Tillamook Burn timber harvest operations. After the 1933 fire, most of these land holdings reverted back to county ownership for delinquent property tax payments. In the 1940s and 1950s, the counties deeded these lands to the state to reforest and manage. Many acres in the Burn were salvage logged, greatly reducing snag concentrations. During the salvage logging, many miles of old railroad grades were converted into truck access roads.

In the 1960s, 1970s, and early 1980s, clearcut harvests occurred in some of the under-productive stands and mature stands not impacted by the fires, resulting in well-stocked Douglas-fir plantations. Beginning in 1983, small-scale commercial thinning operations began on some of the stands planted after the Tillamook Burn. From 1983 through 1991, commercial thinning operations averaged less than 100 acres per year. From 1992 to the present, the amount of commercial thinning over the entire district has gradually increased to approximately 2,950 acres per year.

From the mid-1970s to the present, most planted stands in the district have had a high survival rate and have been precommercially thinned to reduce stand density. About thirty percent of all stands have been fertilized at least one time.

Physical Elements

Geology and Soils

The Forest Grove District is primarily located within the Tillamook Highlands geologic province, which is a large area in the north Coast Range consisting of volcanic flows, igneous rock, and derived sediments. This province formed in the Eocene age (35 to 55 million years ago). It is mostly made up of igneous extrusive and intrusive rock (generally basalt and volcanic breccia) with inter-fingered sedimentary rocks (generally siltstone and sandstone). The large-scale geologic structure is dome-shaped, with significant amounts of folding and faulting due to past tectonic activity. The rock formed originally as an offshore island and has since been accreted, uplifted, and eroded. The result is landforms that are steep in places with areas of potentially high landslide risk.

The soils are mostly "silty sand" (SM) and "plastic silt" (ML) as classified by the Uniform Soil Classification System for engineering purposes. These soils have reasonably high frictional and some cohesive strength and generally remain stable on slopes below 80 percent for relatively long periods of time. There are medium to large-scale ancient landslide features scattered across the landscape that may be prone to natural movement. The high precipitation levels combined with steep slopes results in high erosion rates dominated by mass wasting. Forest landslides that result in debris slides are a dominant geologic process on this landscape.

Topography

The majority of the district is comprised of mountainous highlands featuring deeply incised canyons and sharp ridge crests with elevations rising to over 3,400 feet. Approximately one-half of the district has slopes less than 40 percent, one-third is 40-65 percent, and the remaining acres include slopes greater than 65 percent.

Water

The district's distinguishing geographic feature is its location in relation to the Coast Range divide. About one-half of the district land base drains to the Pacific Ocean and the other half flows to the Willamette River. Five rivers originate within the Forest Grove District. These include the Nehalem River, Salmonberry River, Wilson River, Tualatin River, and the North Fork Trask River. In addition, nine important tributaries feed into these rivers from within the district: Wolf Creek, North Fork Wolf Creek, Lousignont Creek, North Fork Salmonberry, Gales Creek, Devils Lake Fork, South Fork Wilson, Scoggins Creek, and the North Fork of the North Fork Trask River.

The recently expanded Barney Reservoir lies at the district's southern end and is mostly surrounded by state forest land. Covering approximately 450 acres and with a capacity of 20,000 acre-feet, this reservoir will supply water to much of Washington County.

Climate

Mild winters and summers are typical. Although the higher elevations receive snow each year, there is not always enough to build a snowpack. Rainfall averages from 50 inches per year on the district's eastern edge to 150 inches per year on the western edge near the Coast Range divide. Most precipitation results from low-pressure systems flowing in from the Pacific Ocean. During summers, the prevailing jet stream shifts to the north resulting in high-pressure systems that bring fair, dry weather for extended periods.

Douglas-fir is well suited to almost all portions of the district and makes up approximately 95 percent of the forest cover types; the higher elevations are ideal for growing noble fir. Other tree species that do well in this climate include western hemlock, western redcedar, and red alder.

Natural Disturbances

Natural disturbances such as wildfire, windstorms, floods, landslides, and insect and disease outbreaks have influenced and will continue to influence the forest condition. Increased forest diversity and complexity are often the result of disturbances. Laminated root rot disease (*Phellinus weirii*) and windstorms are the most common of these disturbances in the Forest Grove District. Forest management will reduce the impact of epidemic natural disturbances, but endemic levels will continue to result in increased forest diversity and complexity.

Biological Elements

Vegetation

All of Forest Grove District lies within the western hemlock zone (*Tsuga heterophylla)*, as classified by the U.S. Forest Service technical report, *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1973). Typically, the forest is comprised of heavily stocked stands of Douglas-fir mixed with minor amounts of western hemlock, western redcedar, true fir, and hardwoods. Generally, stands in the northern one-third of the district have a larger percentage of these other tree species than the stands in the southern two-thirds of the district, where the stands are nearly 100 percent Douglas-fir. Stands in the district's northern third are primarily 55 to 65 years old, and the stands in the southern two-thirds are primarily 35 to 45 years old. The most common shrubs and herbs include vine maple, hazel, ocean spray, cascara, huckleberry, salmonberry, salal, sword fern, trillium, and oxalis.

Currently there are five exotic plant species known to exist on the district that are classified by the Oregon Department of Agriculture as "noxious weeds". They are Canada thistle, Scotch broom, Himalayan blackberry, Tansy ragwort and Japanese knotweed. Except for Japanese knotweed, these non-native plants are found scattered in various densities throughout the district. Japanese knotweed is found in one small area in the district. Management and control of noxious weeds is described under **Proposed Management Activities.**

Insects and Disease

Laminated root rot (*Phellinus weirii*) is a serious concern throughout the district. It is unknown exactly how widespread the disease is. However, surveys have detected it in every basin, with some basins believed to be fifteen percent infected. The disease spreads by root contact with an infected host and is devastating to younger stands of Douglas-fir. Also, this disease may adversely impact true firs and western hemlock. If left untreated the disease will spread at an estimated rate of one to two feet per year, creating openings in the forest which initially will be occupied by brush species and trees that seed in naturally. Eventually, these young trees will be infected and the disease cycle will continue.

Two possible management strategies in stands with significant presence of laminated root rot are clearcut or thin with patch cuts in the disease pockets. In both cases the resulting open spaces may be planted with tree species that are either disease-resistant or immune. In

a predominately Douglas-fir forest these strategies will contribute to species and age diversity.

These silvicultural decisions are based largely on the extent and magnitude of the disease within a given stand. It is generally not recommended that Douglas-fir stands be commercially thinned if the disease is present in more than 40 percent of the stand. In these highly infected stands, the best option is often clearcutting and reforesting with immune tree species, or stump removal and replanting with Douglas-fir. While stump removal is expensive it is a very effective way to remove the inoculum from the soil. Where the disease is present in 10 to 40 percent of the stand, thinning with patch cutting of disease pockets may be feasible. In stands with minor amounts of laminated root rot, the disease is often ignored. These management strategies contribute approximately 100 acres per year toward the district's annual clearcut objective.

Additional information regarding this disease may be found in the publication titled *Laminated Root Rot in Western North America* (Thies and Sturrock, 1995).

Currently, Swiss needle cast does not occur in significant amounts within the Forest Grove District. No management constraints are anticipated as a result of Swiss needle cast.

Fish and Wildlife

The Forest Grove District is comprised of a variety of habitat types that support many species of mammals, birds, amphibians, reptiles, and fish. The integrated forest management strategies, as well as the aquatic and riparian strategies, of the *Northwest Oregon State Forests Management Plan*, will contribute to diverse habitats that are likely to accommodate most native fish and wildlife species and contribute to the maintenance and restoration of biodiversity.

Of the many wildlife species potentially found on the Forest Grove District, four are listed as threatened or endangered under either (or both) federal and state Endangered Species Acts: the northern spotted owl, marbled murrelet, bald eagle, and peregrine falcon. The presence of two of these species (northern spotted owl and bald eagle) has been confirmed on the Forest Grove District. The protection measures for these species are described in the **Policies for Threatened and Endangered Species** section in **Chapter 1: Overview.** The Forest Grove District has conducted a northern spotted owl survey program since 1990. Currently, there are three known spotted owl sites on the district. Two of these sites are classified as "pair status" and one is classified as "resident single status". Wintering bald eagles have been observed within Forest Grove District, but there are currently no known nest sites. Marbled murrelet surveys have been conducted on the district since 1993, and the presence of murrelets has never been detected. Peregrine falcons have not been observed on this district.

The streams, rivers, lakes, and other water bodies on the Forest Grove District provide habitat for a variety of fish species. There are approximately 388 miles of fish bearing streams on ODF ownership within the district. The Oregon Department of Fish and Wildlife (ODFW) completed stream habitat surveys in the Nehalem, Wilson, and Trask River basins between 1994 and 1996. Fish presence surveys were completed in conjunction with the aquatic habitat surveys. ODFW continues to conduct fish presence surveys on this district, in

order to verify the classification of individual streams. Native salmonid species that have been confirmed on the Forest Grove District include chinook salmon, coho salmon, steelhead trout, and coastal cutthroat trout. The North Fork Salmonberry River contains an important native steelhead run. In addition, the Devil's Lake Fork of the Wilson River, the North Fork of the Trask River, and many tributaries of the upper Nehalem River are important coho streams. Protection measures for listed fish species are also described in the **Policies for Threatened and Endangered Species** section in **Chapter 1: Overview.**

Human Uses

Forest Management

Table 4-4 shows the current annual objectives of silvicultural management activities as well as the five-year average of acres accomplished.

Table 4-4. Silvicultural Management Activities

Activity	Current Level[2] (Acres Per Year)	Five-Year Average (Acres Per Year)
Clearcut[1]	420	330[3]
Partial Cut	2823	2,487
Reforestation	413	392
Precommercial Thinning	38	442
Fertilization	3000	1200
Pruning	139	130

1. Under Oregon Department of Forestry management, this refers to a regeneration harvest (modified clearcut) that removes most trees, but leaves specified numbers of green trees, snags, and down wood to provide structure (habitat) in the new stand.
2. Current harvest levels are taken from the district's most recent annual harvest plan, which is the Fiscal Year 2001 sale plan.
3. The amended 1984/1990 long-range plan clearcut objective for the Forest Grove District was 475 acres. Clearcut acres accomplished over the last five-year period are lower than the planned objective because timber sales were deleted from annual sale plans due to unforeseen presence of northern spotted owls.

Roads

The district's primary road network is an established system that has been in place for ten to fifteen years. It provides access for forest management activities, fire suppression, and public travel. Visions, guiding principles, and goals of for managing the district's road network are discussed in the *Northwest Oregon State Forests Management Plan* (January 2001) and the *Forest Roads Manual* (July 2000).

The district's total system of mainline roads, collector spurs, and minor spurs currently consists of about 520 miles of single-lane roads with turnouts. Many of the district's main roads were originally built as railroads and then converted to truck roads in the 1940s and

1950s, to standards considerably less stringent than those applied today. Many of these roads were constructed with inadequate drainage systems, poor surfacing, and little regard for slope stability and fish passage.

Over the past decade or so, most of these roads have been upgraded and now have improved drainage structures, rock surfacing, width, and alignment. The primary reason for the upgrades was to enhance access to harvest operations and bring the road system into alignment with evolving stewardship philosophies and environmental regulations. As an added benefit, these upgrades have enhanced public's ability to access the district for recreational uses and have enhanced the ability to provide fire protection on the district. However, there are still some road segments and abandoned spurs that are a legacy from those earlier decades and need improvement, access restriction, or closure.

In general, the district road network can be divided into the following categories and subcategories:

Open Road — This category includes any road open for travel with a motorized vehicle with at least four wheels. It includes permanent roads and also temporary roads that are currently in use or will be used in the near future. These roads are usually available for use at any time of the year. Use may be continuous or intermittent. Roads in this category require active maintenance and have a full maintenance obligation under the Oregon Forest Practices Act.

Restricted Access Road — This group includes two sub-categories of roads closed to vehicle use and requiring maintenance under the Oregon Forest Practices Act.

- Closed road — There is restricted access to the road for part or all of the year. This may be as simple as placing a sign or other marker at the start of the road, as might be the case in a cooperative travel management area for wildlife protection. Or, it might involve placing a semi-permanent barricade at the start of the road. This barricade can be a gate, large boulders, stumps and logs, or a trench. This strategy does not significantly alter the nature of the road, and the obligation to maintain the road remains. Road maintenance needs and sediment loads are reduced due to the elimination of traffic-related wear.
- Partially Vacated road — Partial vacation involves barricading the road and installing minor drainage structures, which might include the construction of water bars or rolling dips. This strategy is best suited for roads that will be needed again after long periods (perhaps as much as 15 to 20 years) of inactivity. Ridge-top roads or other roads where drainage and sediment issues are negligible are good candidates. The nature of the road may be altered somewhat through the addition of waterbars and other drainage structures, but the obligation to maintain the road remains. Sediment loads are reduced due to the elimination of traffic-related wear, and road maintenance needs are greatly reduced.

Retired Road — This group includes two sub-categories of roads not available for vehicle use and not requiring maintenance under the Oregon Forest Practices Act.

- Fully Vacated road — Full vacation involves removing all stream crossing structures, installing maintenance-free drainage (outsloping, water bars, rolling dips,

etc.), pulling back any sidecast material, seeding grass on disturbed soil, and barricading the road. The road is effectively "put to bed." All access is prevented, and there is no maintenance obligation. Cross-drain culverts may be left in place but will not be considered as a functional drainage feature.

- Abandoned road — These roads are no longer used or maintained but have not been formally vacated to according to Oregon Forest Practices Act standards. These roads were generally constructed, used, and abandoned prior to the advent of the FPA.

The last two categories are referred to as "Managed Access" categories. The roads in these categories are predominantly short spur roads and some collector spur roads. These roads are closed to reduce or minimize vandalism, dumping, operational conflicts, wildlife harassment (cooperative travel management areas), road wear, and water quality impacts. All Managed Access roads are open to public non-motorized travel (hiking, biking, horse riding) with the exception of areas in active operations.

The Open and Restricted Access Roads have been classified into three separate road use standards as defined in the *Forest Roads Manual* (July 2000), pages 3-6 and 3-7. These standards provide guidance on how roads are constructed, improved, and maintained, and are defined below:

Low Use Standard — These are individual short spur roads designed primarily for pickups and log trucks. Low use roads generally provide access to a single harvest unit. Their use is short term and may be temporary.

Medium Use Standard — These are longer spur roads designed primarily for pickups and log trucks. Medium use roads may provide access to several harvest units, and are often referred to as collector spurs. Their use is more permanent.

High Use Standard — These are longer roads designed for all types of traffic, including large equipment. High use roads are generally permanent and provide access to large areas. They are referred to as mainline roads.

The following table shows the approximate number of miles by road use standard:

Table 4-5. Forest Grove District Road System

Road Use Standards	Miles
Low Use	205
Medium Use	195
High Use	120
Total Miles	**520**

Information has been gathered about current road conditions on 89 percent of the district's road miles. The information will be used to help identify areas of concern, prioritize needed repairs, and plan road management activities. For example, the information shows that 95

percent of the inventoried road miles are in the "Open Road" category and 5 percent are in the "Restricted Access" or "Retired" category. These last two categories will be referred to as "Managed Access" categories.

Approximately 64 percent of the road miles are located on midslopes. Many of these roads are converted railroad beds that were originally constructed on grades that stayed below the ridge tops. Another 32 percent of the road miles are located on ridge tops. The remaining 4 percent of the road miles are located in valley bottoms.

Nearly 95 percent of the road miles are surfaced with gravel. The type of surfacing is split between old rock (usually this is natural quarry or pit run rock) and new, crushed rock. Additional crushed rock will be applied to roads, particularly those surfaced with old rock, as part of the district's ongoing work to upgrade roads.

The road surface on all district roads has been shaped for good drainage. Cut slopes are rated as good on 98 percent of the road miles. Thirty-one areas have been identified with potentially unstable road fill, where there is a risk of material entering a stream if a failure occurs. Most of the areas with potential instability are on older roads, are small, and are the result of sidecast construction. Removal of the sidecast material will usually stabilize them. Ditches are considered to be in good condition on 92 percent of the road miles. The other 8 percent of the road miles have no ditches. Roads without ditches are located on ridge tops or are outsloped for drainage.

There are 3,000 culverts installed across roads in the district. Eighty percent of the culverts are in good condition. The remaining culverts are in less than good condition because of rusting (10 percent), sedimentation (6 percent), or mechanical damage (4 percent). There are approximately 475 locations where additional culverts could be installed to divert ditch water on to vegetated ground to prevent sedimentation from reaching a stream.

Forty culverts are installed in known fish-bearing streams. Of these, sixteen culverts will allow all fish to move upstream and downstream. Another ten culverts will allow adult salmonids and trout to move upstream, but may block upstream passage of juveniles during high water events. Another ten culverts are presently barriers to all fish passage, but plans are in place to restore fish passage at these locations by installing new culverts to current fish passage standards. The remaining four culverts allow upstream passage of adult salmonids but may block upstream movement of trout and juvenile salmonids, and will be examined for the possibility of mitigating the passage issues during this planning period.

The type and level of road activity that will occur during the planning period is discussed in the **Management Activities** and **Management Basins** sections of this document.

Recreation

The Tillamook State Forest is the largest block of public forest in the north Coast Range and has historically attracted large numbers of campers, anglers, hunters, hikers, off-highway vehicle (OHV) users, equestrians, and other recreationists. Recreational activities on state forest lands produce significant revenues for local and regional business, and make an important contribution to the regional economy.

Two major highways (Highway 6 and Highway 26) cross the forest, providing direct access to much of the district from the heavily populated Portland metropolitan area. The most heavily used recreation areas in the district are along the Highway 6 corridor and in the Rogers Basin south of the Highway 6 summit.

