



Tillamook District

Implementation Plan

March 2003

This implementation plan describes the management approaches and activities that Tillamook 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 *Tillamook District Implementation Plan* (and earlier drafts) guide forest management for all forest resources on Tillamook District from July 1, 2001 through June 30, 2011.

The main headings in this plan are listed below. The next page contains a detailed table of contents.

	Page
District Overview _____	2
Management Activities _____	16
Landscape Design Overview _____	31
Management Basins _____	34
Expected Outputs and Habitat Achievements _____	59
Appendix A: Determining Levels of Harvest and Other Silvicultural Activities _____	63
Appendix B: References _____	69
Map Section _____	71

TABLE OF CONTENTS

	Page
District Overview _____	4
Land Ownership _____	4
Forest Land Management Classification System _____	4
History _____	6
Physical Elements _____	6
Geology and Soils _____	6
Topography _____	7
Water _____	7
Climate _____	7
Natural Disturbance _____	8
Biological Elements _____	8
Vegetation _____	8
Insects and Disease _____	8
Fish and Wildlife _____	9
Human Uses _____	11
Forest Management _____	11
Roads _____	11
Recreation _____	14
Scenic _____	15
Forest Stand Structure: Current Condition _____	15
Management Activities _____	18
Current Condition Analysis _____	18
Stand Structure Interaction _____	18
Hardwoods _____	19
Regeneration _____	19
Closed Single Canopy _____	19
Understory _____	20
Layered _____	20
Older Forest Structure _____	20
Non-Silviculturally Capable _____	20
Management Activities in Each Stand Type _____	21
Regeneration Stands _____	21
Closed Single Canopy Stands _____	22
Understory Stands _____	24
Layered Stands _____	24
Older Forest Structure Stands _____	24
Proposed Management Activities _____	25
Roads _____	25
Recreation _____	27
Aquatic Resources: Stream Enhancement Projects _____	28
Cultural Resources _____	28
Energy and Mineral Resources _____	29
Lands and Access _____	29
Scenic Resources _____	30

Special Forest Products _____	31
Landscape Design Overview _____	33
Management Basins _____	36
Management Basins Overview _____	36
Basin Descriptions _____	37
North Fork Nehalem Basin _____	37
Lower Nehalem Basin _____	39
Short Sands Basin _____	41
Miami Basin _____	43
Kilchis Basin _____	45
Tillamook Bay Basin _____	47
Wilson Basin _____	49
Tillamook River Basin _____	52
Trask Basin _____	53
Nestucca Basin _____	55
Little Nestucca Basin _____	57
Information Summary for All Management Basins _____	58
Expected Outputs and Habitat Achievements _____	60
Timber Outputs _____	60
Habitat Achievements _____	61
Recreation Outputs _____	62
Planned and Existing Sales _____	63
Appendix A _____	64
Determining Levels of Harvest and Other Silvicultural Activities _____	64
Appendix B _____	69
References _____	69
Map Section _____	71

District Overview

Land Ownership

The Tillamook District is located on the west slopes of the Coast Range with elevations ranging from near sea level to 3,500 feet. The district is comprised of 250,511 acres. The Oregon Department of Forestry (ODF) manages 1,775 acres of Tillamook County lands under an agreement with the county.

Table 3-1. Tillamook District Acres, by County and Ownership

County	Board of Forestry Land (acres)	Common School Land (acres)	County-Owned Land	Total (acres)
Tillamook	240,143	5,035	1,775	246,953
Clatsop	2,516	0	0	2,516
Washington	1,042	0	0	1,042
Total	243,701	5,035	1,775	250,511

Additional state forest lands are adjacent to the district on two sides, with Astoria District to the north and Forest Grove District to the east. Other adjacent forest landowners include private industrial and non-industrial landowners, the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM).

Forest Land Management Classification System

Below are tables summarizing the Tillamook District Forest Land Management Classification System (FLMCS). More information can be found in **Chapter 1: Overview**.

The FLMCS includes some overlapping classifications, defined as areas where two or more classifications occur on the same parcel of land. Overlap may occur within classifications or between classifications. Where overlaps occur between classifications, the resource requiring the highest level of protection will determine the management approach. Also, overlapping classifications cause the double counting of acres. As a result, if the acres shown in the tables below were totaled, the total would be greater than the actual number of acres in the district.

**Table 3-2. Tillamook District Acres,
by Stewardship Class and Fund**

Classification	BOF	CSL	County- Owned Land	Total Acres
Special Stewardship	52,769	2,490	2,191	57,450
Focused Stewardship	224,535	6,443	3,712	234,690
General Stewardship	65,632	828	66	66,526

**Table 3-3. Tillamook District Acres, Focused and Special Stewardship
Subclasses**

	Focused	Special
Administrative Sites	0	6
Aquatic and Riparian Habitat	75,396	22,351
Cultural Resources	54	56
Deeds	3,997	1,860
Domestic Water Use	1,833	0
Easements	1,773	0
Energy and Minerals	0	0
Operationally Limited	N/A	15,491
Plants	0	58
Recreation	9,897	3,891
Research/Monitoring	5,270	0
Transmission	0	427
Visual	15,899	26
Wildlife Habitat	120,571	13,284

History

The Tillamook State Forest and Tillamook District were created in the mid-1960s while the Tillamook Burn was reforested. The Tillamook Burn was a series of catastrophic fires in 1933, 1939, 1945, and 1951 that burned over 350,000 acres. Before 1933, private timber companies owned most of the forested land in Tillamook County and railroad logging was the most common forest activity on these lands. After the 1933 fire, ownership of most of the burned land was transferred to the county for delinquent property tax payments. Forest activity focused on salvage logging over the next couple of decades. In the 1940s and early 1950s, the county deeded the lands to the state of Oregon for management, and reforestation began.

Due to intensive reforestation work in the 1950s, 1960s, and early 1970s, the district is dominated by dense Douglas-fir stands resulting from hand-planting and aerial seeding. The forest is dominated by closed single canopy (CSC) conifer and hardwood stands 25 to 45 years old. Throughout the forest, riparian areas are dominated by hardwood species, especially next to perennial streams.

Early state forest harvest plans were based on the sustained yield calculations with planned rotation ages. There were limited opportunities for timber harvest because most of the forest was well below the rotation age of 60 years or more. For most of the forest, management focused on interplanting or replanting Douglas-fir, controlling competing species such as alder, and precommercial thinning. Older stands (more than 70 years old) were present on approximately 60,000 acres (24 percent) along the district's western edge, and harvesting has been concentrated in these stands over the past 40 years. Since 1992, partial cutting has been the primary focus for harvesting. Partial cutting is an important management tool to control stand density and to move stands more quickly to complex stand structures. Management emphasis is again changing to clearcut Douglas-fir stands severely impacted by Swiss needle cast (SNC).

Physical Elements

Geology and Soils

The Tillamook District is 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 (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 rock (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 landforms of the Oregon Coast Range are geologically youthful as a result of ongoing uplift and erosion. The high precipitation levels combined with steep slopes result in high erosion rates dominated by mass wasting. Forecast landslides that result in debris slides are a dominant geologic process on this landscape. The major soil series on the district are Rye,

Killam, and Jewell. Characteristics include deep, well-drained soils with site indexes ranging from 100 to 130, based on 50-year site index.

Topography

Long ridges with steep slopes and numerous rock outcrops characterize the terrain. The major streams generally flow through deep canyons with steep side slopes. There are many small, high gradient streams with deeply incised channels originating from headwalls.

Water

Nine of the district's major watersheds drain into three bays along the Pacific Ocean. The North Fork of the Nehalem River and Lower Nehalem River flow into Nehalem Bay. The Miami, Kilchis, Wilson, Tillamook and Trask rivers flow directly into Tillamook Bay. At the southern end of the district, the Nestucca and Little Nestucca rivers flow into Nestucca Bay. The Short Sands watershed drains into the ocean. The Tillamook Bay watershed drains into Tillamook Bay and includes smaller fish-bearing streams and the lower reaches of Miami, Kilchis and Wilson Rivers.

All of the basins have established watershed councils. The Department of Forestry participates in watershed councils at two levels. The first level provides technical assistance and support to councils by providing data on the forest and technical input on forestry issues. The second level involves being an active council member where the Department of Forestry is a major landowner in the watershed, for example Tillamook Bay and Lower Nehalem Watershed Councils. Watershed councils have completed watershed assessments for the Nehalem, Miami, Wilson, Trask, Nestucca, and Little Nestucca basins. *Tillamook Bay National Estuary's Comprehensive Conservation and Management Plan for Tillamook Bay, Oregon* (1999) included an analysis of the Kilchis basin and lands within Tillamook Bay basin.

Domestic and municipal water systems exist throughout the forest. The number of water systems are listed in basin **Key Resources** and have been mapped in the FLMCS. ODF will work through Oregon Water Resources Department (OWRD) and watershed assessments to update mapping and protection of these sites according to Forest Practices Act standards and Forest Management Plan guidelines. Municipal water systems are located in the Kilchis and Tillamook River basins.

Climate

The entire district is on the west slope of the Coast Range and is characterized by a mild climate. Summer temperatures are cooler than the temperatures farther inland, and much of the district is influenced by coastal fog, which generally extends from the ocean to approximately fifteen miles inland. Winters have mild temperatures and large amounts of rain. Intense winter storms occur periodically, and have high winds and heavy precipitation. The high winds can cause significant amounts of windthrow, and the heavy precipitation can trigger landslides. Snow falls at the high elevations during the winter, but often melts quickly with the warm rain typical of Pacific winter storms.

Natural Disturbance

The majority of natural disturbances in coastal forests are wind related but fire, insect and disease also occur. These disturbances can create a variety of patch sizes and conditions in the forest. Damage can occur to an individual tree like a broken top or at catastrophic level like stand replacing fires. The Tillamook Forest receives damage from wind most winters from individual trees to ten acre patches, however larger scale windthrow can occur. Disease and insects are also factors such as spruce tip weevil or SNC. SNC currently impacts 83,323 acres of the forest severely. Historically, fire cycles on coastal forest are 200 or more years and are catastrophic burning thousands of acres. Man caused all of the Tillamook Burn fires.

Biological Elements

Vegetation

The majority of the forest has dense Douglas-fir stands that resulted from planting and aerial seeding of the Tillamook Burn, mixed with naturally regenerated hardwoods. The oldest stands are on the western edge outside the Burn. Mixed stands of Douglas-fir and hemlock are also found scattered throughout the district. Hardwood trees dominate riparian areas and are found in some upland areas. The most prominent understory brush and shrub vegetation that occurs on the district is sword fern, salmonberry, and vine maple.

Tillamook County Soil and Water Conservation District is actively managing to control the spread of noxious weeds. Local emphasis is placed on Canada thistle (*Cirsium arvense*), tansy ragwort (*Senecio jacobaea*) and gorse (*Ulex europaeus*). Thistle and tansy are known to occur on state land. See the **Plants** section for more information on controls of these species.

Insects and Disease

There are four forest health concerns on Tillamook District. The biggest concern is SNC infection in Douglas-fir. The second is the long-term health and vigor of stands that originated from off-site seed sources. The third forest health concern is *Phellinus weirii*, a root rot and fourth is an insect called tip weevil.