There are currently four developed fee campgrounds on the district that collectively have been averaging over 8,500 overnight visitors per year. On the district, there are over 43 miles of trail designated for horse, hiker, and mountain bike use in addition to the 55 miles designated exclusively as OHV trail. The Rogers Basin has been designated for OHV use, with over 50 miles of designated trails currently in place. This basin is well known and used by many OHV enthusiasts. The Sunday Creek Basin and the entire area located north of Highway 6 have been designated for non-motorized recreational use. The Upper Salmonberry Basin has opportunities for remote recreational experiences, mostly located within the Salmonberry River canyon.

Recreation management and development activities are described in the **Proposed Management Activities** section.

Scenic

There are a number of important or sensitive visual resource areas within the district. Currently, the most visually sensitive areas include the corridors along the Wilson River Highway (Highway 6) and the Sunset Highway (Highway 26), two established viewpoints, and the areas immediately adjacent to 5 campgrounds. The 2 highway corridors total about 18 miles in length and impact varying distances of adjacent forest land. The Three Mountains viewpoint along the Sunset Highway overlooks the southeast corner of the McGregor Basin. The Gales Creek interpretive kiosk overlooks the western portion of the Gales Creek Basin. The 5 campgrounds are Browns Camp, Stagecoach Horse Camp (Rogers Basin), Elk Creek (Larch Mountain Basin), Gales Creek (Gales Creek Basin), and Reehers Camp (Wheeler Basin).

Forest Stand Structures: Current Condition

The current stand condition is displayed in the graphs on the next page, and in the second map in the **Map Section**. Figure 4-1 shows the current stand structure, acreage, and percentage, using the structure-based management definitions for structure types. The stand structure abbreviations are given below.

In order to determine the current condition of the stand structure array on the district, the OSCUR stand inventory was screened, and results were verified with aerial photos and field work. The OSCUR inventory was developed in the late 1970s and early 1980s, primarily to track the growth and yield of forest stand types for timber production. Therefore, it is possible to make errors on forest stand types using OSCUR, due to the incomplete stand structure information (e.g., there is no information on understory species composition, nonmerchantable tree species, layering, etc.).

Through 1998, initial stand inventory data such as average diameter, trees per acre, and stand density were projected forward each year to provide an approximation of current stand attributes. OSCUR was also updated each year through 1998 to reflect changes in stand data that resulted from management activities. Due to the anticipation of a new Stand Level Inventory, OSCUR has not been updated since 1998. Therefore, current condition information in this section is based on five-year-old data.

In order to correct any errors, all silvicultural prescriptions will be based on actual field reconnaissance during pre-operational analysis and planning, rather than on these initial OSCUR screens. A new Stand Level Inventory is under development and will include the additional information necessary to accurately assess forest stand structure. For now, the current OSCUR inventory does include some information related to stand structure, including tree species composition, stand age, stand density, and stand management history. These parameters were used in the current condition analysis.

Figure 4-2, on the next page, shows the current age distribution of the forest, regardless of structure, by acreage and percentage.

Abbreviations for Forest Stand Types

REG	Regeneration
CSC	Closed single canopy
UDS	Understory
LYR	Layered
OFS	Older forest structure
NSC	Non-silviculturally capable

Figure 4-1. Current Stand Structure, by Acres and Percent

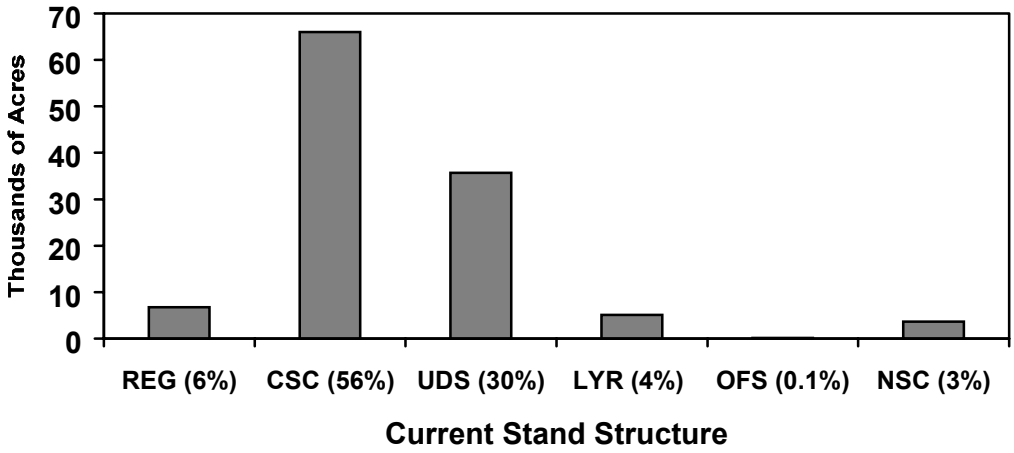
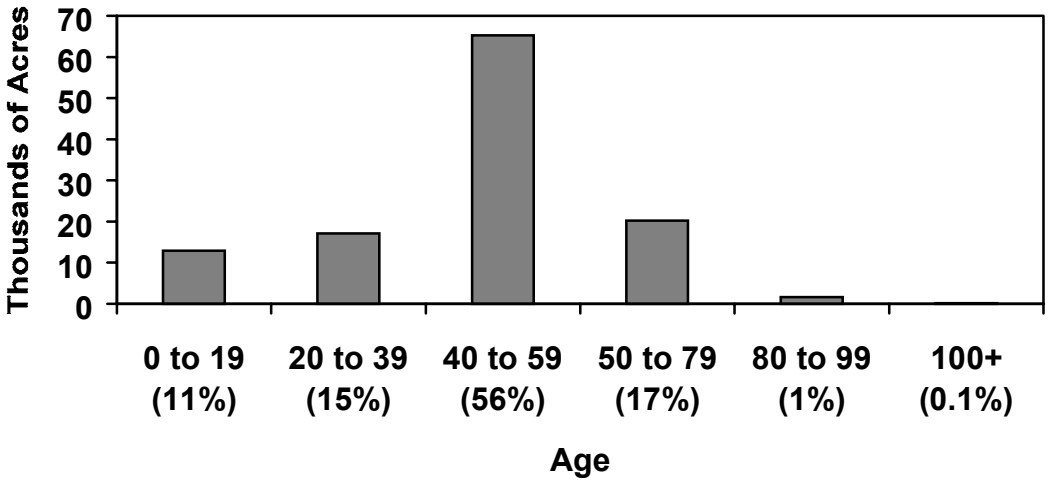


Figure 4-2. Stand Age Distribution, by Acres and Percent



Note: In the above graph, the 11% (12,888 acres) of less than 20-year-old stands includes the 3% (3,619 acres) in NSC.

Management Activities

Current Condition Analysis

Stand Structures Interaction

The Current Condition Analysis and the Landscape Design sections of this Implementation Plan describe the amount of each of the identified forest stand types. As described in the forest management plan, the stand types represent only five points along a continuum of forest development. Five "stand" types were developed as a means to plan for and assess the development of the forest toward a range of "forest" types over time. Because the five types are only points along a continuum they do not express five specific habitat types nor are they perceived as discrete habitats by wildlife species. This is discussed in detail in Appendix C of the forest management plan.

As you think about the current condition and desired future condition descriptions as they relate to wildlife habitat keep in mind the following concepts and refer to Appendix C in the forest management plan for more detail.

In an attempt to describe how wildlife may view the forest, they seem to "see" three fundamental patch types. The table below compares these three patch types to the five stand types described in the forest management plan.

Comparison between Landscape Patch Types and Stand Types

Landscape Patch	Stand Type
Young forest	Regeneration through closed single canopy sapling stands
Pole-sized forest	Closed single canopy pole-sized through layered stands
Mature forests	Closed single canopy, understory, layered, and older forest structure stands (trees larger than pole-sized)

Thus, as you examine the current and desired future conditions described by the stand types, it is important to think about combinations and aggregations of different stand types that function together to provide the benefits for each of the three broad patch types that wildlife use.

For example when thinking about the amount of mature forest habitat that will be provided by the anticipated future array of layered and older forest structure stands – also consider the role of understory and closed single canopy stands. The desired future condition was developed to provide a blueprint of a desirable array for the development of the percentage

of layered and older forest structure stand types in the future if natural disturbances allow and management assumptions come to fruition. As described in the table, these stand types will be complemented by adjacent understory and large diameter closed single canopy stands to provide habitat patches that represent mature forests to wildlife species. The result being significantly more acres of mature forest habitat available for wildlife than any single stand type represents.

The entire array of all stand types has not been depicted because it is virtually impossible to predict how each stand on the landscape will develop over the next several decades. By focusing on generally, where we anticipate the development of layered and older forest structure stands, it provides the local manager with the blueprint for the management prescriptions necessary to move the landscape in the desired direction. Future adjustments will undoubtedly have to be made as natural disturbances, insects and disease, or other factors result in some stands not developing in accordance with management plans.

Hardwoods

A minor component of the district CSC percentage is in red alder dominated hardwood stands, usually found adjacent to creeks and draws in narrow, homogeneous bands called "hardwood stringers." These hardwood stringers do not lend themselves to specialized management and are most often managed as a sub-component of the surrounding conifer stands. However, some red alder plantations have been established in areas with a significant laminated root rot problem. The largest hardwood plantation is a 100-acre, 11-year-old, red alder plantation in the McGregor Basin. Plans for this stand include pruning and density management, which will most likely result in an understory stand type rather than closed single canopy.

Generally, red alder stands are best established on moister aspects at elevations less than 2000 feet. It is estimated that approximately 50% of future clear-cut harvest will be on sites suitable for hardwoods that would allow an opportunity to grow red alder. Analysis indicates that growing alder can be economically desirable, as well as providing an additional component of wildlife habitat diversity on the landscape. The amount of acres planted with red alder for the planning period could average as high as 15% to 20% of the available suitable sites.

Regeneration

The regeneration (REG) structure comprises 6 percent of the district. This structure is primarily characterized by young (less than or equal to 18 years) even-aged stands of conifer or hardwood seedlings and saplings. However, this structure type has evolved as management strategies and techniques have evolved. Presently, it is not uncommon to find mature live trees, snags, and down wood intermixed throughout this structure. This structure type is widely used by big game animals for foraging habitat.

Closed Single Canopy

The closed single canopy (CSC) structure, at 56 percent, covers the largest percentage of the district. This structure is characterized by the closed crowns of the overstory trees, which prevent light from reaching most of the forest floor. This low light level precludes the introduction of both brush and shade-tolerant conifer species in the understory, thus leaving the forest floor sparsely vegetated. Of all the structure types, this type is the least used by wildlife species, especially species requiring more complex habitats.

The overabundance of CSC on the district can be attributed mainly to the highly successful reforestation efforts following the Tillamook fires, coupled with the relatively small amount of stand density management. Often, stands that were precommercially thinned were thinned too young and/or were not thinned heavily enough to advance these stands into the UDS structure. Closed single canopy stands are found in every basin and vary in age from 20 to 70 years.

Understory

The understory (UDS) stand structure, which accounts for 30 percent of the district, is the second most common stand structure. This structure occurs where normal tree mortality, previous density management (precommercial thinning, partial cutting), poor stocking, low growth sites, root disease, or a combination of these factors have prevented the overstory canopy from fully closing. As a result, an understory of herbs, shrubs, and small conifer trees has developed. On good sites in this structure type, large, healthy conifer trees with large crowns characterize the overstory. Some of these stands began in a low stocked condition, with the overstory canopies eventually closing enough to shade out some of the brush and allow young conifer regeneration to occur.

Poor site class also contributes to the occurrence of this structure across the forest landscape. Site class is usually lowest on rocky, south-facing slopes where both water and nutrients are limited for supporting forest tree species. Therefore, in an environment with few overstory trees, the forest floor has many openings available for understory vegetation.

Diseased stands with advanced degeneration caused by *Phellinus weirii* root rot also fall into the UDS structure type. These infected stands are characterized by the presence of both standing and fallen dead trees, with a brush understory, surrounded by the surviving forest canopy. The fallen trees, having died from root disease, usually do not have roots attached to their trunks. The surrounding forest canopy is often infected or in the process of being infected by the root rot disease, thus continuing the spread and progression of the disease.

Finally, previous partial cutting also contributes to the presence of this structure. In stands managed through partial cutting, tree density may have been reduced enough to allow for understory vegetation development. The residual trees have increased growth in girth and crown size. In most cases, this structure provides better wildlife habitat, provides more recreation opportunities, is more scenic, provides better tree growth, and stimulates forest health better than the CSC stand structure.

Layered

Currently, layered structure (LYR) is significantly below the desired target percentage. As shown in Figure 4-1 and illustrated in the current condition map in the **Map Section**, this structure comprises 4 percent of the district. The shortage of this structure will be the primary factor considered in stand management and landscape design decisions applied across the district.

Older Forest Structure

Currently, older forest structure (OFS) is significantly below the desired target percentage. As shown in Figure 4-1 and illustrated in the current condition map in the **Map Section**, this structure comprises less than 0.1 percent of the district. The shortage of this structure will be the primary factor considered in stand management and landscape design decisions applied across the district.

Non-Silviculturally Capable

By definition, non-silviculturally capable (NSC) lands do not form a single structure type. However, these lands do provide unique and significant habitat contributions to the district landscape. Comprising 3 percent of the district, NSC lands are characterized by geologic and hydrologic conditions unsuitable for the commercial growth and harvest of forest tree species. Geologic conditions include rock cliffs, talus slopes, rock slopes and outcroppings, and other substrate conditions incapable of supporting forest tree species. Hydrologic conditions include floodplains, marshes, beaver ponds, and other aquatic conditions that prevent the growth of forest tree species. These lands provide for plant and animal communities not associated with the other forest structures. Non-Forest lands are silviculturally capable areas, greater than 5 acres, that are maintained in a permanently non-forest condition. Examples in this district include the South Fork inmate work camp, located in the Rogers basin, and large power line right-of-ways. Non-silviculturally capable and non-forest areas are not considered part of the commercial forest land base and will not be managed for the growth and harvest of forest tree species.

Management Activities in Each Stand Type

This section describes the various management activities and the effects of management for each structure type.

Regeneration Stands

Management practices will be applied to these young stands in order to obtain the greatest value of this structure (rapid tree growth, big game forage, wildlife habitat, etc.). These stands have the potential to move through all of the stand structures toward OFS, depending on current and future landscape designs. All current and future clearcut harvests are designed to incorporate live green trees, snags, and down wood. These structural components in the young plantation will assure proper habitat function of REG stands throughout their growth and development.

Reforestation

Reforestation promptly follows all clearcut and diseased patch harvests down to one-quarter acre in size. Site-specific conditions determine species composition, stock type, and stocking levels. Site preparation, vegetation management, and tree protection activities occur in conjunction with stand establishment and maintenance. Site-specific prescriptions may include broadcast burning, slash piling, herbicide treatments, manual release, and tubing.

Precommercial Thinning

Precommercial thinning (PCT) is an important density management practice that thins out closely spaced trees, including small and defective young trees, in order to provide more water, light, and nutrients for the healthy residual trees. In addition, PCT keeps the canopy from closing, thus preserving the growth of herbaceous vegetation required by big game, while maintaining vigorous tree growth.

Pruning

Pruning may be used in more specialized situations. Pruning removes the lower limbs on the residual trees. It increases the wood quality of the pruned trees, retains big game forage for a longer period of time, and reduces damage caused by bears. Stands with white pine are pruned to prevent infection from white pine blister rust.

Closed Single Canopy Stands

Partial Cut

Past management experience has found that most CSC stands respond well to partial cutting. Not only do the residual trees grow faster, but also complex structures and diverse habitats develop more rapidly, with the creation of snags, down wood, and a shade-tolerant shrub and conifer understory (such as western hemlock, western redcedar, vine maple). Partial cutting improves forest health through increased stand vigor and lower susceptibility to damage from insects, disease, and windthrow, etc. Partial cutting also produces timber,

revenue, and enhancements to other resources, including scenic and wildlife resources. Therefore, the majority of current CSC stands will be partial cut, to help these stands develop into the UDS structure. In some areas where either a seed source for shade-tolerant conifer species or advanced regeneration are not present, shade-tolerant conifer species will be underplanted, to assure the development of the UDS structure.

Clearcut

In the Department of Forestry, the term "clearcut" refers to a regeneration harvest (modified clearcut) that removes most trees, but leaves specified numbers of green trees, snags, and down wood to provide structure (habitat) in the new stand. The following three subheadings further define the CSC stands that would benefit from clearcutting as a silvicultural treatment.

***Phellinus weirii*-infected stands —** An option for CSC stands with *Phellinus weirii* root rot is to clearcut significantly infected areas. This disease can be found in a variety of stages and spatial configurations in all stand structures, and is fatal to Douglas-fir, true fir, and western hemlock. Most infected stands gradually develop significant openings and patches dominated by brush. Infected areas as small as one-quarter acre may be treated by removing all diseased trees and reforesting the openings with disease-resistant tree species, such as western redcedar, western white pine, red alder, or bigleaf maple. Benefits from treating root rot disease pockets include increased habitat diversity through the creation of small patches or openings, and the incorporation of more diverse tree species into Douglas-fir-dominated stands. Depending on the size of the openings created, the resulting stands will primarily become UDS with a few isolated REG stands. The primary difference between this treatment in CSC versus UDS stands is the advanced stage of the disease in UDS stands, which results in larger clearcut openings.

Over-dense stands — A management option for over-dense CSC stands is to convert them into REG stands through clearcut harvest and reforestation. Over-dense stands have small crowns, are less vigorous, and are more susceptible to poor health conditions. These dense stands have a low likelihood of being able to respond to partial cutting, which usually leads to high mortality due to windthrow and breakage. Those trees that do not die take a long time to respond to the additional light and nutrients available after the partial cut. Therefore, gains made by partial cutting are negated by the increase in mortality and the slow growth response in these overly dense stands.

Big game foraging habitat opportunities — Openings for big game species and other open area-dependent wildlife species may be created through clearcut harvesting and planting. This management option will be used where landscape design and habitat analysis indicate the need for REG structure. Openings are important for the health of the big game populations using the Tillamook and Clatsop state forests. Live green trees will be retained, and snags and down wood will be retained or created to complement the new stand.

Understory Stands

Due to the various ways that UDS stands have developed, and the differing vegetation compositions of the understory, a variety of stand management options will be pursued to address the stand-specific conditions associated with this structure type.

Partial Cut

For UDS stands that have a sparse to moderate overstory and are stocked with a healthy conifer understory, are on lower site soils, or are the result of partial cutting, the preferred management option will be to develop these stands into the LYR structure. In the majority of cases, these stands will be monitored until the overstory begins to shade out and suppress the understory. At that time, a partial cut will be done to release the understory while maintaining the health and vigor of the remaining overstory. This prescription will maintain the growth rates of both the overstory and understory while advancing the stand into the next level of structure complexity. In addition, snags and down wood will be recruited within stands deficient in these important structural habitat components.

Clearcut

The following two subheadings further define the UDS stands that would benefit from this silvicultural treatment.

***Phellinus weirii*-infected stands —** An option for UDS stands with a significant amount of *Phellinus weirii* root disease is to clearcut the infected areas. In some cases, the harvest units may be a series of small patch cuts, 1 to 10 acres. In other cases where the disease is widespread and diffuse, harvest units may be 10 to 120 acres. These harvest units are usually defined by roads or streams so as to provide a barrier to future root contact from adjacent stands that may still contain the disease. Although it is impossible to completely eradicate laminated root rot from the landscape, these harvest practices will retard the spread of the disease. Additional benefits include increased habitat diversity through the creation of the REG structure, and the incorporation of more diverse tree species into Douglas-fir-dominated stands.

Low-stocked stands — In UDS stands that are poorly stocked, and have a brush understory, the preferred management option is to clearcut and regenerate with a healthy stand of trees. In these poorly stocked stands, the emphasis will be to reforest the site with a well-stocked plantation using a natural combination of conifer species. These sites will be converted to vigorous young stands of REG structure while providing foraging habitat for big game. In addition, live green trees will be retained and snags and down wood will be retained or created to complement the new stand.

Layered Stands

Partial Cut

LYR stands will either be left unmanaged until more stands of similar structural complexity are developed, or these stands will be partial cut to further their development in structural complexity toward OFS. The majority of the stands currently identified in this structure type are deficient in snag and down wood levels. Therefore, in addition to opening up the canopy to enhance residual overstory tree growth and understory development, snags and down wood will be recruited in stands deficient in these components.

Clearcut

LYR stands will be considered for clearcut harvest only with sufficient justification. In a few cases, LYR stands may be clearcut harvested and reforested when these stands become surplus to the desired future condition target. In these cases, the result will be to create a new conifer REG stand of vigorously growing trees while maintaining many of the structural components of the previous stand. These structural components include old growth trees, live green trees, snags, and down wood. It is not anticipated that any LYR stands will be clearcut during this planning period.

Older Forest Structure Stands

Partial Cut

OFS stands will for the most part be left unmanaged during this planning period. It is conceivable that a dense stand of OFS could be partial cut to promote increased overstory tree diameter growth and understory tree reponse. This would also be an opportunity to create additional hard snags and large down wood within the stand. In no case shall OFS stands be clearcut during this planning period.

Proposed Management Activities

This section describes the management activities that will be accomplished in Fiscal Years 2002 through 2011.

Silvicultural Activities

Table 4-6. Annual Silvicultural Activities for Fiscal Years 2002 to 2011

Activity	Estimated Annual Acreages
Partial cut	2,365 – 3,547 acres[1]
Clearcut	338 – 506 acres[2,3]
Reforestation	
- Initial Planting	250 – 650 acres[4]
- Underplanting	200 – 1,000 acres
Precommercial Thinning	100 – 300 acres[5]
Fertilization	3,000 – 6,000 acres[5]
Pruning	100 – 400 acres[5]

1. Diseased patch cuts less than five acres will count toward the annual partial cut objective.
2. For this 10-year planning period, stands currently identified as OFS will not be considered for clearcut harvest and LYR stands will be considered for clearcut harvest only with sufficient justification.
3. Diseased patch cuts greater than five acres will count toward the annual clearcut total.
4. Reforestation acres are higher than clearcut acres because it is anticipated that 3 to 5 percent of the partial cut acres will be reforested, where trees infected with *Phellinus weirii* have been removed, forming small openings in the stand approximately one-quarter to five acres.
5. The acres shown represent a range dependent on annual workloads and budget levels. In years of low fiscal budget levels, these estimates could fall to zero.

See Appendix A for additional information on the rationale and method applied to determine the proposed silvicultural activities in Table 4-6 above.

Roads

A three-level approach to transportation planning is described in the *Forest Roads Manual* (July 2000), pages 2-1 and 2-2. Level I planning is a broad scale planning effort that describes long term goals for the road network and determines strategies to achieve the goals. Level II planning is a medium range planning effort that describes the current condition of the road network, the desired future condition of the network, and the general plan to move from the current condition to the desired condition. Level I and II planning is conducted for road activities under this implementation plan.

Level III planning is a detailed planning effort that considers specific projects or actions, and is conducted during the Annual Operations Plan process.

The current condition of the road system is described earlier in this document. The desired future condition of the road system is a network with the minimum amount of road necessary to provide for the transportation needs of the district. The network will be managed in a manner that will minimize impacts to water quality and aquatic and wildlife resources, and will minimize the contribution of roads to the natural mass wasting process.

Guidance for achieving the desired condition will come from the *Forest Roads Manual* (ODF, July 2000).

Road activity that will occur during this planning period is classified into four distinctive types of work:

Construction — The building of new roads. Road construction during the planning period will be necessary to provide or enhance access to timber harvest areas.

Improvement — The upgrading of existing roads to current standards, or significant work necessary to keep a road at its desired standard. Improvement is accomplished by realigning, widening, adding or replacing drainage structures, or adding surfacing.

Maintenance — The ongoing work necessary to keep a road at its desired standard, and to prevent any damage to the road and the surrounding environment.

Access Management — The work necessary to move a road from "Open Road" status to one of the Managed Access categories. This work may involve any activity from simply barricading the road to fully vacating the road.

As road activities are planned, the following components will be considered:

- **Slope Stability -** To the greatest extent possible, new roads will be located on ridge tops or near ridge tops where slopes are relatively gentle. If a road is proposed that may cross steep slopes or other areas where there might be a risk of a landslide or debris flow, the area geotechnical specialist will be consulted. The geotechnical specialist will assist in assessing the location to determine the level of risk and help develop alternatives for consideration. Alternatives may include specific design and construction techniques to mitigate the risk, relocation of the proposed route, or alternative harvest methods to avoid the risk.

- **Surfacing -** Mainline roads will be surfaced with crushed rock to a depth sufficient to allow all-weather use. Collector spur and single spur roads will be surfaced with crushed rock or pit run material sufficient to allow use consistent with planned management activities. Some single spurs may not be surfaced when these spurs are planned for dry weather use, and will be closed upon completion of use.

- **Drainage —** Drainage structures will be adequate to provide proper drainage and minimize delivery of sediment to streams. All stream-crossing culverts will be designed to pass the flow associated with at least a 50-year storm event. All stream-crossing culverts in Type F streams will be designed to allow fish passage according to current guidance.

- **Excess sidecast —** Roads will be assessed to identify sites that present a significant risk of sidecast failure with a significant risk of resource damage. These sites will be reconstructed to mitigate the risk.

- **Road maintenance —** Purchasers of timber sales will be responsible for maintenance on roads providing access to timber sales. Department of Forestry personnel will perform maintenance on all other roads. Key elements of road maintenance include:

  Inventory — Inventory will be updated annually, and include information on road improvements or changes to the road system. Inventory information will be used to identify and prioritize road maintenance needs and road improvement opportunities. The forest road inventory identifies roads of concern in order to prioritize repair activity. Major elements of the inventory include stream crossing structures, sidecast fill on steep slopes, and road surface drainage systems.

  Identification – Road signs are placed to identify roads and facilitate the use of the road system by forest visitors. Road signs and district maps provide valuable information for personnel conducting forest management activities, members of the public using the roads to access recreational opportunities, and emergency services. Signs will be maintained and replaced as necessary, with emphasis on those areas that receive high levels of public use.

  Inspection — Roads will be inspected on an annual basis or more frequently, depending on the level of road use or as specific conditions warrant.

  Planning — Using information from the inventory and inspections, a maintenance operations plan will be developed, which will include the necessary maintenance activities.

  Storm patrols — Within personnel safety parameters, roads will be monitored during significant storms. Post-storm patrols will inspect damage sites. Procedures include damage assessment, reporting and repair estimates.

- **Managed Access —** Roads will be assessed to identify segments that could be closed to restrict access, mitigate potential resource damage, or reduce maintenance costs. Identified roads will be moved into the Restricted Access or Retired categories

as appropriate. All closed roads will be kept open to public non-motorized travel (hiking, biking, horse riding) with the exception of areas in active operations.

- **Vacating —** Many low-use roads will be vacated after use if they are spur roads that access timber stands where no operations will occur for 10 years or more. Abandoned roads will also be vacated if assessment determines a resource risk and that the project is operationally feasible. These closures will reduce the district's road maintenance expenditures and reduce sedimentation from roads. Road vacating will include:

  Removing culverts and re-establishing original stream channels.

  Pulling back old excessive side cast material.

  Waterbarring subgrade and running surfaces.

  Grass seeding running surfaces, cut and fill slopes.

  Blocking access to vehicles.

Potential Road Activities

To accomplish the district's silvicultural objectives, it is estimated that between 85 and 125 miles of new road construction and between 135 and 170 miles of road improvement will be necessary over the entire district during the planning period. Road construction and improvement identified in this plan will be primarily achieved through project work connected with timber sales. Additional details can be found in the **Management Basins** section of this document.

No new mainline roads will be required. Approximately 70 percent of the roads to be constructed will be single spur roads within timber sale areas. These spurs will be narrow and have lengths between 0.1 and 1.5 miles. The collector spurs that connect these sale areas to the mainline system make up the remaining 30 percent, and in most cases, will access other future timber sales. Many of these same roads will be used for numerous management activities over the next several decades.

Approximately 40 percent of the road improvement will be reconstruction necessary to upgrade road standards on older roads. On the remaining 60 percent, improvement will consist mainly of resurfacing and drainage improvements on existing roads, in order to maintain their current standard.

Between 65 and 85 miles of road will be moved into one of the Managed Access categories during the planning period. The work will be accomplished through timber sale project work or by Department of Forestry personnel.

Table 4-7. Potential Road Activities for the Forest Grove District in the Fiscal Years 2001 – 2010, by Road Classification and Miles

	Low Use	Medium Use	High Use
Current Miles of Road	205 miles	195 miles	120 miles
New Road Construction	60 – 90 miles	25 – 35 miles	0 miles
Road Improvement	5 – 10 miles	55 – 70 miles	75 – 90 miles
Road Closure and Vacation	65 – 85 miles	0 miles	0 miles
Estimate Miles of Road in 2010	198 – 206 miles	222 – 234 miles	120 miles

Recreation

The planned recreation management activities cover two broad categories: (1) management of existing facilities and current programs and uses; and (2) new development and improvement of recreational facilities. These activities are based on the goals and action priorities established in the *Tillamook State Forest Comprehensive Recreation Management Plan* (1993) and the *Tillamook State Forest Recreation Action Plan 2000* (ODF, March 2001), which are broadly aimed at user behavior issues, sub-standard infrastructure problems, and new development needs.

Existing Facilities and Programs

Public safety and law enforcement – The district is part of a seven-year old cooperative program with Tillamook district and Tillamook County Sheriffs Department to maintain a consistent regulatory and enforcement presence in the forest. To provide this presence, three Tillamook County Sheriffs deputies are contracted to provide full time coverage throughout the year. Patrol and public contact by ODF staff is a necessary part of this effort. In addition, the ODF sponsored Trail Patrol volunteer program provides assistance and information to off-highway vehicle users, as well as assistance to the Sheriffs department for search and rescue efforts.

Providing information and education to the public through a wide range of recreation guides, maps and brochures is also an important component of public safety. As identified in *Recreation Action Plan 2000*, the district will develop a system to provide updates concerning trail and road closures due to harvest operations, repair needs, authorized events or other reasons.

Continuing the law enforcement program and the other associated efforts at current levels is considered vital to providing a reasonable level of public safety and protection to the resource and recreation facilities.

Management and maintenance — The basic recreation program management and maintenance workload will continue to increase with the growing number of trails and

facilities, and increased visits to the forest. The trail system demands a high level of maintenance to minimize trail damage and water quality problems. Approximately 50 to 65 percent of the total trail system will require maintenance each year. In addition, a significant portion of the OHV trails need the surfacing upgraded in order to handle the level of use and prevent damage. Other types of maintenance workloads and costs include garbage and recycling service, vault toilet cleaning and pumping, well maintenance, sign replacement and maintenance, trailbridge repair, vegetation control, resource enhancement, and vandalism repairs.

Volunteer program — The recruitment and use of volunteers is critical to the overall success of the recreation program. The volunteer program takes a substantial amount of dedicated staff time for effective planning and use of volunteers. The district currently manages a volunteer program that includes the following recreation sub-programs.

Camp hosts	Trail maintenance and construction
Trail system planning	OHV trail patrol
Adopt- a-Trail	Trail machine volunteer operator
Forest cleanup	

These programs are expected to grow. It is estimated that there will be a 10 to 15 percent increase in volunteer hours and accomplishments over each of the next four years.

Event management — The Forest Grove District permits organized club-sponsored trail use events. Both motorized and non-motorized trail events are held on the district. On the average, six to eight OHV (off-highway vehicle) events are permitted on the district each year. The events consist of poker runs (fun runs), competitive timed motorcycle races, trails motorcycle competitions, four-wheel drive rallies, and rally car races. The OHV events occur within the Rogers Basin. Other events, such as equestrian poker rides, mountain bike races, archery competitions, and education-related events are scheduled less frequently and primarily occur within the Gales Creek and Wheeler basins.

Development and Improvement

The action plan component of *the Tillamook State Forest Comprehensive Recreation Management Plan* (1993) was updated and approved as a separate document in March 2001 and is entitled *Recreation Action Plan 2000*. The new action plan provides direction for the recreation program over the next ten years and is considered part of the district Implementation Plan. The objectives and actions were assigned priorities by evaluating them against the following criteria: public safety, legal or policy mandates, reduction of environmental impacts, minimizing user conflicts, cost effectiveness, essential component to the recreation program, and user expectations.

The improvement and development project work summarized below in Table 4-8 is considered high priority in the Action Plan and will be a focus for the first half of the implementation plan period. A district comprehensive trail plan is also a high priority to complete as soon as possible. Other development opportunities identified in the Action Plan are still conceptual and not specifically listed because more detailed planning, assessment, and public involvement are needed before moving them into project status.

Table 4-8. Recreation Development and Improvement Summary (2001 – 2006)

Action	*Activity Level*[*]
Site Improvement and Development	• Reehers Camp: site plan to full construction • Lyda staging: site plan to full construction • 2 trailheads: partial to complete construction
Comprehensive Trail Plan (OHV and Non-motorized)	• Complete plan; review and approval • On-site feasibility review of conceptual trail proposals
Trail Improvement and Development	• 10 - 15 miles non-motorized trail • 7 - 10 miles OHV trail

[*] The activities shown represent a range of planned accomplishment for the first half of the IP period and are dependent on annual workloads and fiscal budget levels.

More specific information about the above planned developments are in the **Management Basin** section of this document.

Aquatic Resources — Stream Enhancement Projects

Surveys conducted by the Oregon Department of Fish and Wildlife (ODFW) identified approximately 60 miles of streams within the district as candidates for instream habitat enhancement. Of these, 3 miles have been given a high priority and 31 miles a medium priority. The remaining miles are listed as either a low or a very low priority.

Habitat enhancement projects were completed on two out of the three miles of high priority streams during the summer of 2000. The remaining mile of high priority stream and an additional four to six miles of medium priority streams will be completed during the ten-year planning period. These projects will be accomplished as timber sale projects and service contracts, with some costs shared by funding from grants.

Specific projects on candidate streams will be finalized in a cooperative effort between district personnel and ODFW biologists. ODFW will provide input on the actual design and location of enhancement work. The Department of Forestry will verify feasibility, provide necessary materials, appraise the cost of work, and prepare and administer the stream enhancement contracts.

Cultural Resources

- A cultural resource inventory was developed and completed in August, 2002. Revisions and updates will continue throughout the 10-year implementation planning period.
- Inventoried cultural resource sites will be evaluated to determine the appropriate protection class (Class I, II, or III).
- Potential operation areas will be checked against the cultural resource site inventory for the district to see if any sites are in or adjacent to the operation area.

- Sites that are within or adjacent to a proposed operation that has the potential to impact the site, and which have not been assessed for class designation, will be evaluated to determine the appropriate cultural resource class.
- Class I sites will be protected according to the legal standards in the applicable laws.
- Protection of Class II or III sites will be based on field inspection of the site and consultation with the appropriate Department of Forestry or other specialist.

Energy and Mineral Resources

The district will locate, assess, and plan for aggregate rock sources where adequate sources for future management are not currently identified. The district will assess existing sources to determine the amount and quality of rock present. Finally, the district will create quarry development and reclamation plans based on the assessment data, estimated long-term needs, and resource protection issues.