Swiss Needle Cast

In recent years SNC, a native fungus infection on Douglas-fir, has increased significantly in western Oregon. This disease currently affects much of the Tillamook District. Based on aerial surveys completed annually since 1996, the estimate of infection on the district has ranged from 10,000 acres to 100,000 acres. Since these flights have varied widely in acres, a standard of combining the last three years of aerial surveys is used for analysis. The 2000 to 2002 flights show over 30 percent of the district has some level of SNC.

The Swiss Needle Cast Cooperative (SNC Cooperative) is actively studying management strategies and implications for SNC. The cooperative is comprised of State, Federal, private and academic partners to fund and implement studies of SNC in the Coast Range. These studies vary from growth analysis in plantations, to retrospective and manipulative studies in

commercial thinning, to aerial surveys. Some of these studies are being sponsored and completed by SNC Cooperative, ODF or university graduate work. These studies are being shared with all land managers to assist in combating the impacts of SNC on forest management and are available in annual reports from SNC Cooperative.

Off-Site Seed Source

Much of the Tillamook Burn was reforested with off-site seed and seedlings; sources ranged from the Puget Sound lowlands to the west slope of the Cascades. It is not yet clear what the long-term effects of the off-site seed source will be on stand development. Many of the records with the seed source information have been lost or destroyed. Poor health or vigor may cause some stands on a Layered or Older Forest Structure pathway to be harvested early. The off-site seed sources combined with SNC may increase the detrimental effects of both situations, and may exacerbate growth reductions. Complex stand development may take longer.

Phellinus weirii

The root rot infections affect 5 to 10 percent of the forest, and vary in magnitude from isolated trees to several acres. The disease is generally concentrated on the eastern portion of the district, and will be dealt with on a site by site basis.

Spruce tip weevil

Another low level or minor concern is tip weevil (*Pissodes strobi*). This insect periodically kills the upper two years of growth on spruce trees that are 5 to 50 feet in height, forcing the tree to produce a new leader. This results in short trees with multiple tops and deformed growth. Mature spruce trees do not seem as susceptible to tip weevil as younger trees. Some reforestation success occurs where spruce grows under other trees like alder or as a second cohort in conifer stands. There is on-going research for management implications of the tip weevil damage.

Fish and Wildlife

The forest contains many indigenous mammal, bird, reptile, and amphibian wildlife species, including elk, deer, spotted owls, marbled murrelets, black bears, and cougars. Over much of the forest, habitat is currently dominated by dense single-species stands that do not allow sunlight to reach the forest floor, resulting in limited available forage. Recent commercial thinnings and clearcuts have opened up many stands and increased forage. Elk populations in large portions of the forest are at or above management objectives.

Threatened and Endangered (T&E) wildlife species found on the district are marbled murrelets, northern spotted owls (NSO), and bald eagles. Marbled murrelet management areas (MMA) have been identified across the district, encompassing over 11,200 acres (3,638 habitat acres and 7,588 buffer acres). An NSO cluster (Kilchis Cluster) has been designated in the Kilchis basin, and includes small portions of the lower Wilson and Trask basins totaling 8,556 acres. The cluster is adjacent to a BLM Reserve Pair Area (RPA) which has a resident single female and totals 8,733 acres. At this time the district has a total

of three pairs, one each in the North Fork Nehalem, Lower Nehalem, and the Miami basins. A single owl is found on state forest land in the Miami basin. Owl sites are located on BLM, USFS, and Oregon Department of Parks and Recreation (ODPR) ownerships and influence management decisions on adjacent state forests. As the proposed HCP is developed, ODF will continue to protect and enhance habitat in conjunction with the current HCP strategies, Strum Creek Agreement, and Endangered Species Act regulations.

The Tillamook District has over 300 miles of fish-bearing streams. Some of these streams have important populations of native salmonids. Anadromous runs on the district include coho, chum, spring and fall chinook salmon, summer and winter steelhead, and sea-run cutthroat trout. Resident cutthroat trout populations are also found in the district's streams. Coho are listed as threatened under the federal Endangered Species Act. Chum salmon are listed as threatened under the state Endangered Species Act. Chinook populations are classified as healthy in rest of the district's streams. ODF will complete action items found in the *Oregon Plan for Salmon and Watersheds (Oregon Plan)* to continue protection and enhancement of riparian habitat, as well as improve fish passage and instream habitat through consultation with the Oregon Department of Fish and Wildlife (ODFW). Salmon Anchor Habitats (SAH) are designated in the North Fork Nehalem, Lower Nehalem, Miami, Kilchis, Wilson and Trask basins. These SAHs incorporate approximately 95,917 acres (38%) of the Tillamook District. See the separate chapter **Salmon Anchor Habitats** for more specific information on salmon strategies.

The current conditions and desired future conditions of wildlife habitats are found in the individual basin description tables. Wildlife species response to moving stands from their current condition to their desired future condition will be evaluated through the monitoring program supported by ODF and ODFW.

Human Uses

Forest Management

Since 1992, management has focused on partial cutting. Stands of dense conifer 30 to 45 years old have provided the biggest opportunity for partial cut operations. Between January 1989 and January 2001, 16,712 acres were partial cut. Another 11,576 acres were under contract as of January 2001. Until the 2003 sale plan the district goal has been to sell approximately 4,000 acres of partial cutting per year. Over 3,800 acres were thinned between 1967 and 1982; these acres now offer second-entry partial cut opportunities.

Before the 1990s, clearcutting was the primary harvest method. Most clearcut acres were harvested in the district's western portion, averaging 800 acres per year. Hardwood sales comprised the majority of these clearcut acres. After 1998, the acres of conifer clearcut increased in response to stand decline due to SNC infection.

Other forest management activities, including precommercial thinning, pruning, and planting, are accomplished using Department of Corrections inmates from South Fork Camp. In the past three years, precommercial thinning has been completed on 300 acres per year. In 1995 and 1996 combined, 20,000 acres were fertilized. The economic and biological benefits of fertilizing are being reviewed and analyzed, looking particularly at the unknown effects of SNC on growth and the retention of stands for longer rotations. Until the analysis is completed, fertilization projects are suspended. Clearcuts are reforested within two years of harvest.

Roads

The district's road system consists of 1,224 miles of single-lane forest roads. The district's primary road network is an established system that has been in place for 40 to 50 years. It provides access for forest management activities, fire suppression, and public travel.

In general, the district road network can be divided into the following four management categories (*Forest Roads Manual 2000*, pages 8-1 and 8-2):

- **Active Use** - Active use roads are those that are part of the permanent roads system and those temporary roads that are currently in use or will be in use 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 Oregon Forest Practices Act.
- **Road Closure** – Road closure involves restricting 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 water.

- **Partial vacation** – Partial vacation involves barricading the road and installing minor drainage structures, which might include the construction of water bars or rolling drains. 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 to consider. The nature of the road may be somewhat altered through the addition of waterbars and other drainage structures, but the obligation to maintain the road remains.
- **Full vacation** – Full vacation involves removing all stream crossing structures, installing maintenance-free drainage (outsloping, water bars, rolling dips, etc.), pulling back any sidecast material, grass seeding disturbed soil and barricading the road. The road is effectively “put to bed”. All the access is prevented, and there is no maintenance obligation. Cross drain culverts may be left in place but will not be considered as functional drainage feature.

The *Tillamook District Transportation Plan* is being developed and the road inventory is a component of the plan. The road inventory is part of Level II planning (mid-level, moderate planning level) while the Annual Operations Plans (AOP) will reflect Level III planning and will discuss road construction, improvement and vacation. The road system has been classified into the three use levels (low, medium, and high use) as described in the *Forest Roads Manual 2000* (pages 3-6 and 3-7). The use levels are defined below:

- **Low Use Standard** – These are generally roads that are used for short term, intermittently and/or have a low traffic volume. Use may be heavy during periods of log hauling but minimal at other times.
- **Medium Use Standard** – These are generally semi-permanent or permanent usage roads that may access more than one logging unit, receive moderate use by the public during portions of the year, and/or provide important access for administrative purposes.
- **High Use Standard** – These are generally permanent roads that have high traffic volumes, higher speeds, movement of heavy equipment and/or a high level of public use during portions of the year.

Table 3-4. Tillamook District Road System¹

Road Use Standards	Miles
Low Use	487
Medium Use	518
High Use	219
Total Miles	1,224

1. Source for data is Tillamook Road Inventory completed summer 2002.

Most of the mainline roads were constructed between 1940 and 1960 for timber salvage in the Tillamook Burn. The district is actively and aggressively improving these roads to reduce any environmental problems caused by the roads and to accommodate future forest

management activities. Since 1994 over 860 miles of road have been improved; over 1,231,000 cubic yards of rock have been spread; and nineteen bridges have been installed or replaced. Eight bridges replaced culverts in order to improve fish passage and open up several miles of additional spawning habitat. Thirty miles of roads have been vacated in the past few years. The roads closed include timber sale spur roads and sections of existing roads no longer needed for forest management.

A comprehensive road inventory compiled information on culvert locations, road surfacing and conditions and use level. The inventory information will be used to identify areas of concern, prioritize improvement activity, and plan road management activities.

Approximately 40 percent of the road miles are located on ridge tops, 50 percent on midslopes, and 10 percent in valley bottoms.

On 75 percent of the road miles, the road surface is intact and shows no sign of erosion. Approximately 20 percent of the road miles are showing some signs of rutting and 5 percent are showing some signs of erosion.

Cut slopes are rated as good on 80 percent of the road miles. Cut slope ravel and cut slope slides are an equal concern on the remaining road miles.

There are 738 areas of potentially unstable road fill where there is a risk of material entering a stream if a failure occurs. Most of the unstable areas are associated with roads that were constructed during the timber salvage in the Tillamook Burn. These areas are generally small and the result of the sidecast road construction technique, no longer used. Removing the sidecast material can stabilize most of them.

Ditches are present on nearly 45 percent of the road miles. These ditches are properly functioning on 86 percent of the road system. Ditches are not present on 55 percent of the road miles. Of the roads without ditches, most are located on ridge tops, are short spurs, or are outsloped for drainage.

There are 5,400 culverts installed across state forest roads in the district. Forty-five percent of the culverts are rated as being in good condition and functioning properly. The remaining culverts are in less than good condition because they show signs of rusting (20 percent), they are not embedded culverts and they have sediment in them (10 percent), there is mechanical damage present (10 percent), or there are other undesirable conditions (15 percent).

Roads cross known fish-bearing streams in 147 locations. Bridges are used for 88 crossings and culverts are used for the other 59 crossings. Thirty-nine culverts allow all fish to move upstream and downstream. Ten culverts allow adult salmonids to move upstream but not adult trout or juvenile salmonids. The remaining ten culverts block upstream movement of all fish. The district has not completed fish presence surveys on all streams on state forest land, and there are a number of culverts on streams where fish presence has not been determined. Once the fish presence surveys are completed, the culverts can be evaluated for fish passage.

Recreation

The district offers a variety of recreation resources and opportunities, including five major river corridors, an extensive road system, trails for motorized and non-motorized use, dispersed camping sites, campgrounds, remote areas, scenic vistas, and historic sites. In 1993, ODF developed the *Tillamook State Forest Comprehensive Recreation Management Plan*. The recreation plan was recently updated and provides specific policy and projects for the next ten years (*Tillamook State Forest Recreation Action Plan 2000*).

In general, recreation use is increasing across the district. As the north Willamette Valley metropolitan area continues to grow, public use and associated impacts can be expected to increase. Most of the district's recreation visitors come from the Portland metropolitan area. These visitors generally focus their use in the Wilson River Basin, which is easily accessed from the east. Recreational use is increasing on state forest lands near the coastal communities and also on land easily accessible from Highway 101. Coastal-based visitors use the more remote areas, such as the Trask, Kilchis, Miami, and Nehalem River basins.

The Tillamook District is popular among hunters, anglers, and off-highway vehicle (OHV) enthusiasts. OHV use continues to be the most popular year-round recreation activity. There are now two developed fee campgrounds with day use areas, and a developed OHV staging area with overnight fee camping. Three full-time Tillamook County Sheriff's deputies enforce public use laws on the state forest, through an intergovernmental agreement.

Hiking, mountain biking and equestrian use are increasing, as new trails are constructed and old ones rehabilitated. Day use activities include picnicking and swimming in the summer, and kayaking in the spring and fall. Dispersed camping continues to be popular and is concentrated along rivers and streams such as Cedar and Cook creeks. Fishing and hunting are also popular throughout the forest. In general, the district's recreation use is seasonal with most activity occurring in the late spring, summer, and fall, but more use is occurring district-wide and all year round.

A multi-faceted volunteer program has been established within the district. The volunteer program includes the following sub-programs.

- Camp hosts
- OHV trail patrol
- Trail machine volunteers
- SOLV (Stop Oregon Litter and Vandalism) forest clean-up
- Trail maintenance and construction work days
- Motorized and non-motorized trail planning groups
- North Coast Travel Management Area volunteers
- Cooperative agreements with OHV clubs for project work and maintenance

Each of the last three years documented over 3,000 hours of volunteer time on the district. Volunteer hours are expected to increase in the future. The trash and dumpsite cleanup is coordinated and overseen by the recreation department and implemented mostly through

volunteers and South Fork Camp inmates. These activities do not reduce funds available for recreation management but is an additional funding level to the recreation program.

A key element of the recreation program is the work performed daily by South Fork Camp inmate crews and staff. South Fork inmate labor is the backbone of the recreation program and essential to maintaining facilities at a high standard and for the construction of the new trails and facilities.

Recreation is growing in economic importance to the area on several levels. ODF commissioned an economic evaluation report titled *Northwest Oregon State Forest Management Plan: Connection to State and Local Economies* (November 1996), which evaluated the Forest Management Plan and included recreation. This report stated that recreation had a low impact on local economy when compared to other counties. However, the impact is expected to quickly grow as the Willamette Valley population grows. The economy is benefited through products sold to recreation users as well as money spent in Tillamook and surrounding areas through hotels, restaurants, etc. Two-thirds of the revenue produced by fee day use areas and campground fees go to the county and one third returns to the department.

Refer to individual basin descriptions in **Management Basins** section for more specific information of planned projects.

Scenic

The Tillamook District has scenic viewsheds from urban areas, highways, county roads, and Tillamook Bay. State Highways 6 and 101 both have scenic ratings of 1, the highest rating. Over 11,000 acres of state forest land are visible from the Highway 6 corridor, and approximately 5,000 acres are visible from Highway 101. Much of the area within 200 feet of the Highway 6 right-of-way is owned and managed by ODPR. The District is currently negotiating an exchange to acquire this ODPR land.

The communities of Tillamook, Bay City, and Garibaldi have views of state forest land. A unique viewshed is Tillamook Bay itself, which is used by anglers and recreational boaters. The slopes and ridges above Bay City and Garibaldi are visible from the bay, and include much of the acreage visible from Highway 101 mentioned above. The basin descriptions in the **Management Basins** section will discuss further the scenic areas in each basin and how management will be adjusted for those concerns.

Forest Stand Structure: Current Condition

The current stand condition is displayed in the graphs at the end of this section, and in the second map in the **Map Section**. Figure 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.

The current condition stand structures were determined with a district retyping project. The existing OSCUR inventory system contained too many inaccuracies or inapplicable data, and could not be used to designate stand structures or set management priorities.

Stand type boundaries were drawn on orthophotos, based on large type islands of similar stand conditions. Many of these boundaries were based on past management units, such as precommercial thinnings and commercial thinnings. Each type was numbered, and data was recorded on species, diameter breast height (DBH), Stand Density Index (SDI), trees per acre, and other parameters. The data came from local knowledge, current inventory, reconnaissance data, and timber cruises. Stand structures were determined by comparing stand data to stand type descriptions found in the *Northwest Oregon State Forests Management Plan*, Appendix C, (pages C-2 to C-15). When stands had been visited on the ground, that information was incorporated.

Information is incomplete for this first stand-type inventory, and some errors have been found already. However, it is felt this review of stands has allowed for a more realistic stand classification than was available through OSCUR for the Tillamook District. In 2002 the Stand Level Inventory (SLI) work began and a pool of stands were designated highest priority for stand structure verification. This pool was based on planned timber sales and where stand structure information is most needed. Review and priorities have also been set for the 2003 inventory work. Any changes in current stand-type designations will be discussed in the AOP and updated in the district inventory database.

Figure 2 shows the current age distribution of the forest, regardless of stand type, 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 3-1. Current Stand Structure, by Acres and Percent

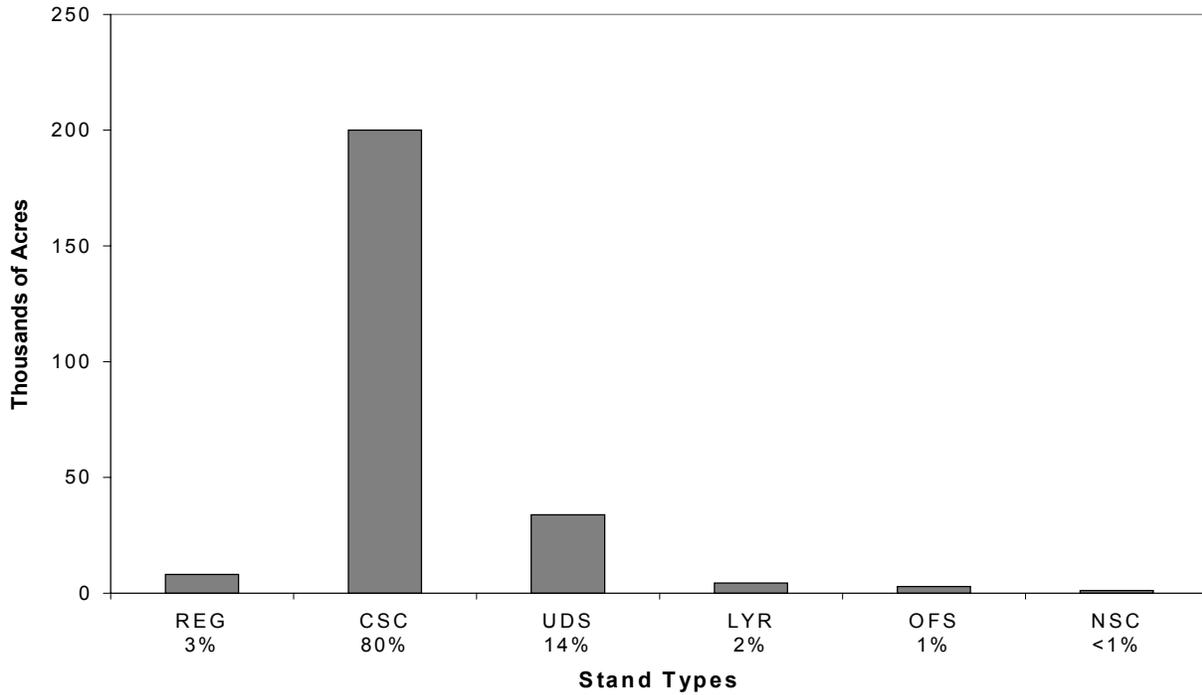
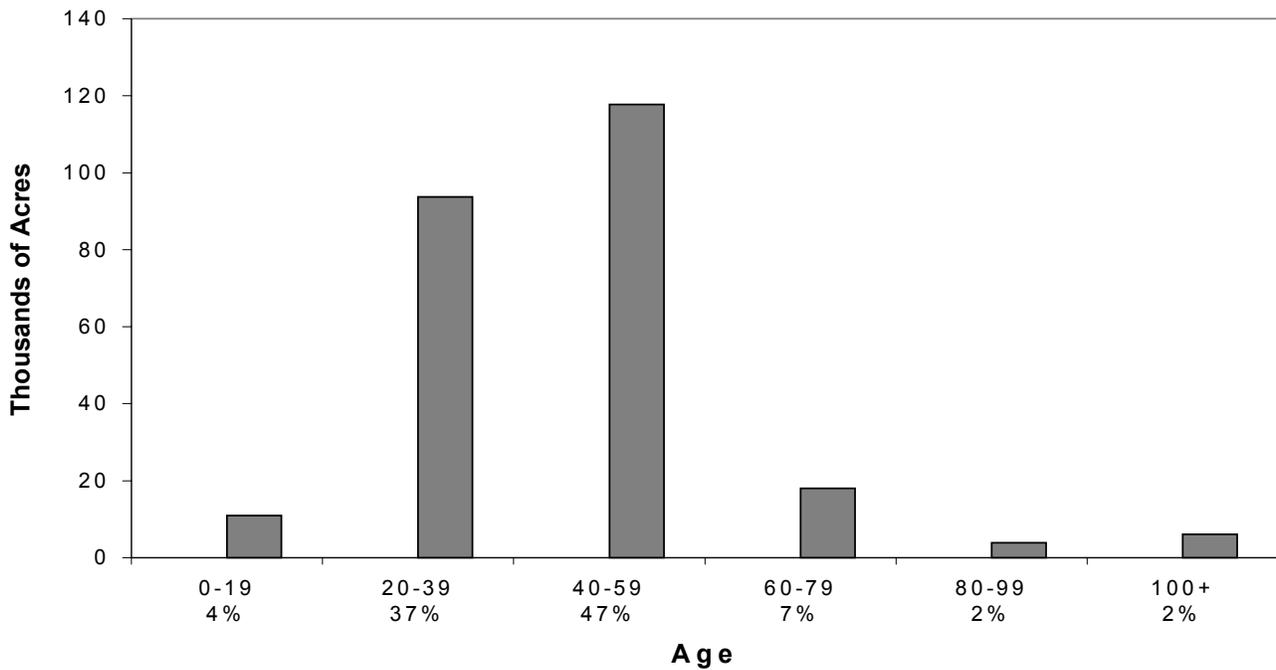


Figure 3-2. Stand Age Distribution by Acres and Percent



Management Activities

Current Condition Analysis

Stand Structure Interaction

The Current Condition Analysis and 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 Forest	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 the combinations and aggregations of different stand types that function together to provide the benefits 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 the blueprint of a desirable array for the development of the

percentages 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 that 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

Stands are classified as hardwood types where more than 70 percent of the basal area is hardwood. Some of these stands have a component of scattered and clumped conifer. These clumps are usually less than 5 acres, so most of these stands are classified as CSC. Approximately 34,000 acres are hardwood stands with 400 acres classified as LYR and 350 classified as UDS. The more complex hardwood stands have vertical and horizontal diversity, a variety of conifer species in the understory and patches of large diameter remnant conifer. Many of these stands have brush species of salmonberry. Hardwood stands are difficult to manage for complex structure due to reduced height and diameter growth after age 40 (Hibbs et al., 1994). Alder is the dominant hardwood species on the district.