Lands and Access

The district will carry out the following activities.

- Continue to pursue land exchange opportunities when:
  (1) The transaction furthers the purposes of ORS 530.010, the acquisition of lands chiefly valuable for the production of forest crops, watershed protection and development, erosion control, grazing, recreation or forest administration purposes; and
  (2) The exchange furthers the objectives of achieving greatest permanent value as defined in OAR 629-035-0020 as expressed in the approved forest management plan; and
  (3) The transaction results in the consolidation of state forest lands, or makes management of state-owned forest lands more economically feasible.
- Follow current Board of Forestry policies for land acquisitions and exchanges and the Administrative Rule for State Forest Land Acquisitions and Exchanges (Chapter 629, Division 33).
- Complete a land exchange and acquisition plan, as required (OAR 629-033-0015).
- Maintain the inventory of property corners and lines.
- The establishment and maintenance of property corners and lines will be prioritized and scheduled through the Annual Operations Plans.

Scenic Resources

The district will carry out the following activities:

- Complete the mapping of high sensitivity areas using the criteria detailed in the *Northwest Oregon State Forests Management Plan* strategies (pp 4-105 to 4-107) and the Forest Land Management Classification guidelines.

- Identify and map moderate and low sensitivity areas using the criteria in the *Northwest Oregon State Forests Management Plan* strategies (pp 4-106 to 4-107).
- Prior to completion of moderate and low sensitivity area mapping, areas not initially identified as high sensitivity will be evaluated at the time of a proposed operation (with the potential for an adverse visual impact) to determine if the area is moderate or low sensitivity.
- Proposed operations in high and moderate sensitivity areas will be evaluated to determine appropriate landscape and/or stand-level prescriptions necessary to mitigate the visual impacts consistent with the management objectives in the strategies.
- The resource analysis section of the annual plan will include an evaluation of the potential visual impacts and a description of the landscape and/or stand-level prescription that will be applied.

Plants

The district will protect plant species in accordance with state and federal Endangered Species Acts. In addition to Endangered and Threatened plants, the district will also make provisions for candidate and special plants. The District Plant List (Table X-X) includes endangered, threatened, candidate, and special concern plants that are, or have the potential to be found, on the district. This list is an expanded version of the list found in the *Northwest Oregon State Forests Management Plan* (pg 2-62*)*.

This will be accomplished by the following:

- During the planning of forest operations, the district will determine whether the proposed operation areas contain a plant on the District Plant List. This determination will be made by reviewing the Oregon Natural Heritage Program database for rare plant locations. In addition, the district will use its local knowledge on rare plant locations and habitat requirements.
- When the district has determined that a plant from its list may occur within an operation area, it will consult with the Oregon Department of Agriculture (ODA) to determine the appropriate level of protection. If ODA deems a field survey is necessary due to the presence of listed plants and/or habitats, the survey results will be submitted to ODA. Survey methods and survey results will comply with OAR 603-73-090 5(C).
- The district will contribute all information about rare plant locations to ONHP so that the database is kept updated.

In addition, the district will contribute to statewide efforts to reduce the quantity and range of invasive, non-native plant species. The noxious weed species currently found on the district are Canada thistle, Scotch broom, Himalayan blackberry, Tansy ragwort and Japanese knotweed. These species will be actively controlled or eradicated.

Generally, species found in small amounts will be eradicated. Japanese knotweed is a plant that fits this category. This will be accomplished using hand and chemical controls as well as continued monitoring of the site.

The other noxious weed species are found scattered throughout the district and will be "actively controlled" because to eradicate them would be impractical. In some cases, "actively controlled" may only mean monitoring their spread and impact through doing stand exams, stocking surveys and road inventory. In other cases, actual control activities, such as roadside spray application, will be identified and included as part of the annual operations plan.

Table 4-9. Forest Grove District Endangered, Threatened or Candidate Plant Species

Genus	Species	Subspecies	Common name[1]	Status	Record exists[2]	Potential to be present
Threatened and Endangered Plants						
Erigeron	*decumbens*		Willamette daisy	SE, FE		✔
Erythronium	*elegans*		**Coast Range fawn-lily**	ST		✔
Lupinus	*sulphureus*	*kincaidii*	**Kincaids lupine**	ST, FT		✔
Sidalcea	*nelsoniana*		**Nelson's checkermallow**	ST, FT	✔	
Plants of Special Concern						
Castilleja	*chambersii*		**Chamber's paintbrush**	SP		✔
Dodecatheon	*austrofrigidum*		**Frigid shootingstar**	SP		✔
Candidate Plants						
Cardamine	*pattersonii*		**Saddle Mt. bittercress**	SC		✔
Filipendula	*occidentalis*		Queen-of-the-forest	SC		✔
Saxifraga	*hitchcockiana*		**Saddle Mt. saxifrage**	SC		✔
Sidalcea	*hirtipes*		**Bristly-stemmed sidalcea**	SC		✔
Sullivantia	*oregana*		**Oregon sullivantia**	SC		✔

[1]Plant names in bold are on the NW FMP list of plants.
[2]Plants have been observed on or in close proximity to state forestlands.

Status:
SE – State Endangered
ST – State Threatened
SC – State Candidate
SP – Special Concern
FE – Federal Endangered
FT – Federal Threatened

Special Forest Products

The district will carry out the following activities.

- Provide permits to harvest special forest products on a request basis, consistent with product availability, protection requirements, and other resource management strategies.
- Periodically review and update district policies, procedures, and product price listings.
- Share special forest product information between districts and communicate permit information with adjacent landowners.
- Assess the need and capability for a special forest product planning program that could: (a) identify major products that would be emphasized on the district, (b) delineate logical sale units and personal use areas, and (c) develop a harvest schedule based on the productivity of special forest products for both commercial harvesting and personal use.

Landscape Design Overview

The Forest Grove District has eleven basins. Of this total, seven basins comprise 90 percent of the district's acres. The district is bordered on the west by state forest land within the Tillamook District. The north and east sides of the district are bordered primarily by private industrial forest land. To the south is an even mix of Bureau of Land Management (BLM) and private industrial forest land. There is also a 4,500-acre isolated tract of state ownership in Columbia County, which is surrounded by private forest land. In addition to the large amount of private industrial forest land to the east and north, there is a 13,000-acre tract of private industrial forest land located in the center of the main body of the district.

A desired future condition map can be found in the attached **Map Section**. The district intends to achieve the desired future condition by designating areas for older forest structure (OFS) and layered (LYR) stand structures across the landscape, ensuring a variety of forest patch sizes and shapes that provide connectivity between watersheds, and dispersal habitat for wildlife. The overall design will also include habitats necessary for those species needing more open conditions.

As can be seen on the district's desired future condition map, complex structures have been designed somewhat evenly across the landscape within every basin, including linkage between basins. The frequency distribution of Interior Habitat Area (IHA) patch sizes matches well with the idealized frequency distribution shown on page C-32 of the *Northwest Oregon State Forests Management Plan* (FMP). Approximately 60 percent of the patch sizes are under 200 acres, compared to the 67 percent shown on the example idealized frequency distribution. The landscape design was spatially arranged so as to avoid the occurrence of large areas without IHAs (for this purpose, large areas were defined as larger than 2,000 acres). Many of the landscape design features are a result of input provided by local fish and wildlife biologists.

Two main strategies will be used in the placement of these future complex forest structures.

The first strategy will be to place OFS and LYR on sites where structural components of mature forests can be rapidly achieved (30 to 40 years from present), where access is good, and the risk to other resources is low. This strategy can be accomplished by partial cutting stands on high site ground where the trees will respond readily with increased growth. Approximately 60 percent of the desired future OFS and LYR will be achieved by this strategy.

The second strategy will achieve the other 40 percent of the desired future OFS and LYR stands on sites where resource protection can be maximized or where other resource values have a higher management priority. These areas have steep slopes, low site, and poor access. In many cases, conventional road building and timber harvest operations may not be feasible; thus the development of complex forest structures may take longer to achieve (60 to 80 years from present). Most of these stands are currently UDS or CSC with a small percentage of LYR. Where possible, CSC stands will be thinned to accelerate development

towards more complex structures. As mentioned before, this may require less conventional means such as helicopter logging, when market conditions make this economically feasible.

In addition, all current OFS stands were assigned a desired future condition of OFS. Current LYR stands were assigned a desired future condition of LYR or OFS with the exception of some extremely small patches which represent less than one-tenth of one percent of the district acreage. Stand origin and age were not heavily considered when developing the district's landscape design. With the vast majority of the stands being between age 40 and 80, and because of the time it will take to meet our desired future condition (30 – 80 years from present), it was decided that other resource issues and landscape design principles would drive the landscape design process. However, some younger stands may be included in the desired future development of OFS and LYR because the location of these stands and the potential stand contributions would best benefit the landscape design goals.

Areas identified for the first strategy are located in the McGregor Basin, Wheeler Basin, Gales Creek Basin, and the eastern half of the Sunday Creek Basin. It is important to achieve these complex forest structures as quickly as possible in these areas. The McGregor Basin is primarily bordered by private forest land on three sides, making this important northern spotted owl dispersal habitat linking the Jewell northern spotted owl cluster with developing owl habitat to the south in Wheeler Basin. Approximately 7,900 acres in the north half of Wheeler Basin and 100 acres in McGregor Basin have been designated as a Spotted Owl Habitat Emphasis Area (SOHEA). Additional planning will be required in the SOHEA to ensure the development of high quality northern spotted owl habitat, while maintaining habitat for the spotted owls currently residing in this area.

The eastern area of the Gales Creek Basin (known as Wildcat Mountain) has been designated as a northern spotted owl cluster area. This 2,522 acre area, completely surrounded by private forest land, will require the development of a very high percentage of complex forest structures. Although the Wildcat Mountain area is excellent tree-growing ground, much of the habitat development will be attained through natural processes rather than silvicultural manipulations, due to harvest restrictions imposed by the spotted owl cluster guidelines. However, density management may take place within stands of poor northern spotted owl habitat, to hasten the development of habitat.

The western portion of the Gales Creek Basin and the eastern half of the Sunday Creek Basin are important headwater areas, particularly for water quality issues. Large areas of contiguous complex structures (2,500 to 3,500 acres) have been designated OFS and LYR within these headwater areas.

Areas identified for the second strategy include the Kings and Elk Mountain area in the western Larch Mountain Basin, the Salmonberry River canyon area in the Upper Salmonberry Basin, the Highway 6 corridor between the Rogers and Larch Mountain Basins, and the North Fork of the North Fork Trask River in the Sunday Creek Basin. As mentioned above, these are mostly steep, low site areas where trees develop slowly.

Large areas (2,000 to 6,000 acres) of complex structures will create large interior habitat areas for future dispersal habitat, and will provide enhanced protection for many resources. Examples include: riparian areas, large interior habitat areas, northern spotted owl dispersal

habitat, important salmonid streams, and areas emphasizing water quality, site quality, slope stability, and scenic and recreational resources.

In areas with slope stability concerns, OFS and LYR stand structures, coupled with proper road building and road maintenance, will significantly reduce the probability of slope failure. In addition, having older, more complex stand structures located below potential landslide initiation areas will lead to properly functioning landslides—that is, debris deposits will contribute large woody material and gravels that develop into stream structure and enhance habitats through natural geologic processes.

For the next 30 to 40 years, areas not designated to be OFS or LYR will provide the pool from which regeneration (REG) and understory (UDS) stand structures will be created. These stand structures will be arranged across the rest of the landscape, based on habitat, resources, and logistical and operational needs and constraints. The closed single canopy (CSC) stand structure will not be purposely designed in the landscape design. It will be identified and mapped as stands move into that stand structure.

Management Basins

Management Basins Overview

The district is divided into 11 management basins ranging in size from 1,727 acres to 20,657 acres. The main body of the district is divided into 7 basins, which are between 10,523 acres and 20,657 acres in size. These basins were delineated using a combination of watershed boundaries and major highways. The 4 remaining basins are located to the south, east, and northeast of the main body of the district, and were delineated using drainage and ownership patterns.

Basin Descriptions

The proposed management activities described below are for the planning period from July 1, 2001 to June 30, 2011. Activities already under contract or in the Fiscal Year 2003 annual operations plan may take place during the planning period, but will not be counted toward the planning period objectives. Activities planned in the final years of the planning period will most likely be completed after June 30, 2011, but will be counted as planning period objectives. Amounts of precommercial thinning, pruning, and fertilization depend on fiscal budget levels. Basins are described in alphabetical order.

Bell Mountain Basin

Bell Mountain Basin is located in the Nestucca River watershed. It is comprised of 9 isolated, state-owned parcels totaling 1,727 acres, and is mostly surrounded by BLM forest lands. The majority of the BLM land is comprised of complex forest structures, and is currently being managed as late successional reserves. Most of the state forest land is comprised of young, less complex stand structures (REG and CSC), as shown in Table 9 on the next page. Three 80-acre parcels will be managed for OFS and LYR because they are close to privately owned land and represent the oldest of the remaining state forest stands within this basin (approximately 55-year-old trees). All of these parcels are candidates for exchange with the BLM for parcels located adjacent to or within the main block of the Tillamook State Forest.

Approximately 6 to 8 miles of OHV trails currently exist in the basin. Trails on state land provide access and connection to the larger OHV network located on BLM land.

Table 4-10. Bell Mountain Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	44	38	12	6	0	0
Post Implementation Plan Condition[1]	26	47	21	6	0	0
Desired Future Condition	4	30	50	5	11	0

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations for Bell Mountain Basin

- A high percentage of the BLM land in this basin is comprised of complex stand structures.
- All the state tracts in this basin are priority candidates to exchange for BLM parcels within the main block of the Tillamook State Forest.
- Approximately 6 to 8 miles of OHV trails currently exist in the basin. Trails on state land provide access and connection to the larger OHV network located on BLM land.
- There are 4 miles of fish bearing (Type F) streams located in this basin.

Desired Future Condition and Landscape Design

Table 4-10 above shows the percentages desired in the different stand structures, for the desired future condition. The landscape design will manage for a high percentage (80 percent) of UDS and CSC stand structures on these parcels because the parcels are scattered, small, and young, and the surrounding BLM land has complex stand structures. Currently 80 percent of the stands on state forest land in this basin are less than 35 years old.

Proposed Management Activities

Harvest — During the planning period this basin will have either no timber sales or one timber sale. Therefore, the harvest opportunity range is 0 acres to approximately 150 acres. This timber sale would be a partial cut in understory and closed single canopy stand structures, in an effort to hasten the development of a layered stand structure.

Precommercial thinning — This basin is expected to need 100 to 200 acres of precommercial thinning, based on current stocking and stand ages. This practice keeps stands growing at their maximum rate and allows the selection of a desirable species mix.

Road construction — Between 0.1 and 1 mile of road will be constructed. Construction will consist of short single spurs or landings along existing roads.

Road improvement — Between 1 and 2 miles of existing roads will be improved. The improvement work is needed to upgrade the standard of the roads.

East District Isolated Tracts Basin

These 14 isolated tracts, widely scattered along the eastern edge of the district, total 2,113 acres and range in size from 40 acres to 1,000 acres. Privately owned land surrounds most of the parcels, and 3 parcels are also adjacent to BLM land. These tracts represent a wide range of stand ages from 10 to 75 years old. The percentages of current stand structure types are shown in the table below. These scattered tracts are all candidates for exchange.

Table 4-11. East District Isolated Tracts Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	3	56	31	10	0	0
Post Implementation Plan Condition[1]	0	50	40	10	0	0
Desired Future Condition	15	22	50	13	0	0

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations for East District Isolated Tracts Basin

- The tracts in this basin are isolated and a high priority to exchange for parcels adjacent to or within the main block of the Tillamook State Forest.
- There is a total of 7 miles of fish bearing (Type F) streams in this basin.
- Fish-bearing streams (West Fork Dairy Creek and Beaver Creek), topography, and access considerations are resource issues that influence landscape design opportunities.

Desired Future Condition and Landscape Design

Approximately 75 percent of the basin acreage is involved in a pending land exchange that will result in the establishment of a state park in Washington County and a reduction of approximately 1,660 acres of state forest land within this basin. Of the remaining 440 acres, located in 5 separate parcels, 240 acres (54%) are designated as desired future condition LYR.

Proposed Management Activities

Harvest —No harvest is planned during the planning period. This is subject to change pending the results of the land exchange.

Road construction — Between 2 and 3 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 4 and 6 miles of existing roads will be improved. The majority of the improvement will take place in the Johnson Road tract and is needed to upgrade the standard of the roads.

Gales Creek Basin

The basin consists of 11,053 acres of state forest land, which is broken into 4 widely separated main blocks within the Gales Creek watershed. Much of this basin is privately owned land and has boundaries with 3 other basins of state forest land to the north, west, and south. This basin is located on the eastern edge of the district, both north and south of the Wilson River Highway, and much of this basin is easily accessible for public recreation. The Gales Creek Campground and the Gales Creek Overlook kiosk are two key recreation and interpretive opportunities located in this basin. The western portion of this basin was part of the 1933 and 1945 Tillamook fires and was one of the first reforested areas; thus, the average stand age is 45 to 50 years.

The Wildcat Mountain area, in the eastern portion of this basin, was not involved in any of the Tillamook fires. As a result, this 2,522-acre area has a wide range of stand ages from 5 to 75 years, and tree species from western redcedar and Douglas-fir to bigleaf maple and red alder. In the mid-1990s a pair of northern spotted owls was discovered nesting in this area. Consequently, the Wildcat Mountain area has been designated as a northern spotted owl cluster as part of the conservation strategy for northern spotted owls under the draft *Western Oregon State Forests Habitat Conservation Plan* (HCP).