The importance of hardwood stands on the landscape has only recently been recognized, and therefore the management of hardwoods is still evolving. The district will maintain a component of hardwoods, in both pure and mixed stands, through a variety of silvicultural techniques. Because of past management practices designed to release conifer from hardwood competition, many of hardwood stands are not growing well. More information on management can be found in **Management Activities in Each Type** section.

Regeneration

At this time the district contains about 3 percent REG structure. Most of these stands are plantations of Douglas-fir. These plantations resulted from clearcut prescriptions in the late 1980 and early 1990's, which many times did not leave previous stand components like snags, down-wood, or green tree retention. The stands were also reforested with a single species (Douglas-fir), which are very simple and most moderately to severely impacted by SNC. Many of the Douglas-fir stands less than ten years of age have been interplanted with hemlock and true fir species.

Closed Single Canopy

Many CSC stands are a result of the reforestation of the Tillamook Burn (approximately 80 percent of the district). Most are dense stands of Douglas-fir, or a mix of conifer and

hardwood dominated by Douglas-fir. Some stands naturally regenerated with hemlock as the dominating component. These hemlock stands are generally located along the west edge of the district and are dense tall stands with high height to diameter ratios. Mixed-conifer types generally contain components of hemlock, cedar, spruce, and Douglas-fir. Many conifer types have a hardwood component, ranging from scattered trees and clumps to narrow riparian strips along streams.

Understory

Less than 15 percent of the district is in UDS. In the 1980s some partial cuts were done and have resulted in UDS stands over 50 years of age. Several of these stands are expected to move back into the CSC structure unless a second entry partial cut is done. Others have had second entry partial cuts to remain in UDS and are expected to begin developing the components of LYR stands. The large effort to partial cut in the district since 1990 is or will be the future development of UDS stands. Some of these stands have begun to establish an understory of conifer or a second cohort in openings (heavier partial cuts). Other stands have taken longer or have not shown a response to partial cutting due to the impacts of SNC. While these stands are more open, the crowns remain small and needle retention is less than two years.

Layered

Approximately 2 percent of the district is LYR structure resulting from natural regeneration. Some LYR stands resulted from early partial cuts done in the early 1980s. Other LYR stands on the district developed through natural growth and disturbance like wind causing openings for second cohorts to establish and creating snags. These stands are usually mixed species stands with shade tolerant species like hemlock or cedar in the understory.

Older Forest Structure

Less than 1 percent of the Tillamook District is classified as Older Forest Structure (OFS). These are natural stands of mixed conifer species like Douglas-fir, cedar, hemlock and spruce. The stands are widely scattered and found in small patches for the most part. Some of these stands exist because they were left during railroad logging and survived the Tillamook Burn. These stands contain large diameter trees, horizontal and vertical diversity as well as snags and down wood.

Non-Silviculturally Capable

These NSC sites are usually rock outcrops or rock slopes. These sites may have a few scattered trees but most only contain some small forb or brush species. It is recognized though, that these sites are unique habitats for plants and wildlife like peregrine falcons.

Management Activities in Each Stand Type

The annual harvest and silvicultural activities are summarized in Table 3-5. The following section discusses the purpose and rationale for these activities in each stand structure.

Regeneration Stands

Management activities in these stand types will consist of reforestation, pre-commercial thinning and pruning. The stand components reserved (green tree retention, snags, differing species, and large woody debris) during the clearcut harvest will be important for wildlife use and creating complex structure (vertical and horizontal diversity) in the developing stand. The young plantations will be managed for a diversity of tree species, rapid tree growth and stand health while retaining those large tree components from previous stands. These stands may also have dense areas of hardwoods along streams, draws and headwalls within the unit. Stands are expected to remain in the regeneration structure for 10 years.

Reforestation

Reforestation is done within 2 years on all clearcuts and patch cuts over 5 acres. Spacing, species, and stock type depend on site-specific conditions and seedling availability. The district will reforest with native tree species using local seed sources where available. Vegetation management activities are undertaken in conjunction with stand establishment and maintenance, and could consist of chemical, manual, or mechanical site preparation or release. Depending on the growth and development of these stands, some may be precommercially thinned and/or pruned. This estimate is based on current reforestation focusing on hemlock, and expected growth rates. Hemlock, cedar, noble fir, spruce, and Douglas-fir are all being planted on the district to create species diversity. Natural regeneration of hardwood species occurs on most units at varying levels or will be planted in areas of root disease.

Conifer Stand Clearcut

Stands clearcut and moved to the REG structure will contain larger standing green trees (at least 8 to 10 trees per acre) grouped or scattered across or adjacent to the unit. These trees will become large diameter trees in future stands or provide a source for snags and down wood. All snags will also be retained on harvest units as safety permits. Additional snags may be created. Some stands will be monitored 5 years after operations to determine if more snags need to be created. The goal of 600 to 900 cubic feet per acre of down wood in decay classes 1 and 2 (3,000 to 4,500 cubic feet in all decay classes) will be strived for by retaining existing down wood adding cull logs and green logs during harvest as well as limbs and tops. At least 2 logs per acre will be 24 inches or greater in diameter on the large end.

Swiss Needle Cast Clearcut

Stands harvested due to severe SNC and moved into the REG structure are often less than 45 years old, with individual trees less than 15 inches DBH. Green tree retention (GTR) within the unit may be reduced to 2 to 4 Douglas-fir per acre along with all other conifer species. The Douglas-fir are expected to grow slowly or die and become snags or down wood. For some timber sales, areas outside the sale may also be designated as long-term GTR areas in

head walls or inaccessible terrain. These GTR areas will be tracked for at least one rotation. Where at least 8 trees per acre have been designated outside the sale area, at least 2 Douglas-fir trees will be left inside the sale area for down wood. Additional down wood may also be created outside the sale areas. The targets for green trees, snags, and down wood will not be met on every acre but will be managed at a landscape perspective.

Closed Single Canopy Stands

The CSC structure will occur across the landscape but is not necessarily a desired stand structure. As all stands continue to grow, they will either move into or return to this structure until another disturbance occurs, such as windthrow, disease, fire, or harvest activity.

Conifer Stand Partial Cuts

Partial cuts can vary depending on the number of trees removed. Light partial cuts of stand density index (SDI) 40 percent and above are usually done in areas where there are T&E species concerns or moderate levels of SNC. Moderate partial cuts (SDI 25 to 35 percent) are normally done to promote the UDS stand structure while maximizing short-term volume production. Heavy partial cuts (less than 25 percent SDI) are usually performed to develop another cohort via natural regeneration or underplanting. This prescription may be used to develop UDS, LYR, and OFS. Heavy partial cuts may be used in stands that are not expected to respond to a lighter partial cut. This treatment may also be used to treat for health problems, such as SNC, by removing the majority of the infected trees and retaining hardwoods and conifers other than Douglas-fir.

In most cases, partial cuts remove the smaller diameter trees with the smallest crowns, and leave the biggest and best trees with more growing space. Partial cuts allow more light to reach the forest floor so shrubs, forbs, and a new cohort of trees can begin to grow. Partial cuts can be combined with group selection cuts to create gaps ranging from 2 to 5 acres. The heavy partial cuts and group selections promote deep crowns and, in some cases, large limbs that are expected to eventually provide nesting habitat for species such as marbled murrelets.

First entry thinnings usually have fewer snags and less down wood compared to clearcut harvests. During first entry partial cuts, existing snags and down wood will be retained. Past snag surveys show an average of 1 large snag per acre. In some stands with an average tree diameter of 15 inches or more, enough snags will be created to average 2 per acre, or the stands will be monitored 5 years after harvest to determine the number of snags created through natural processes. Down wood will be recruited by leaving cull logs and logging slash (tops and limbs) on the site. Managing for these stand components will be more important in second entry thinnings or older stands, due to the size of trees available to create snags and down wood.

Stands of Douglas-fir with more than 3 years of needle retention are considered to be slightly infected by SNC. Most of these stands will be candidates for partial cut. Monitoring of the severity of the disease as well as growth response will be combined with adaptive management to manage these stands and the disease intensity.

The partial cutting opportunities have been reduced due to SNC and will probably continue to decrease. See **Appendix A** for harvest calculations and ranges.

Hardwood Stand Clearcut

CSC hardwood stands may be harvested in operations where hardwoods are cut, and conifers are reserved or thinned, meeting green tree retention goals. At this time, harvesting pure hardwood stands is a low priority due to economics and concerns for SNC infection. However, these stands may be harvested in conjunction with SNC infected stands. Other hardwood stands will be retained in riparian areas and headwalls or will be reserved clumps and patches within conifer partial cut units. Hardwoods usually develop through natural regeneration or are planted in areas of *Phellinus weirii* infection. It is recognized that hardwoods add a component of horizontal and vertical diversity and benefit soil productivity. It is expected that hardwoods will comprise at least 10% of the forest at any given time.

Conifer Stand Clearcut

Many of the CSC stands are pure Douglas-fir stands resulting from reforestation of the Tillamook Burn. These stands are also moderately to severely impacted by SNC and are the focus for management during this planning period as directed by the Board of Forestry Intent Statement Number 6. This intent statement is as follows:

“The District Implementation Plans will reflect the principles and assumptions contained in OSU model run 1C-2, and will aggressively treat Swiss Needle Cast (SNC), consistent with the SNC Strategic Plan.”

The OSU model run 1C-2 instructs the Tillamook District to harvest severely affected SNC stands in the first two decades. Criteria and guidance for stand management will follow the *Silviculture and Swiss Needle Cast Draft Position Paper* (Swiss Needle Cast Cooperative, 1999) and the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast* (ODF, January 2000). As more research is completed these management strategies may be adjusted to incorporate new information.

Harvesting at this rate will create REG structure on about 18-20 percent of the district over the next 10 to 15 years. This will reduce the amount and proportion of Douglas-fir and increase the amount of other native species not affected by needle cast. These species include western hemlock, western redcedar, true firs, Sitka spruce, and red alder.

Decisions will be made on a stand-by-stand basis, but generally Douglas-fir trees with less than 2 years of needle retention are considered severely infected. Stands more than 20 years old may be candidates for harvesting as they reach merchantable size. Approximately 9,700 acres of the district are Douglas-fir plantations from 10 to 20 years old and it is not clear what management opportunities will exist in these stands. See **Appendix A** for harvest calculations and ranges.

Douglas-fir stands with 2 to 3 years of needle retention are considered moderately infected. There is a high probability that most of these stands will not be acceptable candidates to develop into LYR or OFS. Management options for these stands are similar to the options for severely infected stands. However, some of the stands may be grown longer and clearcut or heavy partial cut at an older age than severely infected stands. See the **Regeneration** section for more detail on stand components left after clearcut harvest.

Understory Stands

Future partial cutting is planned to promote the development or maintenance of complex stand structure. Most second entry partial cuts will be moderate, with some 2 to 5 acre patch cuts to stimulate further development of the second cohorts started with previous partial cuts. The second entry partial cutting will remove the smaller trees with small crowns and retain the largest trees with large crowns and in good health. In order to promote development of LYR and OFS stand structures; the prescription in UDS stands often includes reserving some of the smaller shade-tolerant trees in the understory such as hemlock, spruce, and cedar. Snags and down wood will be retained or created in these operations.

Layered Stands

These stands will be monitored over time, and partial cutting may be prescribed. Light or moderate partial cutting and/or group selection cutting may be prescribed to create small openings and continue understory tree growth and development as well as maintaining growing space for larger trees. Partial cutting could include removing Douglas-fir severely infected with SNC and leaving the other conifer and hardwoods. The overall management goal will be to maintain or enhance opportunities for future management or structure development. In these stand structures, harvest prescriptions and operational concerns are reviewed with ODFW biologists as well as ODF wildlife biologists, during reviews of annual operations plans (AOP). All the LYR structure currently on the district will be retained for at least the next 10 years.

Older Forest Structure Stands

These stands are often found in scattered areas and may be managed in conjunction with surrounding stands. However, many of these stands are associated with T&E species and are not available for timber management. None of these stands will be clearcut in this planning period.

A pool of stands of varying ages, species and sites have been designated for future research and monitoring. A majority of these stands are naturally regenerated and no past management has occurred and no management is planned in the next 10 years. As research and monitoring projects are developed, these stands will be reviewed and designated for studies where and when appropriate.

Proposed Management Activities

Table 3-5. Annual Silvicultural Activities for Fiscal Years 2002 to 2011

Activity	Estimated Acres	Estimated Annual Acres
	2002 ⁶	2003-2011
Partial cut	2,146 acres	1,000 – 1,400 acres ¹
Conifer Clearcut	2,131 acres	3,500 – 5,100 acres ^{2,3}
Hardwood Clearcut	185 acres	0 - 1,100
Reforestation	780 acres	1,500 – 3,500 acres
-Initial Planting	780 acres	1,500 – 3,500 acres ⁴
-Underplanting	0	0
Precommercial Thinning ⁵	300 acres	0 – 500 acres
Fertilization ⁵	0	0
Pruning ⁵	0	0

1. 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 and LYR will not be considered for clearcut harvest.
3. Patch cuts greater than five acres will count toward the annual clearcut total.
4. Replanting portions of clearcuts is expected due to areas of unsuccessful reforestation.
5. These activities are at zero due to the impacts of SNC and unknown impacts of intensive management on stressed Douglas-fir stands.
6. FY 2002 acres are outside the planning period range because of the impacts of SNC. 2002 AOP was a period of transition to clearcut harvest, SNC impacts and increase of personnel to implement the Forest Management Plan.

Roads

Guidance for achieving the desired condition will come from the *Forest Roads Manual 2000* and the developing *Tillamook District Transportation Plan*. The *Transportation Plan* will be completed with the next revision of the district Implementation Plan. As road activities are planned, the following components will be considered:

- **Location** — To the greatest extent possible, new roads will be located on or near ridge tops, where slopes are relatively gentle. Roads will not be located on steep slopes or in high risk areas unless risk analysis determines that the probability of failure is low, and that the probability of resource damage in the event of a failure is low. This risk analysis will involve the department's Northwest Oregon Area geotechnical specialist. Roads will be designed to the minimum width necessary to accommodate the planned management activity.
- **Surfacing** — Mainline roads will be surfaced with crushed rock to a depth sufficient to allow limited 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 should 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 and resource damage. These sites will be reconstructed to mitigate the risk.
- **Abandoned roads** — Non-system roads will be assessed to identify any potential for failures resulting in damage to resources. Where feasible, identified sites will be rehabilitated 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.
- **Road closures** — 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 barricaded or vacated 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.
- **Inventory** — The detailed road inventory will be updated on an annual basis to reflect any road improvements or changes to the road system. Information from the inventory will be used to identify and prioritize road maintenance needs and road improvement opportunities.

Potential Road Activities

To accomplish the district's silvicultural objectives, it is estimated that about 5 miles of new road construction and between 80 and 100 miles of road improvement will be necessary annually. Road construction and improvement identified in this plan will be primarily achieved through project work connected with timber sales. In addition, the district will plan to close or vacate between 5 and 10 miles of road annually during the 10-year planning period. The District will reduce the extent of permanent roads whenever possible considering recreation, fire protection and management. Tillamook is taking a proactive approach to repairing/closing road consistent with ODF funding levels.

The road inventory is part of Level II planning and makes connections to the *Oregon Plan*, to address concerns for road erosion, stream sedimentation, and fish passage. Review of the road data and completion of spatial analysis are on-going at this time to complete error checking and data management. The inventory information may be used to prioritize and estimate the cost of road projects required for achieving the goals of the *Oregon Plan*. The inventory will be updated over time, to build a history of past successes, failures, and actions.

Level III planning occurs with AOP and review of high-risk sites and slope stability. This will involve geotechnical specialist review of terrain, soils and topography of sites on aerial photos, maps and in the field. These comments will be addressed in the AOP and adjustments made as needed. Overall, high-risk sites will be avoided whenever possible. Where high-risk sites cannot be avoided, state-of-the-art design and construction practices will be used.

Tillamook District is aware of the increase of recreational users on the forest road system. This use comes from OHV, hunting, fishing and sight-seeing. As part of the roads and recreation management there are on-going efforts to improve and maintain road signage, update maps and improve communication with recreational users of active harvest operations.

Table 3-6. Road Activities for the Tillamook District from Fiscal Year 2002 through Fiscal Year 2011, by Road Classification and Miles

	Low Use	Medium Use	High Use
Current Miles of Road	487 miles	518 miles	219 miles
New Road Construction	20 – 30 miles	20 – 30 miles	5 - 10 miles
Road Improvement ¹	200 - 300 miles	150 - 250 miles	100-200
Road Closure and Vacation	25 – 50 miles	25 – 50 miles	0
Estimated Miles of Road in 2010 ¹	682 – 767 miles	663 – 748 miles	324 – 429 miles

1. Same section of road may be improved more than once during this planning period (brushing, surfacing, or drainage structure upgrades). Therefore, total road estimates are expected to be **1,400 to 1,600** miles at any one time on the district.

Recreation

Specific recreation projects and program direction are provided in detail in the *Tillamook State Forest Recreation Action Plan 2000*, a ten-year action plan, to guide development.

This implementation plan describes specific recreation projects and actions for the next three to four years, and general program direction for the ten-year period. Review **Basin Descriptions** for more information on planned recreational management.

For the next ten years, recreation management in the Tillamook District will focus on maintaining and rehabilitating existing facilities; addressing resource concerns; and developing new recreation opportunities, including new trails, trailheads, and staging areas. To expand and maintain the program, the recreation staff plans to increase volunteer support and the use of alternative labor sources such as Oregon Youth Authority crews and Oregon Youth Conservation Crews. Although alternative labor sources are an important contribution, they are supplemental only. Continued maintenance and construction support from South Fork Camp is vital for the program's future.

Public Safety and Law Enforcement

Increasing communication with recreational users is a top priority to address public safety concerns. A few of the actions to improve communication are distributing notices, and newsletters addressing locations of active forest operations and other events as well as posting information at trailheads and campgrounds. Work is planned to identify cell phone access sites, improve communications with camp hosts, trail patrol, and law enforcement. Efforts improving road signs, maps, and brochures are on-going.

During summer months three full-time Tillamook County Sheriff's deputies enforce public use laws on the state forest, through an intergovernmental agreement. Two deputies work during winter months. Expanded law enforcement coordination is occurring with officers from Washington and Clatsop County Sheriff's Office. A review of timing and location of officer patrols is a priority to focus patrol in the forest during short periods of high use such as holiday weekends and spring break.

Aquatic Resources: Stream Enhancement Projects

Stream enhancement projects will be accomplished in accordance with the *Oregon Plan*, following the *North Coast Stream Project Guide to Restoration Site Selection Phase II*, (ODFW, June 1997) and in consultation with the ODFW. The Department of Forestry funds an ODFW biologist to provide technical input on timber sales and planning coordination of restoration projects.

On the Tillamook District, many fish passage and stream restoration projects have been accomplished over the last ten years. These projects have focused on the South and East Forks of the Trask River, Edwards Creek, Anderson Creek, Kilchis River, and Miami River, as well as several smaller streams. These projects have either been associated with timber sales or funded by grants combined with budgeted matching funds.

Future projects will be high priority instream and riparian restoration work. Beyond 2001, the Department of Forestry anticipates that at least one large instream project will be completed each year for the next several years. Basins that will receive future work include the Trask, the Kilchis, and the Lower Nehalem. Additional, smaller projects may be done in the Tillamook and Nestucca basins.

Preservation and enhancement of complex, properly functioning aquatic habitats will continue to be a high priority. Active restoration projects will be implemented where appropriate to accelerate natural processes. Upland management activities will be designed to protect aquatic resources.

The district will also implement the action items identified in the *Tillamook Bay National Estuary's Comprehensive Conservation and Management Plan for Tillamook Bay, Oregon* (1999). These actions include reducing erosion and sedimentation as well as fisheries projects.

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 assess aggregate rock sources where adequate sources for future management are not currently identified. The district will also assess the amount and quality of rock present at identified sources. 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.

Currently the district is developing land exchange plans with Longview Fibre and ODFPR. The district would receive 1,583 acres from Longview Fibre in Cook Creek and Salmonberry. The district would also receive 359 acres from State Parks along the Wilson River. Longview Fibre would receive 200 acres in the Short Sands basin.

Other land exchanges are being developed in the Salmonberry subbasin and with the Forest Service in the Nestucca and Little Nestucca basins.

Scenic Resources

The district will carry out the following activities:

- Complete the mapping of high sensitivity areas using the criteria detailed in the strategies and the FLMCS guidelines.
- Identify and map moderate and low sensitivity areas using the criteria in the strategies.
- Prior to completion of moderate and low sensitivity areas mapping, areas not initially identified as high sensitivity will be evaluated at the time of a proposed operation (with 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 AOP will include an evaluation of the potential visual impacts and a description of the landscape and/or stand-level prescriptions 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 3-7) 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*.

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.

Table 3-7. Tillamook District Endangered, Threatened or Candidate Plant Species

Genus	Species	Subspecies	Common name¹	Status	Record exists²	Potential to be present
Threatened and Endangered Plants						
<i>Cordylanthus</i>	<i>maritimus</i>	<i>palustris</i>	Salt-marsh bird's beak	SE		✓
<i>Erythronium</i>	<i>elegans</i>		Coast Range fawn-lily	ST	✓	
Plants of Special Concern						
<i>Castilleja</i>	<i>chambersii</i>		Chamber's paintbrush	SP		✓
<i>Dodecatheon</i>	<i>austrofrigidum</i>		Frigid shootingstar	SP	✓	
Candidate Plants						
<i>Cardamine</i>	<i>pattersonii</i>		Saddle Mt. bittercress	SC		✓
<i>Filipendula</i>	<i>occidentalis</i>		Queen-of-the-forest	SC	✓	
<i>Saxifraga</i>	<i>hitchcockiana</i>		Saddle Mt. saxifrage	SC	✓	
<i>Sidalcea</i>	<i>hirtipes</i>		Bristly-stemmed sidalcea	SC	✓	

¹Plant names in bold are on the NW FMP list of plants.

²Plants have been observed on or in close proximity to state forestlands.