Table 4-12. Gales Creek Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	6	71	20	3	0	0
Post Implementation Plan Condition[1]	5	55	34	6	0	0
Desired Future Condition	10	15	18	23	34	0

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations for Gales Creek Basin

- Gales Creek, a main tributary of the Tualatin River, originates in this basin. The main tributaries to Gales Creek in this basin are Beaver Creek, Iler Creek, and White Creek. Salmonids and resident trout reside in Gales Creek and most of its tributaries.
- There are approximately 38 miles of fish bearing (Type F) streams in this basin.
- Recreational considerations include Gales Creek Campground and trailhead facilities and 10 miles of non-motorized trails. This basin is designated for non-motorized recreational uses only.
- Visual resource considerations include those areas visible from the Wilson River Highway (Highway 6), particularly those areas of the forest visible from the Gales Creek Overlook, and Gales Creek Campground.
- The 2,522-acre Wildcat Mountain area has been designated as a northern spotted owl cluster.

Desired Future Condition and Landscape Design

As shown in Table 4-12 above, close to 57 percent of the basin will be managed to produce OFS and LYR stand structures. A large segment (2,000 to 3,000 acres) of the western part of the basin, which surrounds the upper reaches of Gales Creek, will be designated for OFS and LYR stand structures. In this part of the basin, the arrangement of the complex stand structures will provide connectivity to adjacent basins, as well as enhanced water quality protection. Management for OFS and LYR in this area will also enhance the visual and recreational resources listed above.

Another large interior habitat area will be created in the Wildcat Mountain northern spotted owl cluster. Approximately 94 percent of this area has been designated as future OFS and LYR stands.

Proposed Management Activities

Fertilization — There are 400 to 500 acres of the basin that could be included in fertilization projects during the planning period if budgets allow.

Harvest — During the planning period it is estimated that approximately 200 to 300 acres of clearcut will take place within this basin. No clearcut harvest is scheduled within the Wildcat Mountain area. Partial cutting for the planning period is estimated at 1,200 to 1,900 acres. The majority of this will come from younger, closed single canopy stands approximately 45 to 55 years old. Approximately 150 acres of the planned partial cutting could take place within the lowest quality habitat in the northern spotted owl cluster, pending biologist approval.

Recreation — Approximately eight (8) miles of the Gales Creek and Storey Burn trails were recently constructed in this basin, along with the upgrade of the Summit Trailhead located at the summit of Highway 6 and the Storey Burn Trailhead located at MP-2 on Storey Burn Road. These projects complete the development projects identified in *Recreation Action Plan 2000*. Recreation management activities in this basin will focus on the operation and maintenance of the existing trails and facilities.

Road construction — Between 3 and 5 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 7 and 10 miles of existing roads will be improved. The majority of improvement work will be necessary to keep these roads at their current standard. Individual projects will include replacing a culvert crossing with a bridge on the Wildcat Mountain Road, and vacating a portion of the Old Wildcat Mountain Road, to include removal of a fish-blocking culvert. Both projects will enhance fish passage on an unnamed tributary to Beaver Creek.

Larch Mountain Basin

This basin contains 13,081 acres of contiguous state-owned land, bordered by privately owned land to the north and state forest land on the other three sides. The Wilson Basin in the Tillamook District borders this basin to the west. The Wilson River and the Wilson River Highway (Highway 6) form the entire 11-mile southern boundary of this basin. Larch Mountain, Elk Mountain, Kings Mountain, Elk Creek, Idiot Creek, and Drift Creek are the dominant features and drainages. The topography varies from the steep rugged slopes and river canyons of the Kings Mountain area to moderate slopes at the middle to upper elevations on Larch Mountain. This area was burned in the 1933 and 1945 Tillamook fires. The stands in this basin range from 40 to 55 years old as a result of the Tillamook Burn reforestation projects, and have more western hemlock than most basins in the district.

Table 4-13. Larch Mountain Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	2	39	43	3	0	13
Post Implementation Plan Condition[1]	4	29	41	13	0	13
Desired Future Condition	4	5	13	28	37	13

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- Recreational and visual resources include Elk Creek Campground, Kings Mountain Trailhead, 16 miles of non-motorized trails, and the areas visible from Highway 6. The Kings Mountain and Elk Mountain area is approximately 6,000 acres of very rugged terrain with high recreational and scenic value.
- There are approximately 31 miles of fish bearing (Type F) streams located in this basin.

- Important salmonid streams include: South Fork Wilson, North Fork Wilson, Devils Lake Fork, Elk Creek, Idiot Creek, and Drift Creek. Approximately 2,300 acres of the Ben Smith Creek Salmon Anchor Habitat area is located in the western portion of this basin.
- Much of the eastern portion of the basin has stands infected with *Phellinus weirii*, a fungus that causes root rot and is fatal to Douglas-fir.

Desired Future Condition and Landscape Design

The rugged terrain and the high recreation, scenic, fish, and wildlife values dictate that a large percentage of this basin will be designated OFS and LYR. The entire Kings Mountain and Elk Mountain area (approximately 6,000 acres) will be designated OFS and LYR, which will provide dispersal habitat and connectivity with the Tillamook District to the west. Because of the rugged terrain and low site, these complex structures will take longer to develop than in other parts of the district. For the most part, these complex forest structures will develop naturally with little or no silvicultural manipulations. Any future partial cutting in the Kings Mountain area will most likely be done with helicopters.

Large areas of OFS and LYR will be designed to create large interior habitat areas to enhance protection for riparian areas and the many steep slopes along the important streams within this basin. These protection measures, combined with the other key resources in the basin, require OFS and LYR to be planned at target levels well above the district average.

Proposed Management Activities

Fertilization — Larch Mountain Basin could receive 6,000 to 7,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth, and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest — Extensive root rot throughout the basin's eastern portion provides opportunities to improve forest health and biological diversity through the creation of some REG structures. These open spaces will be replanted with immune or disease-resistant tree species, enhancing biological diversity. These areas will also function as big game foraging areas and create an edge effect, benefiting those wildlife species that are associated with this ecotone. An estimated 300 to 400 acres of clearcut will take place in this basin during the planning period.

An estimated 900 to 1,250 acres of partial cutting in 45- to 55-year-old closed single canopy stands will help move these stands towards a more layered stand condition.

Precommercial Thinning — This basin is expected to need approximately 68 acres of precommercial thinning, based on current stocking and stand ages. This practice keeps stands growing at their maximum rate and allows the selection of a desirable species mix.

Pruning — There are 68 acres that can be pruned to increase timber value.

Recreation — Development of about a 3.5 to 4.0 mile segment of the Wilson River Trail (from Kings Mountain Trailhead to Jones Creek Campground) will be in reconnaissance and initial construction phase. This trail project also includes the location and design of a bridge

across the North Fork Wilson River. Other work will include conceptual planning for the location of the eastern portion of the Wilson River Trail from Elk Creek Campground to Summit Trailhead and the location and construction of a mountain bike trails system in the Storey Burn area.

Road construction — Between 3 and 5 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 10 and 15 miles of existing roads will be improved. The majority of these roads will be improved to upgrade their standard.

Underplanting — This basin contains even-aged stands with limited species diversity. Underplanting 90 to 110 acres in this basin would increase stand structural diversity.

McGregor Basin

This basin contains 10,523 acres of contiguous state forest land located directly north of the Sunset Highway. To the south the basin is bounded by state land; privately owned land borders the other three sides. Timber is between 45 and 65 years old. The dominant feature is the North Fork Wolf Creek, which is a tributary to the Nehalem River and an important salmonid stream. This area receives low recreational use except during hunting season.

During the 1990s, northern spotted owl surveys detected non-territorial single owls moving in and out of this basin. The basin represents an important connection between the northern spotted owl usage in the Jewell area and the high quality habitat being developed to the south in the Wheeler Basin. Approximately 100 acres along the Sunset Highway are designated as part of the Spotted Owl Habitat Emphasis Area (SOHEA) and will be managed to develop and maintain northern spotted owl habitat over the next 30 years.

Table 4-14. McGregor Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	6	64	28	2	<1	<1
Post Implementation Plan Condition[1]	11	31	50	6	1	1
Desired Future Condition	13	10	31	20	26	<1

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- There are approximately 36 miles of fish bearing (Type F) streams located in this basin.

- The North Fork of Wolf Creek and Olson Creek are both important coho salmon streams. The western edge of this basin is located within the Upper Rock Creek Salmon Anchor Habitat area.
- Recreational resources include the one-mile Four Corners Trail and a 1.5 mile interpretive loop trail at the Sunset Wayside on Highway 26. Hunting and dispersed camping is the most prevalent recreational use of this basin.
- The stands visible from the Sunset Highway are important as a visual resource.
- While northern spotted owls have been detected passing through this area, there are no known resident owls. However, this basin may act as important dispersal habitat. Approximately 100 acres of the SOHEA are in the basin.
- In this basin, there is one individual domestic water right registered with the Oregon Department of Water Resources.

Desired Future Condition and Landscape Design

To ensure dispersal habitat while maximizing protection to the water and salmonid resources, OFS and LYR stand structure designations will be concentrated along the North Fork Wolf Creek and Olson Creek, providing a continuous band of complex forest structures from the southeast to the northwest portions of the basin. This will also provide northern spotted owl dispersal habitat between the Jewell northern spotted owl cluster and the Wheeler Basin SOHEA. Another large area of interior habitat will include the headwaters of Clear Creek.

Proposed Management Activities

Fertilization — This basin could receive 1,000 to 2,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest —With most of this basin facing south, many opportunities exist to designate REG areas for optimum elk foraging habitat. Creating this habitat will put this basin at the high range of the REG target. It is estimated that between 700 to 900 acres of clearcut will take place during the planning period. Generally, these clearcut opportunities will come from over-dense stands, sparse stands, or stands heavily infected with *Phellinus weirii.*

It is estimated that between 4,700 and 7,500 acres of CSC and UDS stands will be partial cut during the planning period to hasten stand development into more complex stand structures. Most of this partial cutting will take place in stands 55 to 70 years old. The presence of shade-tolerant tree species throughout this basin will allow for natural development of layered stand structures in the decades following harvest.

Precommercial thinning — There are 75 to 100 acres that will need thinning to keep the stand open and growing at its optimal rate.

Pruning — There are 50 to 100 acres that could be pruned to increase timber value.

Recreation — The Four-Corners Trailhead is located at Milepost 35 on Highway 26 and will be improved to create a more defined and designated trailhead facility to better accommodate users. The project will include signing and construction for parking.

Road construction — Between 25 and 35 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 25 and 30 miles of existing roads will be improved. Approximately one-half of the roads will be improved to upgrade their standard; the remainder will be improved to maintain their existing standard.

Underplanting — This basin regenerated naturally after a fire in 1933 and contains relatively good species diversity. Therefore, most stands will develop understories following partial cutting without underplanting. In areas where this is not the case, underplanting may be desirable. From 80 to 90 acres may be underplanted during the planning period.

Rogers Basin

With 20,657 acres of contiguous state forest land, this basin represents the district's largest management basin. The majority of the Wilson River headwaters are included within this basin. The basin is made up of 35- to 50-year-old stands resulting from the reforestation after the Tillamook fires. This is the district's most heavily used basin for recreation; it is used primarily by off-highway vehicle (OHV) users. The basin has about 50 miles of OHV trails, an OHV campground (Browns Camp), Stagecoach Horse Camp, and 10.5 miles of non-motorized trails. Approximately 85% of this basin has been classified as Focused Stewardship-Recreation. This basin is bounded by privately owned land to the south and east, state forest land to the west, and state forest land across Highway 6 to the north. The Wilson Basin in the Tillamook District borders this basin to the west.

Table 4-15. Rogers Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	2	59	35	<1	0	3
Post Implementation Plan Condition[1]	5	26	61	5	0	3
Desired Future Condition	10	10	26	25	26	3

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- This basin has the highest recreational use in the district, with OHV use being primary. There is an extensive trail network throughout the basin, which includes approximately 50 miles of designated OHV trails and 10.5 miles of designated non-motorized trails. Dispersed camping and hunting are also important uses.
- Browns Camp Campground, Stagecoach Horse Camp, Lyda Camp staging area, University Falls Trailhead, Rogers Camp Trailhead, and Deyoe Creek Trailhead are located within this basin.
- A major visual resource is the area visible from the Wilson River Highway, which forms the basin's northern boundary.
- There are approximately 66 miles of fish bearing (Type F) streams located in this basin.
- There are four important salmonid streams: Devils Lake Fork, Elliot Creek, Deyoe Creek, and South Fork of the Wilson. Approximately 6,000 acres of the Devils Lake Fork Wilson River Salmon Anchor Habitat area is located in the eastern portion of this basin.
- Much of the basin has stands infected with *Phellinus weirii*, a fungus that causes root rot and is fatal to Douglas-fir.
- A state-listed endangered plant, Nelson's checker-mallow, *Sidalcea nelsoniana*, is located in two small meadows adjacent to the upper Devils Lake Fork of the Wilson River.
- In this basin, there are two individual domestic water rights that are registered with the Oregon Department of Water Resources.

Desired Future Condition and Landscape Design

The majority of the complex stand structures will be placed along the Wilson River Highway and around the entire length of the four important salmonid streams, thus enhancing the protection of these resources. Also, OFS is planned for development adjacent to the forest parks in order to protect the visual and recreational values associated with these resources.

Proposed Management Activities

Fertilization — This basin could receive 6,000 to 7,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest — Currently only 2 percent of the basin is in the REG structure, and most of that is located in one general area in the basin's northeast corner. Most of this basin is heavily infected with *Phellinus weirii*. Opportunities will be sought to increase the REG stand structure and provide for big game habitat, in conjunction with treating the most severely infected root rot areas by clearcutting and replanting with immune or resistant tree species. It is estimated that approximately 450 to 800 acres of clearcut will take place during the planning period.

Currently 94 percent of this basin is in the CSC and UDS stand structures. Approximately, 4,500 to 6,500 acres within these stand structures will be partial cut to hasten the development of more complex stand structures. Partial cutting will take place in 50- to 60-year-old stands of Douglas-fir during this period.

Precommercial Thinning — This basin contains 150 to 200 acres that will require precommercial thinning to reduce density and allow optimum tree growth.

Recreation —

- Lyda Camp (OHV campground and staging area) — Lyda Camp is currently an undeveloped staging area used by OHV riders. It has been identified as an opportunity for a developed staging area/trailhead and possibly a small campground for OHV users. Over the next three to four years, work will include a site assessment, development of conceptual and project plans, coordination with the public and OHV users, and site construction.
- Graham Bridge Trailhead — This trailhead is located at the east end of Graham Bridge along Highway 6. It provides access to the Storey Burn–Gales Creek non-motorized trail systems. In the next three to five years, work will include developing the access, parking and signing features based on already established project plans, and phased-in interpretive elements.
- Fern-Rock Creek Falls Viewing and Interpretive Site — This site is located along Highway 6 just west of Milepost 30 and has been identified for development of scenic and interpretive opportunities. The work would happen in the second half of the planning period and would be based on already established project plans.
- OHV Trail Development — The following projects will be in some phase of project development (reconnaissance, location/design, or construction). Projects are listed top to bottom in order of priority.

Beaver Dam Trails	6 miles	(MC/Quad/4WD)
Blockbuster to Marks Trail	1.5 miles	(MC/Quad)
Hoodraiser to Hogsback Trail	0.5 mile	(MC/Quad)
Gummy Worm to Chute Trail	2 miles	(MC/Quad)
Firebreak 5 to Hoodraiser Trail	4 miles	(MC/Quad/4WD)

- Overall between 15 to 20 miles of new OHV trail will be constructed during the planning period. Construction will consist of projects necessary to upgrade existing trails, better connect the trail system and reduce the potential for conflict with other uses and management activities.
- Non-Motorized Trail Development - Planning and reconnaissance will be done for a five-mile extension to the Historic Hiking Trail (Stagecoach Horse Camp to Elk Creek Campground). Construction of logical segments will occur as locations are established. In addition, various segments of the Historic Hiking Trail will be relocated or upgraded for safety, maintenance, and resource protection reasons.

Road construction — Between 20 and 25 miles of road will be constructed during the planning period. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 20 and 25 miles of existing roads will be improved. The majority of these roads will be improved to maintain their existing standard.

Underplanting — This basin was part of the Tillamook Burn and is very low in species and structural diversity. Significant efforts need to be made to increase conifer understory development. Underplanting may take place on 450 to 550 acres in this basin.

Scoggins Creek Basin

This small, 3,039-acre isolated basin drains directly into Hagg Lake by means of Scoggins Creek. The Scoggins Creek canyon is predominantly characterized by steep slopes, highly erosive soils, and high risk sites. As shown during the February 1996 storm, large slide features can become active under the right weather conditions. Hagg Lake provides water for irrigation and municipal uses, and is heavily used for recreation. The state forest land within this basin is completely surrounded by privately owned land. The predominant adjacent landowner is Stimson Lumber Company, and all the state parcels within this basin are a high priority for exchange.

Table 4-16. Scoggins Creek Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	13	65	15	7	0	0
Post Implementation Plan Condition[1]	10	57	23	10	0	0
Desired Future Condition	10	20	35	14	21	0

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- Approximately 252 acres adjacent to the City of Forest Grove's watershed has been designated as Focused Stewardship – Domestic Water Use.
- Scoggins Creek flows directly into Hagg Lake and provides water for irrigation, recreation, and municipal use.
- There are approximately 13 miles of fish bearing (Type F) streams in this basin.
- State forest parcels are excellent candidates for exchange with Stimson Lumber Company.