Status:

- SE – State Endangered
- ST – State Threatened
- SC – State Candidate
- SP – Special Concern

In addition, the district will contribute to statewide efforts to reduce the quantity and range of invasive, non-native plant species. Noxious weeds are controlled through two methods at this time. Tansy ragwort is controlled through biological methods with an introduced cinnabar moth (*Tyria jacobaeae*). Chemical application through roadside spray and site preparation are the largest effort to control Canada thistle in conjunction with using native seed mixtures on areas of disturbed soil. Other plant species are listed as “noxious” in the county and ODF will continue to work to control these weeds when they are found on state land.

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 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

In the regional context of northwestern Oregon, the Tillamook District contains two-thirds of the Tillamook State Forest and a small portion of the Clatsop State Forest, which combine to form the largest contiguous ownership in the area. The district is adjacent to private and federal forest lands as well as other state forest districts.

The development of the landscape design is a broad-scale, long-term endeavor. The design is a vision of the desired future condition for the array of stand structures over the district landscape. To achieve the design, a variety of silvicultural prescriptions will be applied to a diverse area of forest stand types.

Past forest management sometimes aimed at goals different from the desired future condition (DFC) now envisioned. Therefore, as the landscape design principles are applied to the forested landscape, current stand condition is not always the primary factor for developing the desired future condition stand structure array. Some past management created simpler stand conditions by cutting snags, salvaging down wood or reforesting with a single species. As outlined in *the Northwest Oregon Forest Management Plan* (page 4-47) a variety of resources and conditions are considered when creating a vision of the Landscape Design.

Two factors will have significant influence on the timing and development of the landscape design and management of individual stands for complex types. They are (1) the severity of SNC infection, and (2) the off-site seed sources. Stands less affected by SNC may be managed to develop into complex stands, using density management to continue fast growth. Severely affected stands may be clearcut or rehabilitated using silvicultural practices such as light thinnings, shelterwood cuts, and patch cuts. These techniques would retain portions of existing stands, favoring shade-tolerant species like hemlock or cedar. As new information becomes available on the long-term effects of SNC, stand treatments may change through adaptive management. The impacts of SNC will be the foremost consideration to continue growing existing stands or to clearcut the stand and reforest with a mixed species stand. The interaction of SNC and off-site seed sources is unknown at this time. The concern is that one or the other factor may stress stands and the interaction will further slow growth or kill stands of Douglas-fir.

The district is working to retain as many opportunities as possible to develop DFC complex. Keeping these options is accomplished at the AOP level by retaining current stands on the landscape, components of existing stands (snags, down wood or green tree retention) or focusing clearcut management first in stands where SNC impacts are severe. Since the forest composition is dominated by single species and narrow age range, it can be said that all existing stands are being managed for DFC complex until something occurs or develops to take the stand off that pathway. Examples of conditions, which would take stands off the pathway to DFC complex, are SNC, slowed growth or large scale windthrow. These decisions are made on a stand by stand basis. By keeping stands on the landscape as long as possible, future managers will have more options to make decisions for landscape design.

However, it is recognized that due to the extent and severity of SNC in the forest, the REG level will be 18-20% across the district in the short term (10-15 years) and over 25% in some basins for short periods of time (5-10 years).

The district's vision is described below for the future development of complex stands on the landscape. The DFC complex structures shown on the display titled Desired Future Conditions (in the **Map Section**) are stands that have the potential to move most quickly toward complex structure. The stands shown are just one example of possible DFC complex arrangement on the landscape. During the next 10 years, approximately 20 percent of the district will be actively managed. All the current LYR and OFS structures currently on the district will be retained.

The first priority is to manage multiple species stands, shade tolerant hemlock stands, and stands with low levels of SNC on high site ground. These stands should move quickly to DFC complex. Some of these stands have already had one partial cut entry and understory development has begun. Second entry thinnings will be needed to continue vigorous growth and development of the understory. These stands will cycle between closed single canopy and understory until the second cohort develops into significant layering, probably after a second partial cut entry. Openings 1 to 10 acres in size may be created in these stands to allow the understory to develop into a LYR stand while edge trees may develop large limbs and deep crowns.

Second, the district has targeted those areas or stands where multiple resources are being managed for DFC complex. An example is an area in the North Fork Nehalem basin where there are MMMA's, NSO Activity Center, and connectivity concerns between districts. These stands will be managed through light thinnings or partial cuts and fewer entries. Many of these stands are older with multiple tree species. Not all stands in the T&E sites were included in DFC complex display. This decision was based on impacts from SNC where it is not known if the stands will continue to grow or decline and die. Some areas, which are unmanaged and not currently available for management due to T&E species, are part of a pool of candidate stands for future monitoring and research projects. Some have already developed complex stand characteristics, while others are in CSC and would improve with density management.

The third priority to develop complex structures is single-species Douglas-fir stands. These stands comprise the majority of the district, and are affected by SNC at different severity levels. Stands with moderate to severe symptoms of SNC (less than 2 years of needle retention) are not expected to develop into LYR and OFS stands. In these stands, growth has slowed too much to expect a response to thinning, and these stands may be targeted for clearcut. Sometimes the quickest way to achieve DFC complex in these stands is to clearcut and reforest with mixed species stands. Over time, the stands with low to moderate needle cast infection will be most of the UDS and CSC structures on the landscape. The district is completing first entry thinnings in many of these stands, but the crowns are small and growth responses are slow due to SNC. Growth expectations for these stands are uncertain, and second entries are questionable.

Finally, there are stands on low quality sites or in inaccessible areas. Some of these stands are poorly stocked with open-grown trees. The individual trees have large limbs and deep crowns but grow very slowly. These stands are expected to develop into larger diameter

trees with a component of shrub understory and are considered a unique habitat type on the district. Other sites, which are inaccessible and on steep slopes are more densely stocked and will take a much longer time to reach DFC complex with no active management.

The landscape design and management decisions consider adjacent landowners. For example, in the Nestucca and Little Nestucca basins, scattered state parcels will be managed for timber production. Within the USFS and BLM forest lands, much of the area has been designated as Late Successional Reserve (LSR) and Adaptive Management Areas (AMA). The state contribution to more complex stands in these areas would not be significant. On the other side, less REG structure may be planned for state forest lands adjacent to industrial private land like the Tillamook River basin. Nearly, all private industrial forest lands are on shorter rotations and are predominantly REG or CSC structure. These approaches address the Board Intent Statement Number 17,

“State forests will contribute to ecological goals at the landscape level without assuming responsibility for mitigation of the effects of management on other ownerships.”

The regeneration structure or creation of open conditions will come mainly from SNC infected Douglas-fir stands and to a lesser extent from hardwood stands. Clearcuts will usually retain conifer other than Douglas-fir, some hardwood (in draws and riparian areas), and some of the largest trees (at least 2 to 4 trees per acre), which will provide a future source of snags, down wood or large remnant conifer in future stands. Selected hardwood stands will be stands that were aerially treated with herbicides in the 1960s and 1970s and have developed into trees with short boles with many limbs or tops. There may also be opportunities to create openings where deformed hardwoods are intermixed with conifer.

The LYR and OFS patch sizes will mostly be 40-260 acres size classes. See the *Northwest Oregon State Forest Management Plan* (page C-32) for discussion of interior habitat patch size and frequency distribution. When the example map was developed, emphasis was on connectivity across district lines and through the forest. Therefore, the future desired complex habitat look like large areas on the map. However, not all areas in the planned complex habitat will develop into complex stands at the same time. Other areas on the example map may be clearcut if stand health continues to decline due to off-site seed sources, SNC, or other causes. The desired future condition map will be updated over time to reflect on-the-ground changes.

Management Basins

Management Basins Overview

Management basins have been designated by using the fifth order watersheds as defined by the OWRD. This approach identified nine major basins: North Fork of the Nehalem, Lower Nehalem, Miami, Kilchis, Wilson, Tillamook, Trask, Nestucca, and Little Nestucca. Two other basins were also identified: the Tillamook Bay basin, which flows into Tillamook Bay; and the Short Sands Basin, which flows into the ocean. The major basins are further divided into sub-basins in the **Basin Descriptions** section. The following table summarizes basic information about the basins, listed from north to south.

Table 3-8. Tillamook District Planning Basins

Basin	Acres	Percent of District
North Fork Nehalem	7,390	3
Lower Nehalem	58,236	23
Short Sands	309	0.1
Miami	13,921	6
Kilchis	34,846	14
Tillamook Bay	1,950	0.7
Wilson	65,723	26
Tillamook River	3,465	2
Trask	56,387	22
Nestucca	7,493	3
Little Nestucca	791	0.2

Basin Descriptions

North Fork Nehalem Basin

The basin has a total of 17,961 acres, with state forest land consisting of 7,390 acres (41 percent of the basin) in two parcels. The two parcels of state land are adjacent to private industrial forest ownership and are separated by the North Fork of the Nehalem River and agricultural land in the river floodplain.

State Forest Land in the Basin

There are 55 miles of road in this basin. The Coal Creek sub-basin is accessed by Coal Creek Road. County Line Road and God's Valley County Road access the God's Valley and Acey Creek sub-basins. Marbled murrelets, NSOs, and bald eagles have been observed in the basin. There is one large Type F stream, Coal Creek, within the state-owned portion of the basin. This stream and others make up the 7 miles of Type F streams in the basin. A SAH is located along Coal Creek.

The basin's stands are predominately Douglas-fir and hemlock. Most stands are either plantations less than 40 years old, or naturally regenerated stands more than 50 years old. Past management consisted of planting, release, precommercial thinning, pruning, partial cutting, and clearcut. The basin is currently fragmented by past management, with some larger blocks of mature mixed conifer. Severe SNC has been identified on over 50 percent of state land in the basin.

Recreation activity in the basin has been mainly hunting, dispersed camping, mountain biking, and scenic driving. ODF, in cooperation with the ODFW and the Oregon Hunters Association, signs about 30 percent of the roads in the God's Valley Area as closed to vehicle traffic during the general deer and elk rifle season. The North Coast Travel Management Program is intended to improve the hunting experience, decrease road damage, and improve big game escapement.

Table 3-9. North Fork Nehalem Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	5	65	29	1	0	0
Post Implementation Plan Condition ¹	15	44	40	1	0	0
Desired Future Condition ⁴	10	15	25	25	25	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50-80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Approximately 50 percent of state land in the basin is showing severe symptoms of SNC.
- Marbled murrelet habitat is designated on 1,397 acres; buffers influence an additional 2,576 acres.
- An NSO Activity Center is designated in the basin: North Rector Ridge Pair Site.
- A bald eagle nesting site was identified in the western portion of the ownership in 1996. The site has not been occupied from 1997 to 2000.
- Core coho salmon areas are located within this basin. An SAH has been designated on 1,348 acres of Tillamook District along Coal Creek.
- Six domestic water sources are located on or within 100 feet of state forest land.
- Portions of state-owned land within the basin are visible from the city of Nehalem and approximately 1.5 miles of state forest land borders Highway 53; this land has a visual sensitivity rating of 2. Some ridge tops on the western edge of state forest land are visible from Highway 101 as well.
- Trail development will be ¼ mile away from T&E species habitat areas.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 615-885 acres of partial cut and 550-785 acres of clearcut will take place. The North Fork Nehalem Basin will provide a range of habitat types, with complex habitats generally less than 500 acres. The basin will be fragmented, with complex habitats located in the mixed conifer stands more than 50 years old that are suitable for long-term retention, and in vigorous mixed conifer stands. Mixed conifer stands currently in CSC will be targeted for density management harvests to move them to UDS and LYR stands.