Desired Future Condition and Landscape Design

The basin will be managed for a mix of habitats. The state forest land within this basin has been identified as a potential land exchange candidate with the adjacent landowner. Thus, the REG stand structure target is above the district average. Complex structures will be designed for added protection to the water resource, namely Scoggins Creek, and the steep slopes adjacent to it. The CSC stand structure will be drastically reduced over time, moving 70 percent of the basin into UDS, LYR, and OFS.

Proposed Management Activities

Harvest — Little harvest is planned for this basin during the planning period. The estimate for clearcut is 100 to 200 acres and the estimate for partial cut is 100 to 300 acres.

Precommercial thinning — Stocking and stand age indicates that 50 to 100 acres will need thinning in the basin to keep stands growing at their optimal rates.

Pruning — There are 50 to 75 acres that could be pruned to increase timber value.

Road construction — Between 1 and 2 miles of road will be constructed during the planning period. Construction will primarily consist of short single spurs.

Road improvement — Between 2 and 4 miles of existing roads will be improved. The majority of these roads will be improved to upgrade their standard.

Sunday Creek Basin

The southernmost contiguous ownership in the district, Sunday Creek Basin, totals 15,264 acres. The vast majority of the stands in this basin are between 30 and 50 years old, as a result of reforestation after the Tillamook fires. This basin is bounded by privately owned land to the north and east, BLM and private land to the south, and by the Trask Basin in the Tillamook District to the west. Key features include the headwaters of the Tualatin River, Middle Fork of the North Fork Trask River, the North Fork of the North Fork Trask River, and Barney Reservoir (the municipal water supply for much of Washington County). Except for a small area in the southwest corner of this basin, the recreational use in this basin is designated as non-motorized and is low to moderate in frequency. The main recreational uses in this basin are hunting, fishing and dispersed camping.

Table 4-17. Sunday Creek Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	<1	56	40	1	0	3
Post Implementation Plan Condition[1]	6	20	68	3	0	3
Desired Future Condition	9	10	20	23	35	3

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- Important water resources include: Barney Reservoir (the general municipal watershed for the cities of Hillsboro, Beaverton, and Forest Grove) and the headwaters of the Tualatin River, which include Sunday Creek and Maple Creek. Approximately 1,461 acres around Barney Resevoir have been designated as Focused Stewardship – Domestic Water Use.
- There are approximately 54 miles of fish bearing (Type F) streams in this basin.
- The Middle Fork of the North Fork Trask River and the North Fork of the North Fork Trask River are important salmonid habitat resources. The southwest tip of this basin is located within the Elkhorn Creek Salmon Anchor Habitat area.
- Approximately 1.5 miles of OHV trail exists in the southwest corner of the basin that provides connections to established trails on the Tillamook district as well as on adjacent landowners.

Desired Future Condition and Landscape Design

At the basin's east end, an area of combined OFS and LYR stand structures totaling approximately 3,500 acres will provide increased protection to most of the headwaters of the Tualatin River, which include Sunday Creek and Maple Creek. At the west end of the basin, approximately 3,000 acres of OFS and LYR will protect the Middle Fork of the North Fork Trask River and the North Fork of the North Fork Trask River, both important coho salmon streams. Smaller patches of OFS and LYR will be placed in upland areas, and around Barney Reservoir (a 450-acre body of water, which diverts additional water from the Trask Basin into the headwaters of the Tualatin River for municipal uses). For these reasons this basin will have a relatively high OFS and LYR stand structure target of 58 percent.

Proposed Management Activities

Fertilization — This basin could receive 5,000 to 6,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest — With only 1 percent of this 15,000-acre basin in the REG structure, there is a lack of open spaces which provide for big game foraging habitat and edge habitat. Opportunities to create these types of habitat will be studied during this planning period and may result in approximately 350 to 700 acres of clearcuts. Some of this habitat would come from treatment of root rot-infected areas and some from over-dense or sparse stands.

With over 14,000 acres currently in the CSC and UDS stand structures, it is estimated that 4,500 to 6,500 acres of partial cut will take place in predominately 40- to 55-year-old Douglas-fir stands. To hasten the development of more complex stand structures, approximately 10 percent of these acres will be heavy partial cuts followed by underplanting of shade-tolerant tree species.

Recreation – The OHV trail will be assessed, upgraded or relocated for safety, maintenance, and resource protection reasons. Other work will include repair of OHV damaged sites and signing the rest of the basin to reduce illegal OHV use.

Road construction — Between 18 and 25 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 25 and 30 miles of existing roads will be improved. Approximately one-half of the roads will be improved to upgrade their standard; the remainder will be improved to maintain their existing standard.

Underplanting — This basin was part of the Tillamook Burn and is very low in species and structural diversity. Significant efforts need to be made to increase conifer understory development. Underplanting may take place on 450 to 550 acres in this basin.

Upper Salmonberry Basin

This 18,911-acre basin is dominated by important salmonid streams, steep terrain, remote recreational opportunities, and scenic views. It will be targeted for a high percentage of OFS and LYR stands. This design will allow for large interior habitat areas and maximum protection of the inner canyon zones of the Salmonberry River and the North Fork Salmonberry River. While much of the basin was railroad logged, portions were burned in large fires in 1932 and 1945. Stand ages range from 35 to 65 years, resulting from natural regeneration and planting following logging and fires. This basin is bordered by privately owned land to the north and south, and by state forest land to the east and west. The Cronin Creek Basin and the Salmonberry Basin in the Tillamook District border this basin to the west. The Port of Tillamook Bay railroad divides the basin nearly in half, paralleling the Salmonberry River. This basin is zoned for non-motorized recreation.

Table 4-18. Upper Salmonberry Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	2	60	30	5	0	3
Post Implementation Plan Condition[1]	4	46	40	7	0	3
Desired Future Condition	4	7	21	29	36	3

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- There are approximately 71 miles of fish bearing (Type F) streams in this basin.
- The North Fork Salmonberry River has an important native steelhead population.
- The Salmonberry River, Wolf Creek, and Pennoyer Creek are other important salmonid streams. The southwest corner of this basin is located within the South Fork Salmonberry River Salmon Anchor Habitat area.
- This basin is often utilized for dispersed camping and remote recreational experiences. Hunting and viewing migrating fish in the North Fork Salmonberry River are other popular activities.
- The scenic quality of the Salmonberry River canyon is an important resource.

Desired Future Condition and Landscape Design

Although currently no northern spotted owls are known to occupy this basin, it will be necessary to provide dispersal habitat and large interior habitats due to the large blocks of privately owned land both to the north and south. Also, the important salmonid resource and visual aspects of the inner canyon zones of the Salmonberry and North Fork Salmonberry Rivers warrant a strong emphasis on the development of complex forest structures. Some of these structures will be placed in areas of steep slopes and poor site quality, thus requiring more time to achieve the characteristics of complex stand structures. This placement will reduce the risk to the soil, water, visual, and salmonid resources.

Approximately 8,000 acres of OFS and LYR stands will dominate the western portion of the basin, creating a large area of interior habitat suitable for species dependent on complex forest structures. Wide areas of OFS and LYR will be designated along all the main salmonid streams, with special emphasis on providing enhanced riparian protection along the North Fork of the Salmonberry River, Salmonberry River, Pennoyer Creek, and Wolf Creek. In the eastern portion, OFS and LYR will extend up from the inner canyon area and over ridge tops, connecting adjoining basins and encompassing many headwall areas.

Proposed Management Activities

Fertilization — This basin could receive 6,000 to 7,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest — With only 2 percent of the basin currently in the REG stand structure, opportunities will be sought to provide additional small patch cuts for elk foraging habitat and edge habitat. Most of these opportunities will be located in the eastern half of the basin, on upland areas where new road construction can be minimized. It is estimated that 300 to 500 acres of clearcut will take place during the planning period.

Approximately 1,800 to 2,600 acres of partial cutting will take place during the planning period. With the exception of one 300-acre hemlock type, most of the partial cuts will take place in CSC Douglas-fir stands, 60- to 70-years-old.

Precommercial thinning — Stocking and stand age indicates that 250 to 300 acres will need thinning in the basin to keep stands growing at their optimal rates.

Pruning — There are 150 to 200 acres in the basin that could have their value increased from pruning during the period.

Recreation – The Salmonberry trail concept identified in the *1993 Recreation Plan* and *Action Plan 2000* will be explored to determine its feasibility. Other work will include inventory and assessment of dispersed campsites.

Road construction — Between 4 and 7 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 18 and 25 miles of existing roads will be improved. The majority of these roads will be improved to upgrade their standard. Major road improvement will take place in the Red Rock Hill and Belding areas, and the culvert passing the Salmonberry River under Cochran Road will be replaced with a bridge.

Underplanting — This basin was part of the Tillamook Burn and is very low in species and structural diversity. Significant efforts need to be made to increase conifer understory development. Underplanting may take place on 180 to 220 acres in this basin.

Wheeler Basin

This basin is bordered by private land to the east and state land on the other three sides. Stand ages are predominantly 50 to 70 years old as a result of natural regeneration following railroad logging in the 1930s.

Several key coho streams are located in this 16,384-acre basin. They include the Nehalem River, Carlson Creek, Wolf Creek, Lousignont Creek, and North Lousignont Creek. These streams are located in the eastern two-thirds of the basin. Dominating the north half of this basin is an 8,000 acre Spotted Owl Habitat Emphasis Area (SOHEA) where the focus will be on the development and maintenance of spotted owl habitat over the next 30 years.

This basin is popular for hunting, driving and dispersed camping. It is becoming increasingly popular for non-motorized trail users, particularly equestrian users. It is zoned for non-motorized recreation. Approximately three (3) miles of the Gales Creek Trail from Bell Camp Road to Reehers Camp is located within the basin.

Table 4-19. Wheeler Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	8	52	25	14	0	<1
Post Implementation Plan Condition[1]	4	32	45	16	2	1
Desired Future Condition	10	5	20	32	32	<1

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- This basin contains an 8,000 acre Spotted Owl Habitat Emphasis Area.
- There are approximately 53 miles of fish bearing (Type F) streams in this basin.
- Important coho streams include: Lousignont Creek, North Lousignont Creek, Wolf Creek, Carlson Creek, the upper Nehalem River, and the South Fork of Rock Creek. Nearly all of this basin is within the Lousignont Salmon Anchor Habitat area.
- Recreational resources include Reehers Camp campground and three (3) miles of the Gales Creek Trail.
- The surveyed route of the Salem to Astoria Military Road runs through this basin. It has recently been identified and marked. These markers will be preserved during any operations.
- The town of Timber obtains its drinking water from the Nehalem River at a location adjacent to this basin. A 1,846-acre area upstream from this water source has been designated as Focused Stewardship – Domestic Water Use.

Desired Future Condition and Landscape Design

With the numerous coho streams and the large Spotted Owl Habitat Emphasis Area in this basin, the focus will be on developing OFS and LYR stand structures quickly. In some cases this can be achieved through stand density management on gently sloping, high-site, easily accessible areas. Nearly 90 percent of the SOHEA is on a pathway to OFS or LYR. While some partial cutting will take place within the SOHEA to enhance northern spotted owl habitat, no clearcutting will take place. The high percentage of complex structures as a

desired future condition (64 percent in OFS and LYR) will provide for good habitat connectivity and dispersal habitat to adjoining watersheds.

Proposed Management Activities

Fertilization — This basin could receive 5,000 to 6,000 acres of fertilization during the period. Fertilization will be targeted for areas that have the greatest potential for increased growth and that will be scheduled for partial cut or clearcut harvest from 8 to 15 years from the time of fertilization.

Harvest — Overly dense stands and very sparse stands not suitable for developing into complex structures over the next several decades will be high priority for REG structure. It is estimated that 450 to 500 acres will be clearcut during the planning period.

Approximately 4,000 to 5,500 acres of 60- to 75-year-old, predominately Douglas-fir stands will be partial cut. A separate 10-year harvest plan has been developed for any partial cutting that will take place within the SOHEA. This plan will be part of the HCP and must be reviewed and approved by Department of Forestry wildlife biologists.

Precommercial thinning — This basin contains 150 to 300 acres that will be thinned during the planning period. This practice keeps stands growing at their maximum rate and allows for the selection of a desirable species mix.

Pruning — There are 100 to 300 acres that could be pruned to increase timber value during the planning period if budget allows.

Recreation —

- Reehers Camp Campground and Trailhead — The Reehers Camp project will be designed and developed primarily as a horse camp facility. It will also have a day-use trailhead component and will provide limited opportunity for campers without horses. Work will include completion of the project plan, engineering site survey, coordination with the public, and development of a final design. Construction could occur in Fiscal Years 2003 and 2004 depending on Department of Forestry and grant funding levels.

- Non-motorized trail development — The Gales Creek Trail project segment from Bell Camp Road to Reehers Camp will be under construction. Approximately one (1) mile of construction is needed to complete this segment. Various loop trail opportunities in the Reehers Camp area will be explored, located, and reviewed to become part of the comprehensive trail plan. Construction efforts can occur as soon as individual loops are approved and resources are available. Other trail work in this basin includes a feasibility assessment of a segment of the Salmonberry trail concept.

Road construction — Between 10 and 15 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 20 and 25 miles of existing roads will be improved. Approximately one-half of the roads will be improved to upgrade their standard; the remainder will be improved to maintain their existing standard.

Wilark Basin

Located in Columbia County in the northeast part of the district, these 4,596 acres of state forest land are entirely surrounded by privately owned land. A 240-acre parcel owned by Columbia County, known as Camp Wilkerson, lies at the center of the state forest land. Because of deed restrictions, the county parcel will be maintained as mature forest structure. Therefore, OFS and LYR stand structures will be located adjacent to this parcel to increase the interior habitat area. Oak Ranch Creek and the Little Clatskanie River are the only fish-bearing streams in this basin and are not designated as core salmonid areas. Approximately 60 percent of the basin has been clearcut within the past 25 years, leaving few opportunities to achieve mature forest structures in the next four decades. The terrain is very gentle, the timber is easily accessible with little or no road building, and there are few recreation or scenic opportunities. The most complex stands remaining in the basin are between 75 and 95 years old and will be designated OFS and/or LYR.

Table 4-20. Wilark Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC[2]	UDS[3]	LYR[4]	OFS	NSC
Current Condition	44	39	10	3	3	<1
Post Implementation Plan Condition[1]	15	55	19	5	5	1
Desired Future Condition	8	20	40	18	13	<1

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations

- State forest land surrounds the 240-acres of county-owned land, which is being managed for complex stand structures. This provides one of the few opportunities in this basin for a large interior habitat area.
- There are approximately 15 miles of fish bearing (Type F) streams in this basin.
- Oak Ranch Creek and Little Clatskanie River are the only major fish streams.
- In this basin, there is one individual domestic water right registered with the Oregon Department of Water Resources.

Desired Future Condition and Landscape Design

OFS and LYR will be designed to create four interior habitat areas. These structures will occur across the basin, with an emphasis on utilizing the complex stand in the county park located at the center of the state forest land. The more complex structures of UDS, LYR,

and OFS will move from a combined percentage of 16 percent to 71 percent. The percentage of REG in this basin will be dramatically reduced during this planning period, from 44% to 15%. In addition, it is anticipated that the REG target (8%) will be achieved during the next planning period (2012-2022).

Proposed Management Activities

Harvest — Those CSC and UDS stands not suited to quick development into more complex structures or stands heavily infected with laminated root rot will be candidates for clearcut. It is estimated that 250 to 350 acres will be clearcut during the planning period. In this basin, REG stands are growing out of the REG type at a rate of approximately 3 percent per year. Based on this rate, it is expected that some time during the decade after this planning period the REG type will achieve its target goal of 8 percent. Some clearcut units will be scheduled in this basin during this planning period, because many opportunities exist to conduct this type of operation with minimal impacts to other resources. Forgoing these clearcut opportunities would only reduce the time necessary to achieve the REG target by one year.

Other stands, the 30-year-old plantations to 95-year-old, dense stands, present opportunities to develop more complex structures through partial cutting. Many of these older stands have been partial cut once already, and require a second entry partial cut to release a struggling conifer understory. Approximately 500 to 850 acres of partial cut will take place during the planning period.

Precommercial thinning — This basin contains 300 to 500 acres that will be thinned during the planning period. This practice keeps stands growing at their maximum rate and allows for the selection of a desirable species mix.

Road construction — Between 1 and 2 miles of road will be constructed. Construction will consist of extending existing collector spurs and short single spurs.

Road improvement — Between 2 and 4 miles of existing roads will be improved. The majority of these roads will be improved to maintain their existing standard.

Information Summary for All Management Basins

Table 4-21. Summary: Current Condition (CC) and Desired Future Condition* (DFC), by Stand Structure and Percentage

Management Basin	Acres	NSC/ Non-Forest**		REG		CSC		UDS		LYR		OFS	
		CC	DFC	CC	DFC	CC	DFC	CC	DFC	CC	DFC	CC	DFC
Bell Mountain	1,727	0	0	44	4	38	30	12	50	6	5	0	11
East District Isolated Tracts	2,113	0	0	3	15	56	22	31	50	10	13	0	0
Gales Creek	11,053	0	0	6	10	71	15	20	18	3	23	0	34
Larch Mountain	13,081	13	13	2	4	39	5	43	13	3	28	0	37
McGregor	10,523	<1	<1	6	13	64	10	28	31	2	20	<1	26
Rogers	20,657	3	3	2	10	59	10	35	26	<1	25	0	26
Scoggins Creek	3,034	0	0	13	10	65	20	15	35	7	14	0	21
Sunday Creek	15,264	3	3	<1	9	56	10	40	20	1	23	0	35
Upper Salmonberry	18,911	3	3	2	4	60	7	30	21	5	29	0	36
Wheeler	16,384	<1	<1	8	10	52	5	25	20	14	32	0	32
Wilark	4,596	<1	<1	44	8	39	20	10	40	3	18	3	13
District Total	**117,342**	**3**	**3**	**6**	**8**	**56**	**10**	**30**	**23**	**4**	**26**	**<1**	**30**

- *The Desired Future Condition will be achieved in an estimated 40 to 60 years.
- ** NSC/Non-Forest (Non-Silviculturally Capable and Non-Forest lands). Non-Silviculturally Capable lands are those not capable of growing forest tree species (defined in OAR 629-035-0040). Non-Forest lands are those areas, greater than 5 acres, that are maintained in a permanently no forest condition (example include district offices, work camps and large power line right-of—ways).

Information Summary (continued)

In the *Northwest Oregon State Forests Management Plan* (pg 4-48*)*, the ranges for the desired future condition of stand structure types were outlined. These ranges are given below.

Regeneration (REG)	5–15%
Closed Single Canopy (CSC)	10–20%
Understory (UDS)	15–35%
Layered (LYR)	20–30%
Older Forest Structure (OFS)	20–30%

Table 4-21 on the previous page shows that for the Forest Grove District's desired future condition, the planned percentages of stand structure types fall within the management plan ranges, and emphasize the importance of the more complex structures by tending toward the range's high end for those structure types. The desired future condition map in the **Map Section** shows potential future stand structure across the district.

The time required to achieve this desired future condition depends on site quality and density management. In general, the desired future condition should be achieved in 40 to 60 years. In all cases, the achievement of the desired structure percentages is limited by the current shortage of OFS, which also takes the longest time period to produce. On higher quality sites (site classes 1, 2, or 3), active density management (i.e., partial cutting) should be able to produce OFS in a relatively short time period. On lower quality sites (site classes 4 or 5), where little or no density management occurs, it will take longer to achieve OFS. Therefore, considering the current stand structure distribution, it is estimated that on higher quality sites OFS stand characteristics can be attained in 30 to 40 years from now, while on lower sites OFS can be attained in 60 to 80 years from now.

Expected Outputs and Habitat Achievements

In general, structure-based management intervals used in this district have been determined to fit an 18-year average. Within any given 18-year period, a stand will be subject to review for a management prescription. If a silvicultural treatment is determined to be necessary or beneficial, the stand will be managed to either advance it toward the next level of structural complexity or to convert it into a new, young, vigorous stand, depending on the desired landscape goals for the stand. For the 10-year planning period, stands currently in OFS will be retained to function as complex structure on the landscape. In the future, when replacement stands achieve a similar structure, some of the older complex structures may be targeted for final harvest. In a few cases during the 10-year planning period, LYR stands may be clearcut harvested and reforested when the size and location of these stands are such that it is neither reasonable nor effective to manage them for complex forest structures.

Partial cutting will be the primary silvicultural stand management activity to advance stands toward the next level of structural complexity. More complex structures will not be achieved immediately following a partial cut. Historical evidence suggests that it may take the full 18-year period following the management prescription for a more complex structure to be achieved. For partial cuts, approximately one-half of the yearly harvest acreage will be in older stands (greater than 55 years old). The other one-half of the partial cut harvest acreage will be in younger stands (less than or equal to 55 years old). Partial cutting in both younger and older stands will progress CSC and UDS stand structures toward the more complex LYR stand structure. Some younger stands will receive multiple partial cut entries on an 18-year interval to develop the components of a LYR stand. Some LYR stands may require an additional partial cut entry to hasten the development of OFS characteristics (larger diameter trees, higher snag densities, and greater down wood levels, etc.).

Structure Targets, Timber and Habitat

The harvest levels proposed in this implementation plan will contribute toward the desired future structure targets as outlined in Table 4-21, **Information Summary for all Management Basins**. The greatest risk for missing these structure targets would come from clearcutting too many stands of more complex structures. The long-term desired future condition for the REG structure is 8 percent across the district; however, this first 10-year implementation plan proposes an average of 422 acres of clearcut per year, which will yield 6 percent of the district in REG structure. This conservative approach will provide the opportunity to accumulate additional information regarding both current and desired future conditions and structure-based management. During this initial 10-year planning period, stands in the following conditions will be assessed for conversion into the REG structure:

- Stands in poor forest health condition (e.g., *Phellinus weirii*-infected stands greater than 5 acres in size).
- Stands surplus to the CSC or UDS stand structure targets.
- Stands that are not reasonable silvicultural candidates for development into complex stands (LYR or OFS). Typically these stands are sparsely stocked with a brush understory, or overstocked with a low likelihood of responding positively to partial cutting.
- Stands in a location on the landscape that cannot effectively be managed for complex forest structure (LYR or OFS).

For the 10-year planning period, stands currently identified as OFS will not be considered for clearcut harvest, and LYR stands will be considered for clearcut harvest only with sufficient justification.

The Annual Operations Plan (AOP) will include a projection of how planned silvicultural activities in a given fiscal year will contribute toward meeting desired future condition goals.

Annual timber outputs are listed in Table 4-23 on the next page. Volumes used for these estimates were based on historical averages for these types of harvest within the district. Volumes by county are difficult to predict prior to the development of actual sale plans. A best estimate of the volumes produced during the planning period by county is:

Tillamook	40 percent
Washington	40 percent
Clatsop	15 percent
Columbia	5 percent

Annual habitat achievements are listed in Table 4-24. The standardized achievements per category were obtained from the *Northwest Oregon State Forests Management Plan* (pp 4-52 to 4-55).

For partial cuts, the addition of structural components will vary based on the age of the stand. In the older stands (greater than 55 years old), an average of two hard snags per acre will be the target. If no hard snags exist within a given stand the target will be met by tree-topping at the time of the partial cut operation. For younger stands (less than or equal to 55 years old), the current strategy for snags will be to monitor the partial cut stands for natural snag recruitment and create snags at the next partial cut harvest based on monitoring results. This delay in snag creation in younger partial cuts will provide for the creation of larger diameter snags. While there is no specific down wood target for partial cuts, it is felt that the recruitment of down wood should be somewhat continuous for those stands progressing towards complex stand structures. An estimated 200 cubic feet per acre of down wood will be added during partial cut operations as a result of residual slash and snag creation. In addition, these stands will be monitored over time to ensure that recruitment of down wood is taking place through natural processes.

Within the clearcut units, the snag creation level will be 2 per acre by tree topping. Down wood will be added at the time of harvesting by leaving cull logs, slash, and the tree tops

resulting from snag creation. The down wood target for clearcuts will be 600 to 900 cubic feet per acre in decay class 1. Where down wood is severely lacking, 1 to 2 trees per acre may be left in addition to the 5 green trees per acre target. These additional trees may be felled immediately after harvest or left standing for the purpose of recruitment by natural means over time (e.g., windthrow).

Table 4-22. Anticipated Stand Structure Development by 2011

	REG	CSC[2]	UDS[3]	LYR[4]	OFS
Current Condition	6	56	31	4	<1
After Implementation Plan Period[1]	6	35	47	8	1
Desired Future Condition	8	10	23	26	30

1. These are estimates that may differ from the actual conditions significantly.
2. After partial cutting CSC stands, it takes about 5 –to 7 years for an understory to develop.
3. After partial cutting and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.
5. The percentage for all stand structures does not equal 100% because 3% of the district is designated as Non-Silviculturally Capable or Non-Forest.

Table 4-23. Annual Partial Cut and Clearcut Harvest Objectives, by Volume and Acres

Partial Cut*		Clearcut		Total
Acres	**MMBF**	**Acres**	**MMBF**	**MMBF**
2,365 – 3,547	33.1 – 49.7	338 – 506	11.8 – 17.7	44.9 – 67.4

*Partial cut harvests are used to move stands to more complex stand structures.

Table 4-24. Estimated Annual Habitat Achievements for Partial Cuts and Clearcuts for Fiscal Years 2002 to 2011

Harvest Type	Structure Development (acres)	Snag Retention[1] (snags)	Down Wood Recruitment[2] (thousand cubic feet)	Green Tree Retention[3] (trees)
Clearcut	N/A	676 – 1,012	254 – 380	1690 – 2,530
Partial Cut	2,365 – 3,547	2,365 – 3,547	473 – 709	Not Applicable

1. Snag retention levels – younger partial cuts may not include snag creation; older partial cuts will have a target of 1 or 2 snags per acre, and clearcuts 2 snags per acre.
2. Down wood recruitment levels – average of 200 cubic feet per acre in partial cuts, and average of 750 cubic feet per acre in clearcuts.
3. Green tree retention level – average of 5 trees per acre

FY 2003 Sale Plan and Existing Sales

There are 22 timber sales currently under contract. The numbers below represent the acres remaining to be completed as of January 2003.

Table 4-25. Summary of Current and Planned Timber Sales as of January 1, 2003.

Harvest Type	Clearcut Acres	Partial Cut Acres
FY 2000*	0	751
FY 2001*	0	1,566
FY 2002	281	2,429
FY 2003	420	2,823

* The Annual Operations Plans for Fiscal Years 2000 and 2001 were approved prior to the adoption of the Northwest and Southwest Oregon State Forest Management Plans by the Oregon Board of Forestry. These two operation plans also occur prior to the time frame of this implementation plan, although the contracts extend into the implementation period.

Recreation Outputs

Estimated outputs for the planning period are listed below. Additional information on planned objectives and actions are in the *Tillamook State Forest Recreation Action Plan 2000* (ODF, March 2001).

Non Motorized Trails

- Construction of 15 – 23 miles of new non-motorized trail.
- Complete feasibility review on three major conceptual trail proposals.

Motorized Trails

- Construction of 18 - 22 miles of new OHV trail.
- Relocate and rehab 7 - 12 miles of OHV trail.
- Complete feasibility review on one OHV trail proposal.

Campgrounds, Staging Areas and Trailheads

- Development of Reehers Camp campground, day use area and trialhead.
- Development of Lyda Camp staging area and campsites.
- Develop additional trailheads associated with new trails.

Dispersed Camping Sites

- Inventory and assess dispersed camping sites; accomplish needed repair and management actions.
- Install fire grates at 10 sites.

River Access Sites

- Develop and implement plans for management of dispersed recreation sites adjacent to the Wilson River.

Appendix A

Determining Levels of Harvest and Other Silvicultural Activities

This document shows the results and outlines the steps and processes used to arrive at the activity levels in the *Forest Grove District Implementation Plan.* Levels for harvest and other silvicultural activities were determined utilizing the department's *Implementation Plans 2001: Determining Levels of Harvest and Other Silvicultural Activities for Northwest State Forests and Procedure for Review and Refinement of the Draft IP Harvest Calculations* (ODF, 2001a).

Results

Table 4-26 summarizes the estimated annual objectives for harvests and other silvicultural treatments for the 10-year period from fiscal year 2002 to fiscal year 2011.

Table 4-26. Annual Objectives/Estimates

Silvicultural Activity	Annual Objective Acres / Year
Conifer Partial Cut Harvest[1]	2,365-3,547
Conifer Clearcut Harvest[2,3]	338-506
Hardwood Partial Cut Harvest	N/A
Hardwood Clearcut Harvest	N/A
Rehabilitation	0
Reforestation	
Initial Planting[4]	250-650
Underplanting	200-290
Precommercial Thinning[5]	100-300
Fertilization[5]	3,000-6,000
Pruning[5]	50-150

1. Diseased patch cuts less than five acres in size will count toward the annual conifer partial cut objective.
2. For this 10-year planning period, stands currently identified as OFS will not be considered for clearcut harvest, and LYR stands will be considered for clearcut harvest only with sufficient justification.
3. Diseased patch cuts greater than five acres in size will count toward the annual conifer clearcut objective.
4. Reforestation acres are higher than clearcut acres because it is anticipated that 3 to 5 percent of the partial cut acres will be reforested where trees infected with *Phellinus weirii* have been removed, forming small openings in the stand approximately one-quarter to five acres in size.
5. The acres shown represent a range dependent on annual workloads and budget levels. In years of low fiscal budget levels, these estimates could fall to zero.

Step 1. Allocate the district acreage into four categories.

In Step 1, the acreage in roads and Special Stewardship Riparian Management Areas (RMAs), as well as the acreage in lands not capable of supporting a commercial harvest operation, were subtracted from the total district acreage to determine the acreage of stands capable of supporting a commercial operation. The acreage of stands capable of supporting a commercial operation was then divided into conifer and hardwood stands based on the species composition of the stands.

Table 4-27 summarizes the amount of district acreage in these categories. The narrative below documents the applied methodology to determine acreages listed in the four substeps of Step 1.

Table 4-27. Determination of Stands Capable of Supporting a Commercial Operation

Category	Acres
Total District Acres	117,342
Roads and Streams	13,892
Non-Commercial	11,317
Commercial Conifer	91,533
Commercial Hardwood	600

1. **Roads and Streams** – Acres in roads were determined by multiplying the total road length of all roads on the district (796 miles) by the average acre/mile for road right-of-ways (3.597 acres/mile). Acres in streams represent special stewardship stream buffers and were calculated from GIS.
2. **Non-Commercial Opportunities** – Acreage that would not support a commercial operation in the foreseeable future due to non-silviculturally capable designation, special stewardship other than aquatic-riparian (i.e., northern spotted owl clusters, northern spotted owl core areas outside of clusters, and marbled murrelet management areas), very low site or bad terrain, or because the site is grass, brush, or a non-commercial hardwood vegetation type. Severe needle cast-infected non-merchantable Douglas-fir stands are included in this category.

Step 1.1 — In this step the road acreage to be subtracted from the district gross acreage was first determined by multiplying the linear feet of existing road in the Forest Grove Spencer Gross SGROADS database (3,005,640 feet) by the average road width (30 feet), and dividing by the square footage in one acre (43,560 square feet). The result equals approximately 2,071 acres of roads.

Second, the Special Stewardship Riparian Management Area (RMA) acreage was determined by applying the Special Stewardship RMA buffer widths shown in Table 4-28 to both sides of the updated Forest Grove Spencer Gross SGHYDLIN database. These Special Stewardship RMA buffer widths were determined by summing the average

Aquatic Zone width with the Inner Zone width. Both of these zone widths are based on stream size. The Aquatic Zone includes the stream channel and the channel migration zone. The Inner Zone may include the Stream Bank Zone and the Inner RMA Zone as prescribed by stream size in the June 1999 draft *Western Oregon State Forests Habitat Conservation Plan*. The widths of each of these zones and the resulting Special Stewardship RMA widths are listed in the table below.

Table 4-28. Estimate of Special Stewardship RMA Widths

Stream Attributes	Aquatic Zone (feet)	Inner Zone (feet)	Total Special Stewardship RMA (feet)
Small, No Fish, Seasonal	0’	0’	0'
Small, No Fish, Perennial	5’	25’	30'
Small, Fish-Bearing	5’	100’	105'
Medium (all)	10’	100’	110'
Large (all)	20’	100’	120'

The updated SGHYDLIN database represents the best current linear and spatial hydrography estimate for the Forest Grove District. These lands, in addition to other significant aquatic areas, were designated as Special Stewardship – Aquatic and Riparian Habitat in the draft Forest Land Management Classification System. In total, these lands approximate 11,821 acres.

The road acreage was then added to this acreage of Special Stewardship RMAs prior to subtraction from the district gross acreage. The total of 13,892 acres was subtracted from the district gross acreage, as shown in Table 4-27 above.

Step 1.2 — In Step 1.2 the acreage in lands not capable of supporting a commercial harvest was calculated and also subtracted from the total district acreage. Lands not capable of supporting a commercial harvest operation (identified in the draft Forest Land Management Classification System as Special Stewardship) included administration sites, cultural sites, deeds, easements, energy and mineral extraction sites, operationally limited areas, recreation sites, research and monitoring areas, transmission line corridors, and wildlife habitats. (In order to prevent the double counting of acreages, lands classified as Special Stewardship – Aquatic and Riparian Habitat were included with the inner zone RMAs and subtracted from the district total acreage in Step 1.1 above.)

The acres in each of the Special Stewardship classifications for the Forest Grove District, excluding Aquatic and Riparian Habitat, are shown in Table 4-29.

Table 4-29. District Acres in Special Stewardship Classifications, Excluding Aquatic and Riparian Habitat

Special Stewardship Classification	Acres
Administrative Sites	88
Agriculture, Grazing, or Wildlife Forage	0
County or Local Comprehensive Plans	0
Cultural Resources	16
Deeds	21
Domestic Water Use	0
Easements	3
Energy and Minerals	42
Operationally Limited*	10,208
Plants	9
Recreation	148
Research/Monitoring	203
Transmission	256
Visual	0
Wildlife Habitat	3,262
Total Special Stewardship	**14,256**
Overlap	**2,743**
Net Total Special Stewardship	**11,513**
Reduced (1.7%) to Account for Roads	**11,317**

***The Operationally Limited acreage includes the 3,619 acres designated as Non-Silviculturally Capable in the Forest Grove District Land Base.**

Approximately 2,743 acres of overlap occurs between these Special Stewardship classifications. When this overlap is removed, the Special Stewardship acreage totals 11,513 acres. This acreage was reduced by 1.7 percent (196 acres) to account for roads occurring on these lands. The net acreage of Special Stewardship lands incapable of supporting a commercial operation, 11,317 acres, was also subtracted from the total district acreage, as shown in Table 4-27.

Steps 1.3 and 1.4 — In these steps, the acreage of stands capable of supporting a commercial operation was divided into conifer and hardwood stands based on the species composition of the stands. The OSCUR inventory lists conifer stands as stands with greater then 30 percent of the basal area in coniferous species. Using this criteria to differentiate between conifer and hardwood stands, approximately 91,533 acres of the stands capable of supporting a commercial operation were determined to be conifer, and 600 acres were determined to be hardwood, as shown in Table 4-27.

Step 2. Determine annual conifer harvest objectives.

Conifer Partial Cutting Objective

The calculation of the conifer partial cutting objective is summarized in Table 4-30. The rationale for these estimated values is described below.