Regeneration structures over the next 10 years will come mainly from stands less than 50 years old severely infected by SNC. Other candidates for regeneration structures will come from hardwood harvest in conjunction with SNC infected stands. The SAH designation in Coal Creek is not expected to impact management in the sub-basin since most of the basin has already been treated.

Road construction/improvement — Mainline roads are established in the basin, and most road work will be improvement of drainage structures and road surfaces. Some construction of short, low use, spur roads may be necessary to access timber sales.

Recreation — The basin was designated for non-motorized development in the 1993 *Tillamook State Forest Comprehensive Recreation Plan*, and the *Non-Motorized Trail Plan* (ODF, March 2001) calls for focused mountain bike trail development in the basin. Five miles of trail is planned in the Coal Creek sub-basin, and the construction of a primitive trailhead. Planned trails will stay at least ¼ mile away from T&E habitat areas. A non-motorized trail accessing a giant spruce off Rector Ridge Road is also planned.

Recreation management activity will focus on non-motorized trail development, management of impacts from hunting activity and dispersed camping, and continued participation in the ODFW North Coast Travel Management Area. The rolling terrain, moderate grades, and proximity to Highway 101, Nehalem Bay State Park, and Oswald West State Park make the area suitable for this development. Development of a river corridor plan is also a priority.

Lower Nehalem Basin

The basin has a total of 88,593 acres; state forest land consists of 58,236 acres (66 percent) of the total. The western portion of the basin is privately owned.

State Forest Land in the Basin

Access to the basin is by way of Foss, Miami-Foley, and God's Valley county roads. There are 300 miles of road in this basin. Access to the southern portion of the Cronin Creek sub-basin and the northern portion of the Salmonberry is not secured at this time. The basin has opportunities for exchange or acquisition of several hundred acres.

State forest land has 77 miles of Type F streams. The basin contains several sub-basins: Foley Creek, Lost Creek, Cook Creek, Cronin Creek, and Salmonberry. The Salmonberry is an important wild fish stream. SAHs have been designated on Foley Creek, Cook Creek and South Fork Salmonberry River. MMMA and NSO Activity Center have been designated north of the Nehalem River.

Most stands in the basin are Douglas-fir with an alder component. Hemlock stands are present along the western part of the basin and at higher elevations. The Lost Creek and Cook Creek sub-basins are predominately 25- to 45-year-old planted or seeded Douglas-fir stands. The remaining sub-basins are predominately naturally regenerated mixed conifer stands 50 years and older. In the last decade harvests have been distributed throughout the basin and have consisted mainly of partial cuts. Approximately 20 percent of ODF ownership in the basin is showing severe symptoms of SNC.

Recreation attractions include Nehalem Falls Campground, river access to the Nehalem River, dispersed camping along Cook Creek and the Nehalem River, and high scenic viewpoints such as Foley Peak, Pinochle Peak, and Lost Creek Ridge. The main recreation activities are dispersed camping, hunting, fishing, limited hiking, and day-use activities such as swimming, and kayaking in the spring and fall. A moderate level of OHV use occurs in the Cook Creek sub-basin and is generally associated with dispersed camping and hunting activity. Currently management focus limits OHV use to maintained forest roads and a limited network of old roads, firebreaks, and trails. The Salmonberry River is an important fishing area and is reached by hiking the Port of Tillamook Bay railway tracks.

Table 3-10. Lower Nehalem Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR	OFS	NSC
Current Condition	3	89	5	1	1	1
Post Implementation Plan Condition ¹	11	67	19	1	1	1
Desired Future Condition ⁴	10	15	25	30	20	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50-80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Approximately 20 percent of ODF ownership in the basin is showing severe symptoms of SNC.
- The northeast portion of the basin has limited road access. ODF is attempting to obtain a 5 year temporary easement for access to Burma Road.
- Marbled murrelet habitat is designated on 554 acres; buffers influence an additional 2,076 acres.
- An NSO Activity Center has been designated as the Helloff Creek Pair Site.
- Core coho salmon areas are located within this basin, and the Salmonberry is managed as an important wild fish stream. SAHs are designated on Foley Creek, Cook Creek and South Fork Salmonberry River encompassing 25,504 acres of Tillamook District.
- Twenty-five domestic water sources are located on or within 100 feet of state forest land.
- Numerous dispersed campsites are located in riparian areas. Road conditions and human waste may affect water quality.
- There are impacts from unauthorized OHV trail construction, primarily associated with hunting activity.
- Trail development will be ¼ mile away from T&E species habitat areas.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 5,440-7,770 acres of partial cut and 3,650-5,215 acres of clearcut will take place. The basin will provide a range of habitat types, with complex habitats ranging from larger than 2,000 acres to less than 100 acres. In the northeast part of the basin, current stand characteristics provide opportunities for large complex habitat; some of these stands also have limited management opportunities due to difficult access. The conifer stands in the Cook Creek and Lost Creek sub-basins are in CSC, and will be targeted for density management to move the stands to UDS and LYR.

Regeneration structures will come from harvesting hardwood-dominated stands, dense unmanaged conifer stands, and Douglas-fir stands severely impacted by SNC. The SAH designation in the South Fork of the Salmonberry is not expected to impact management during the planning period since most opportunities are partial cuts. The SAH in the Cook Creek sub-basin is not expected to impact management since many stands are hardwood, which is not a priority for clearcut harvest during this planning period, and the Foley Creek SAH is designated in areas of difficult access.

Road construction/improvement — Most mainline roads are established in the basin, and road work will be improvement of drainage structures and road surfaces as necessary on these mainline roads. Some new construction of short, low use, spur roads may be necessary to access timber sales.

Portions of the basin have very difficult or limited access. Access to the southern portion of the Cronin Creek sub-basin and the northern portion of the Salmonberry will require new road construction from the east or acquiring an easement across private property to use Burma Road from the west. A major road improvement project in the basin is the North Fork Cronin Creek Road, which accesses the eastern portion of the basin. This road has not been used for harvest in over 20 years, and is planned for improvement for harvest activities.

Recreation — Recreation management will focus on maintaining and improving Nehalem Falls Campground, improving dispersed campsites and river access points to reduce water quality impacts, designation and rehabilitation of a limited system of existing OHV trails, and non-motorized trail construction. Development of a river corridor plan is an overall priority. Details may be found in the updated *Tillamook State Forest Recreation Action Plan 2000*.

Short Sands Basin

The basin has a total of 3,203 acres; state forest land consists of 309 acres (10 percent). The Short Sands Basin drains into the Pacific Ocean. The western portion of the basin is owned by the ODP, and the majority of the private land is industrial forest land.

State Forest Land in the Basin

Short Sands Basin contains 309 acres in two tracts. The western tract is 109 acres adjacent to Oswald West State Park. The trees range from 65 to more than 100 years old; there is a

conifer stand with some hardwoods. This parcel is special stewardship, park buffer and may eventually be exchanged to the ODPR. The stands in the 200-acre eastern tract are conifer and range in age from 17 to 50 years. This parcel is part of a proposed three-way land exchange involving the ODF, ODPR, and the Longview Fibre Company.

No recreation management is directed toward this basin at this time. Use of the basin consists primarily of hikers and mountain bikers in the western parcel and hunters in the eastern parcel.

Table 3-11. Short Sands Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR	OFS	NSC
Current Condition	0	57	16	15	12	0
Post Implementation Plan Condition ¹	0	57	16	15	12	0
Desired Future Condition ⁴	25	40	0	0	35	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Over 30 percent of ODF ownership in the basin is showing severe symptoms of SNC.
- Core coho salmon areas are located within this basin.
- State land in T3N, R10W, Section 7, adjacent to Oswald West State Park, is designated as Special Stewardship.

Desired Future Condition and Landscape Design

Harvest — Most state forest land in T3N, R10W, Section 7, abutting Oswald West State Park, is not planned for harvest. This parcel is planned for land exchange with ODPR. No harvest is anticipated in this basin during the planning period.

Road construction/improvement — Road work for the basin will be minimal, mainly consisting of road maintenance. No new roads are proposed for this basin.

Recreation — Recreation management in the basin will be minimal and will focus on management of impacts from hunting, hiking, and mountain biking use.

Miami Basin

The basin has a total of 23,053 acres; state forest land consists of 13,921 acres (60 percent). The lower basin is adjacent to private industrial forest land and agricultural land in the Miami River floodplain.

State Forest Land in the Basin

Access to the basin is by Highway 101 and the Miami Foley County Road. There are approximately 75 miles of road in this basin. There is also steep, difficult access on approximately half the basin. There are approximately 19 miles of Type F streams crossing state forest land. A SAH has been designated in the basin. Portions of the state land in the lower basin are visible from Garibaldi and Highway 101. Marbled murrelets occupy several sites in the lower basin and NSO Activity Centers are located in the upper basin. Approximately 7 percent of the basin is Common School Forest Land.

The basin's forest is predominately 25- to 55-year-old Douglas-fir stands with a component of hemlock and spruce. Approximately 30 percent of ODF ownership in the basin is showing severe SNC symptoms. Hardwood stands comprise 20 percent of the basin. Some of these are in riparian management areas; there are also large contiguous acres of hardwoods in the upper basin. Patches of older trees are located primarily in the basin's lower portion.

Recreation use in the Miami Basin is primarily hunting, dispersed camping, fishing, moderate OHV use, and limited mountain biking on the road system. Several camping sites are located along the Miami River. OHV use is generally confined to active and abandoned roads.

Recreation management has focused on mitigating the impacts from summer and hunting season dispersed camping, and discouraging unauthorized OHV trail construction. Regular patrol has reduced the incidence of long-term camping and the impacts from litter and human waste. The Department of Forestry has physically blocked some of the OHV trails.

Table 3-12. Miami Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	3	90	2	4	1	<1
Post Implementation Plan Condition ¹	10	78	7	4	1	<1
Desired Future Condition ⁴	10	15	25	25	25	<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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Severe SNC has been observed on approximately 30 percent of state ownership in the basin.
- The portion of the upper basin adjacent to the Kilchis Basin has limited road access opportunities due to terrain.
- Two NSO Activity Centers have been designated in the basin. One center is a pair and the other is resident single.
- Marbled murrelet habitat is designated on 280 acres; buffers influence an additional 1,341 acres.
- Core coho salmon areas are located within this basin. A SAH encompasses all state forest land in the basin.
- Six domestic water sources are located on or within 100 feet of state forest land.
- Approximately 500 acres are visible from Highway 101 and the city of Garibaldi, and have a visual sensitivity level of 1. A visual sensitivity rating of 2 is given to state forest lands near the Miami Foley County Road.
- Trail development will be ¼ mile away from T&E species habitat.
- Unauthorized OHV trail use has pushed into areas zoned for non-motorized use.
- Dispersed campsites along Miami River may impact water quality.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 600-885 acres of partial cut and 820-1,170 acres of clearcut will take place. This basin will provide a range of habitat types, with complex habitat areas generally less than 500 acres. The resource considerations above direct the landscape design. LYR and OFS structures will be located in mixed conifer and hardwood stands suitable for long-term retention, in areas designated as MMMA's and owl activity centers, and in visually sensitive areas.

Regeneration structure will be created by harvesting hardwood stands, stands affected by SNC, and stands in the upper basin with limited intermediate management options because of limited access opportunities. This SAH designation in conjunction with other resource considerations decreases management (clearcut) opportunities in this basin during the planning period.