Table 4-30. Calculation of Conifer Partial Cut

Partial Cut Acres	72,906 acres
Partial Cut Interval	18 years
Partial Cut Gross Acres/Year	4,050 acres/year
Partial Cut Reductions (Step 4)	27% or 1,094 acres
Partial Cut Net Acres/Year	2,956 acres/year
Partial Cut Range	2,365 – 3,547 acres/year

Partial Cut Acres — Partial cut acres were determined by estimating the percent of current conifer stand acres that are silvicultural candidates for partial cutting, based on a stand's trees per acre or relative density depending on age. This includes all stands that could be managed for Understory (UDS), Layered (LYR), and Older Forest Structure (OFS).

The candidates for partial cutting include commercial conifer stands less than or equal to 30 years of age with more than 150 trees per acre. Many of these stands will not be available for commercial harvest within the next 10 years. This reduction is accounted for in Step 4, availability reductions. For commercial conifer stands greater than 30 years of age, a relative density between 44 percent and 75 percent was used to identify partial cutting candidates. Approximately 80 percent of the commercial conifer stands, or 72,906 acres, were identified in the OSCUR inventory as partial cutting candidates. During the first half of the 10-year planning period, stands with higher relative densities will be scheduled for partial cut first. This will provide the best opportunity to move these densely stocked stands lacking in biological diversity towards greater structural complexity as soon as possible. This will be a critical step towards achieving the desired future condition targets as design across the district landscape.

In stands with concentrations of *Phellinus weirii*, partial cuts with openings greater than 5 acres in size and 150 feet in width will count toward the clearcut objective.

Partial Cut Interval — Based on historical evidence, it has been noted that the reentry rate for partial cut stands ranges from 15 to 20 years, depending on the original partial cut prescription. Therefore, an average 18-year partial cut interval was used to determine the acres of yearly partial cutting.

Partial Cut Gross Acres/Year — This is the partial cut acres divided by the partial cut interval.

Partial Cut Reductions — See Step 4 below for the explanation of these reductions.

Partial Cut Net Acres/Year — This amount is determined by subtracting the Partial Cut Reductions from the Partial Cut Gross Acres/Year.

Partial Cut Range — The range shown is plus or minus 20 percent of the Partial Cut Net Acres/Year. A range is preferred over a designated target for several reasons. First, a range communicates the level of accuracy within which the local manager can realistically plan forest operations. A range also allows for annual fluctuations in workloads and forest conditions. Finally, a range provides for the incorporation of new information as it becomes available. In general, a range provides flexibility to the manager to efficiently and effectively plan annual forest operations.

Conifer Clearcut Harvest Objective

The calculation of the conifer partial clearcut objective is summarized in Table 4-31 below, followed by the rationale for these estimates.

Table 4-31. Calculation of Conifer Clearcut

Clearcut Available Acres	18,627 acres
Clearcut Conversion Period	30 years
Clearcut Gross Acres/Year	621 acres/year
Clearcut Reductions (Step 4)	32% or 199 acres
Clearcut Net Acres/Year	422 acres/year
Clearcut Range	338 – 506 acres/year

Clearcut Available Acres — Clearcut available acres were defined as the percentage of commercial conifer stands that are not silvicultural candidates for partial cutting (approximately 20 percent), including stands with the following stand conditions:

- Stands in poor forest health condition (e.g., *Phellinus weirii*-infected stands greater than 5 acres in size).
- Stands surplus to the CSC or UDS stand type targets.
- Stands that are not reasonable silvicultural candidates for development into complex stands (i.e., LYR or OFS). Typically these stands are sparsely stocked with a brush understory, or are overstocked with a low likelihood of responding positively to partial cutting.
- Stands in an undesirable location on the landscape to effectively manage for complex forest structure (i.e., LYR or OFS).

For this planning period, stands currently identified as OFS will not be considered for clearcut harvest, and LYR stands will be considered only with sufficient justification.

Clearcut Conversion Period — The 30-year clearcut conversion period represents the best balance of impacts that will allow reasonable progress toward the 8 percent REG landscape target. A balance of impacts must take into consideration not only the forest condition, but also forest management constraints and implications.

Forest condition considerations include stand health, stand stocking, age distribution, species composition, and growth rates. Forest management constraints and implications include watershed management issues, public use considerations, economic concerns, district workloads, etc. In addition, the 30-year clearcut conversion period observes the Northwest Forest Management Plan Steering Committee's guidance (i.e., no drastic increase in current harvest levels) without compromising local management experience.

In general, stands in poor forest health and poor structural condition will be targeted for conversion earlier in the 30-year period, while other stands unsuitable for partial cutting will be converted in the middle to the end of the 30-year conversion period. At the end of the 30-year conversion period, 6 percent of the total district acreage will be in the REG stand type.

Clearcut Gross Acres/Year — This is the Clearcut Available Acres divided by the Clearcut Conversion Period.

Clearcut Reductions — See Step 4 below.

Clearcut Net Acres/Year — Clearcut Gross Acres/Year minus Clearcut Reductions.

Clearcut Range — The range shown is plus or minus 20 percent of the Clearcut Net Acres/Year. A range is preferred over a designated target for several reasons. First, a range communicates the level of accuracy within which the local manager can realistically plan forest operations. A range also allows for annual fluctuations in workloads and forest conditions. Finally, a range provides for the incorporation of new information as it becomes available. In general, a range provides flexibility to the manager to efficiently and effectively plan annual forest operations.

Step 3. Determine annual hardwood harvest objectives.

Hardwood Partial Cutting and Clearcut Objectives

These objectives are not applicable to the Forest Grove District. The 600 acres of hardwood stands capable of supporting a commercial operation occur predominantly in small islands adjacent to or surrounded by commercial conifer stands. These hardwood stands will be managed through either partial cut or clearcut harvest concurrently with the larger adjacent conifer stands, and therefore they do not have an associated annual objective.

Step 4. Adjust harvest objectives for availability factors.

The gross annual harvest objectives and estimates represent opportunities. The opportunities may not be achievable and may need to be adjusted due to availability factors. Step 4 documents the reductions made to the gross annual harvest opportunities to account for potential availability factors based on specialized screens of the OSCUR

inventory and local management experience. Availability reductions include limitations due to ecological or biological immaturity of stands, or restrictions for threatened and endangered species. For example, those stands that will not be of sufficient age and size for commercial harvest during the 10-year planning period are considered unavailable. Harvest restrictions in the spotted owl cluster and the spotted owl habitat enhancement area (SOHEA) further limit available acres for various harvest opportunities.

These reductions are summarized in Table 4-32. Note that the reduction of available acres for clearcutting is almost twice as high for partial cuts. This is due largely to the fact that partial cutting is allowed in the 8,007 acre SOHEA and clearcutting is not. Another factor contributing to this difference is that healthy stands are available at a younger age for partial cutting than for clearcutting due to silvicultural and economic reasons.

Step 5. Adjust harvest objectives for operability factors.

Operability reductions to the gross annual harvest opportunities include limitations caused by terrain, ownership boundaries, harvest type/method, or operational constraints. These areas represent site-specific areas not included in Special Stewardship - Operationally Limited including some high risk sites, areas of active soil movement, and areas of fragile soils.

The district prepared logging plans on three different sub-basins to sample these operational constraints. These sub-basins were selected to represent the variety of terrain found throughout the district. It was assumed that over the 10-year planning period market conditions would make helicopter logging an economically feasible option for hard-to-reach areas. The operability reductions shown in Table 4-32 reflect the average of these three sample sub-basins.

Step 6. Adjust harvest objectives for logistical factors.

Logistical reductions to the gross annual harvest opportunities include limitations due to the operational holding capacity of the district, log accountability issues due to sale adjacency, workload, social considerations, and environmental constraints. The operational holding capacity refers to the number of management activities or operations that can reasonably coexist due to limitations imposed by roads systems or conflicts with other resource management goals. It is estimated that at current staffing levels the proposed management objectives will be achieved.

The reduction for logistical factors is greater for partial cuts because these sales make up the greatest portion of the gross annual harvest objectives, take up a larger area on the landscape, and take longer to complete. These reductions are summarized in Table 4-32.

Table 4-32. Summary of Availablinity, Operability, and Logistical Reduction Factors

Harvest Objective	Gross Annual Objectives	Availability Reduction	Operability Reduction	Logistical Reduction	Net Annual Objectives
Conifer Clearcut	621	155 (25%)	25 (4%)	19 (3%)	422
Hardwood Clearcut	0	0	0	0	0
Conifer Partial Cutting	4,050	526 (13%)	284 (7%)	284 (7%)	2956
Hardwood Partial Cutting	0	0	0	0	0

The gross partial cut and clearcut acres per year estimated in Step 2 represent annual harvest opportunities. The annual harvest opportunities were reduced due to potential operability, availability, and logistical factors to determine the annual net clearcut and partial cut harvest objectives used in Step 2, as shown in Tables 4-30 and 4-31.

Step 7. Estimate the annual rehabilitation acreage.

Due to the absence of known silviculturally capable stands requiring an investment to control existing vegetation, prepare the site for planting, and establish a new stand of trees, both the annual and total rehabilitation acreage estimates are zero.

Step 8. Estimate the annual reforestation acreage.

Initial planting — The reforestation acreage includes estimated clearcut areas, patch cuts for disease treatment, and interplanting. The previous decade, 1990 to 1999, averaged 430 reforestation acres per year. Planned harvest levels should keep the reforestation acres between 250 and 650 acres per year, including diseased patch cutting and interplanting.

Underplanting — Underplanting is desirable in certain situations to ensure the development of a second canopy of shade-tolerant trees that are typically found in older forest stands, while contributing to the merchantable timber volume to be removed at intermediate and final harvests. In parts of the forest where very little seed source exists for shade-tolerant conifers, it will be necessary to introduce those species into the understory through underplanting to develop more complex forest stand structures. In addition, where a seed source for shade-tolerant species does exist, seed crops from these tree species can be unreliable, leaving the understory to become dominated by various brush species that prevent the development of a significant conifer understory. Therefore, the current estimate of underplanting is approximately 10 percent of the partial cutting objective, or 200 to 290 acres per year. This estimate is based on the historical percentage of partial cut stands which could develop into complex forest stand structures with underplanting.

Step 9. Determine the annual PCT estimate.

Precommercial thinning (PCT) increases the value of the stand biologically, silviculturally, and economically more than the costs to perform the operation. Biologically, PCT is necessary to maintain vigorously growing stands and high levels of forage for big game animals. Silviculturally, PCT has the additional benefit of providing for the selection of residual trees by size and species, thereby producing a healthy and diverse stand. Finally, PCT is cost-effective due to the economic benefits derived from maintaining a rapid growth rate at both the stand and individual tree level.

PCT can be either contracted or completed with inmate labor. Although levels may fluctuate due to stand needs, budget levels, and inmate or contract crew availability, PCT levels should not fall to zero. The average acreage of PCT will be between 200 and 400 acres per year for the planning period, based on current stocking levels. This PCT level represents a 30 percent reduction over the previous 10-year average.

Step 10. Determine the annual fertilization and pruning estimates.

Fertilization Estimate

The OSCUR inventory information indicates that there are approximately 66,000 acres on the district that could realize a positive return from a fertilization investment. Analysis shows that significant additional growth is achieved through fertilization every 8 to 15 years. Using the 8-year interval yields a potential maximum fertilization acreage of 8,250 acres annually. However, partial cut and clearcut harvests are currently planned for approximately 3,000 acres annually. Therefore, the most cost-effective level of fertilization will also approximate 3,000 acres annually to allow planned harvest levels to keep pace with fertilization levels. In so doing, additional wood volume will be created from fertilization at approximately the same rate as planned harvest, thereby reducing the investment period. Additional acres may be fertilized in a given year to compensate for years when fertilization was not completed due to budget level constraints. Therefore, the potential fertilization range may be between 3,000 and 6,000 acres per year.

The estimated contract cost for fertilization is $70/acre, for an annual cost of $210,000 at 3,000 acres of fertilization per year. This level of fertilization may produce an estimated 30 MMBF (million board-feet) of additional timber volume at an estimated value of $13.5 million at harvest. These volume and value estimates include additional volume and value captured at intermediate harvests.

Pruning Estimate

Pruning is done to enhance future revenue, to reduce the level of bear damage in some young stands, and to maintain understory vegetation for wildlife habitat. Stands are selected for pruning based on site quality, age, and stocking levels. Stands with a site class 2 and greater, aged 13 to 20 years, and stocked with less than 260 trees per acre, are candidates for pruning. These stands require pruning to produce structural and veneer quality wood products in the bottom log. It has also been noted that pruning reduces the likelihood of bear damage and bear-caused mortality in young stands, due to the raising of plant sugars up the stem with the removal of lower live limbs. Finally, pruning

increases the amount of light and growing space on the forest floor, thus increasing the likelihood of understory vegetation survival in the REG and CSC stand types.

Pruning is normally accomplished in 3 entries over a 5- to 6-year period to achieve a fully pruned stand. The amount of acres pruned annually over the planning period will vary due to the distribution of stand ages and fluctuations in the availability of inmate labor. The maximum acreage that should be fully pruned during the 10-year planning period will be approximately 350 acres or 50 to 150 acres annually, considering stand age and site quality.

Each acre with 90 trees pruned to a height of 18 feet costs an estimated $290 in inmate labor. The creation of 350 pruned acres over the 10-year period results in an estimated $50,000 increase in the present net value of these stands. Some of this value will be realized at intermediate harvests. Pruned trees could be removed in partial cuts as early as 50 to 65 years of age.

Step 11. Adjust estimates for logistical, operability, and availability factors.

The other annual silvicultural activity opportunities did not need to be further reduced for logistical, operational, or availability factors. These reductions were included either in the initial harvest reductions or in the annual estimates for each silvicultural opportunity.

Appendix B

References

Franklin, J. F., and C. T. Dyrness. 1973. Natural Vegetation of Oregon and Washington. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. General Technical Report PNW-8.

Governor's Natural Resources Office. 1999. Oregon Plan for Salmon and Watersheds. Office of the Governor, Salem, OR.

Hibbs, D., and D. DeBell, R. Tarrant, editors. 1994. The Biology and Management of Red Alder. Oregon State University Press, Corvallis, OR.

Oregon Department of Fish and Wildlife. June 1997. North Coast Stream Project Guide to Restoration Site Selection Phase II. Portland, OR.

Oregon Department of Forestry and Oregon Department of Parks and Recreation. 1993. Tillamook State Forest Comprehensive Recreation Plan. Oregon Department of Forestry, Tillamook, OR. January 1993.

Oregon Department of Forestry. 1996. Marbled Murrelet Management Plan for State Forest Lands. Revised May 30, 1996. State Forests Program, Salem, OR.

Oregon Department of Forestry. 1999. Draft Recreation Design Standards and Management Guidelines. State Forests Program, Salem, OR.

Oregon Department of Forestry. June 1999. Western Oregon State Forests Habitat Conservation Plan. Unpublished draft plan. State Forests Program, Salem, OR.

Oregon Department of Forestry. January 2000. Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast. State Forests Program, Salem, OR.

Oregon Department of Forestry. July 2000. Forest Roads Manual. State Forests Program, Salem, OR.

Oregon Department of Forestry. January 2001. Northwest Oregon State Forests Management Plan. State Forests Program, Salem, OR.

Oregon Department of Forestry. September 2000. Astoria District Recreation Management Plan. Astoria, OR.

Oregon Department of Forestry. September 2000. Santiam State Forest Recreation Management Plan. Clackamas-Marion District, Molalla, OR.

Oregon Department of Forestry. October 2000. Northern Spotted Owl Management Measures. Unpublished memo. State Forests Program, Salem, OR.

Oregon Department of Forestry. 2000a. Oregon Forest Practice Rules and Statutes. Salem, OR.

Oregon Department of Forestry. 2000b. Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report. Astoria, OR.

Oregon Department of Forestry. 2001a. Implementation Plans 2001: Determining Levels of Harvest and Other Silvicultural Activities for Northwest State Forests and Procedure for Review and Refinement of the Draft IP Harvest Calculations, March 6, 2001. State Forests Program, Salem, OR.

Oregon Department of Forestry. 2001b. Tillamook State Forest Recreation Action Plan 2000. Tillamook, OR.

Oregon Department of Forestry. 2001c. Draft Non-Motorized Trail Plan for the Tillamook State Forest. Tillamook, OR.

Oregon Department of Forestry. May 2001. Interim State Forests Salmon Protection Policy. State Forests Program, Salem, OR.

Oregon Department of Forestry. In progress. Forest Grove District Comprehensive Road Plan. Forest Grove, OR.

Pacific Seabird Group. 2000. Methods for Surveying for Marbled Murrelets in Forests: An Update to the Protocol for Land Management and Research. Pacific Seabird Group, Marbled Murrelet Technical Committee. Oregon State University, Corvallis, OR.

Swiss Needle Cast Cooperative (Filip, G., and A. Kanaskie, K. Kavanaugh, G. Johnson, R. Johnson, D. Maquire). 1999. Silviculture and Swiss Needle Cast Draft Position Paper. Oregon Department of Forestry, Salem, OR. September 29, 1999.

Thies, W. G., and R. N. Sturrock. 1995. Laminated Root Rot in Western North America. USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Tillamook Bay National Estuary Project. 1999. Tillamook Bay National Estuary's Comprehensive Conservation and Management Plan for Tillamook Bay, Oregon.

USFWS (USDI Fish and Wildlife Service). 1990. The Procedures Leading to ESA Compliance for the Northern Spotted Owl. Portland, OR.

Map Section

1. **Forest Grove District Overview**
2. **Forest Grove District: Current Condition Stand Structure**
3. **Forest Grove District: Desired Future Condition Stand Structure**