Road construction/improvement — Road work in this basin will mainly be road improvement on the Miami Forest Road, and other roads as necessary to access timber sales. New road construction in this basin will be limited to low use roads to access sale areas; the roads will be considered for closure after the sale is done.

Recreation — Recreation management will be focused on maintaining and improving the dispersed camping opportunities, limiting OHV use to existing roads, closure of OHV trails, and non-motorized trail construction. Development of a river corridor plan for the Miami is planned. Details may be found in the *Tillamook State Forest Recreation Action Plan 2000*.

Kilchis Basin

The basin has a total of 41,581 acres, with state forest land consisting of 34,846 acres (84 percent). Kilchis County Park is located in the basin and surrounded by state forest lands.

State Forest Land in the Basin

Most access is by Kilchis Forest Road. The basin contains approximately 150 miles of road. Sub-basins include Clear Creek, Little South Fork, Sam Downs South Fork, and North Fork. The basin also has 57 miles of fish-bearing streams. An SAH has been designated in the Middle Kilchis River sub-basin. Common School Forest Land in the lower basin is influenced by an owl cluster and designated marbled murrelet habitat. Stands adjacent to the Kilchis River have deed restrictions that limit or exclude harvest activity to develop structure. Much of the Clear Creek drainage is managed by the BLM and is designated as LSR and RPA for owls.

The forests in the upper and lower basin are generally in distinctly different age classes. Over 60 percent of the basin's stands are in the 26- to 45-year age class. Most of these stands are pure Douglas-fir with over 20 percent showing severe symptoms of SNC. The lower basin contains stands of spruce and hemlock from 80 to over 100 years old.

The Kilchis Basin receives heavy recreation use and is a popular destination for local communities. The basin is rugged and features the Kilchis Falls and the remote Sawtooth Ridge area. The South Fork of the Kilchis is the most remote area of the Tillamook State Forest. Recreation activities include hunting, fishing, drift boat and kayak use, swimming, dispersed camping, hiking, OHV use, mountain biking, and scenic driving. Recreation management has focused on management of dispersed camping impacts. The area is designated for non-motorized trail development.

Table 3-13. Kilchis Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	6	80	4	5	4	1
Post Implementation Plan Condition ¹	13	72	5	5	4	1
Desired Future Condition ⁴	15	20	10	30	25	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Over 20 percent of ODF ownership in the basin is showing severe symptoms of SNC.

- The stands in the upper basin are dominated by dense Douglas-fir stands. The stands in the lower basin are older, mixed species stands in UDS, LYR, and OFS structures located adjacent to BLM Late Successional Reserve.
- The upper basin has limited road access.
- Marbled murrelet habitat is designated on 406 acres habitat in the basin; buffers influence an additional 382 acres.
- An NSO cluster (Kilchis Cluster) is centered in the basin with a historic spotted owl site. This designation covers approximately 5,976 acres of the basin.
- Core coho salmon areas are located within this basin. The Middle Kilchis River SAH encompasses 14,154 acres of state forest.
- Ten domestic water sources are located on or within 100 feet of state forest land.
- Bay City municipal water wells (groundwater wells) are located in the basin.
- Deed restrictions on lands adjacent to the Kilchis River include county and state lands designated for park and recreation use.
- Trail development will be ¼ mile away from T&E species habitat.
- Challenges to building trails are steep slopes, large stream crossings, and T&E species.
- Unauthorized OHV trail construction threatens remote areas of the basin.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 285-405 acres of partial cut and 2,115-3,015 acres of clearcut will take place. An owl cluster, designated marbled murrelet habitat, county and state lands with county park and other deed restrictions are located in the lower basin. This area is also adjacent to BLM's LSR. State land management objectives and the management of adjacent BLM land make the lower basin viable for developing LYR and OFS stands for long-term retention. The complex habitat on state land will be over 1,000 acres in size, and when combined with BLM ownership the complex habitat may be over 5,000 acres.

The short-term focus for the upper basin is to create REG and UDS structures, because current forest types are simple, access is limited, and the impact of SNC infection is severe to moderate. Clearcut or small patch cuts where Douglas-fir can be removed and other conifer retained, or heavy thinnings, will be used to manage many of these stands. Partial cutting will be carried out in some stands where density management would be beneficial (hemlock or mixed species stands), and symptoms of SNC are low to moderate. Management opportunities in this basin will fall into the later portion of the planning period due to difficult access and low economic benefits of timber harvest in small diameter stands. Therefore, the SAH designation is not expected to impact management either.

Road construction/improvement — There is little opportunity for operations in this basin for the first five years of this planning period, due to the age class distribution and access concerns. Due to road access costs in this basin, much of the short-term management will be completed along existing roads or where road improvement costs are low. Road construction and most improvement will be completed only to access timber sales. Spur roads built for

timber sale access will be considered for closure after completion of use. Portions of Sam Downs and White Creek roads will be closed and vacated.

Recreation — Emphasis will be on management and rehabilitation of dispersed camping sites, closure of unauthorized OHV trails development of non-motorized trails, and redirection of target shooting to appropriate areas. Development of a river corridor plan for the Kilchis River is planned. The presence of T&E species requires careful consideration of trail routes. Details may be found in the *Tillamook State Forest Recreation Action Plan 2000*.

Tillamook Bay Basin

The basin has a total of 13,202 acres, with state forest land consisting of 1,950 acres (15 percent) that drain directly into Tillamook Bay. This basin is not based on a 5th order watershed but contains the smaller creeks like Electric Creek, Patterson Creek and Doty Creek and lower portions of the Miami, Kilchis, and Wilson.

State Forest Land in the Basin

Access to the basin from Highway 101 is by Patterson Creek and Electric Creek roads. There are 15 miles of road in this basin. There are approximately 3 miles of Type F streams on state forest land in this basin. Electric Creek, Patterson Creek, and Larsen Creek are the major streams draining this area.

Most of the forest stands are between the ages of 30 to 60. There are some older hemlock stands with a spruce component; these stands have marbled murrelet nesting sites and one bald eagle nest site. About 65 percent of ODF ownership in the basin is showing severe symptoms of SNC. REG structure currently makes up 19 percent of the basin.

Recreation use in the Tillamook Bay Basin consists primarily of hunting, OHV use, target shooting, scenic driving, and some limited mountain biking use. The basin's close proximity to local communities contributes to a host of problems, including trash dumping and abandoned vehicles.

The basin is designated for limited motorized use in the *Tillamook State Forest Recreation Action Plan 2000*. OHV activity in the basin has been concentrated on the western portion adjacent to Bay City. The limited trail system is in poor condition. Soils in the western portion of the basin have a high clay content and are prone to compaction and erosion. The motorized/non-motorized designation for this area is being reviewed.

Hunting use is high. Target shooting occurs year-round at landings, dead-end spurs, rock pits, and stockpiles. Trash and targets left behind by shooters are an issue. Local mountain bikers use the road system.

Table 3-14. Tillamook Bay Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	19	59	10	4	8	0
Post Implementation Plan Condition ¹	21	34	33	4	8	0
Desired Future Condition ⁴	10	15	25	30	20	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Severe SNC symptoms have been identified on about 65 percent of ODF ownership in the basin.
- REG structure currently make up 19 percent of the basin.
- Marbled murrelet habitat is designated on 391 acres and buffers influence an additional 547 acres.
- Bald eagle nest site is present.
- Core coho salmon areas are located within this basin.
- Eight domestic water sources are located on or within 100 feet of state forest land.
- Land in the immediate vicinity of Garibaldi, Bay City, and Tillamook Bay has a visual sensitivity rating of 1.
- Soil compaction and erosion is occurring from OHV use.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 280-400 acres of partial cut and 10-100 acres of clearcut will take place. Small patches of LYR and OFS will be maintained and developed throughout the basin, in order to protect marbled murrelet habitat and the bald eagle nest site. The complex habitat will tie into the areas with visual concerns. Some regeneration structure will be developed through harvest of Douglas-fir severely infected with SNC. However, many of the SNC stands contain enough other conifer (spruce, cedar, and hemlock) that removal of the Douglas-fir will leave most of the area as a partial cut with at least 35 to 40 square feet of residual basal area per acre. These stands will contain a mixture of ages, densities, and species, helping to create future UDS and LYR stands. Regeneration structures in the basin should top out at 25 percent and will then reduce to 15 percent. Thinning will be carried out in wind-firm stands of conifer where density management will be beneficial.

Road construction/improvement — Most mainline roads have been built or approved in the last 10 years. Therefore, road work in this basin will consist of road improvement as necessary when accessing timber sales. New road construction will be limited to a few low use roads to access sale areas; these roads will be considered for closure after the sales are done.

Recreation — Recreation management will concentrate on curbing illegal dumping and inappropriate target shooting, and development of limited mountain bike trails. Details can be found in the *Tillamook State Forest Recreation Action Plan 2000*.

Wilson Basin

The basin has a total of 77,830 acres, with state forest land consisting of 65,723 acres (84 percent). Other forest lands in the basin include industrial and non-industrial forest lands, and BLM lands.

State Forest Land in the Basin

Wilson is the largest basin on the Tillamook District and main access is via Highway 6. The basin has approximately 350 miles of road, and the main access to the basin is Highway 6. The roads with the most recreational use are Kansas Creek, Hembre Ridge, Fox Creek Ridge, Jordan Creek, Cedar Creek, Diamond Mill, and Cedar Butte roads. Over the past 5 years, partial cutting has dominated operations in the basin and many of the roads have been improved.

There are 6 large fish-bearing streams totaling 65 miles; N. Fork Wilson, Ben Smith, Cedar Creek, Jordan Creek, Little North Fork Wilson, and mainstem Wilson River. SAHs have been designated in the Little North Fork Wilson, Cedar Creek, and Ben Smith sub-basins. Portions of an NSO cluster (Kilchis Cluster) are located in the lower basin and an NSO Activity Center is on BLM ownership in the lower basin influencing state land management. An MMMA is also located in the basin.

Most stands in the basin are between 35 and 50 years of age and dominated by Douglas-fir or Douglas-fir and alder. Approximately 40 percent of ODF ownership is showing severe symptoms of SNC. Current management consists of hardwood harvest, partial cutting and clearcutting stands severely impacted by SNC. Density management has been carried out on over 5 percent of state forest land.

The Wilson Basin has the most recreation use in the district, including OHV use, camping, hiking, fishing, mountain biking, hunting, swimming, picnicking, kayaking, scenic driving, hang gliding, and para-sailing. Several developed recreation facilities are located in the basin, including Jones Creek Campground, Diamond Mill OHV Area, Jordan Creek OHV Staging Area, and Keenig Creek Campground. The basin has areas zoned for both non-motorized and motorized off-road use.

OHV use is the most popular year-round recreation activity. There are 37 miles of designated, signed OHV trails in the Jordan Creek sub-basin and approximately 40 miles of OHV trails in the Diamond Mill area. Seven to ten organized OHV events are held each year

in the Diamond Mill, Jordan Creek, and Cedar Creek sub-basins. OHV clubs regularly donate volunteer time and resources to install bridges, repair trails, and participate in monthly trail planning meetings.

Jones Creek Campground has over 4,000 registered campers per season. The day-use area remains open year-round and is used by swimmers, picnickers, hikers, kayakers, school groups, and highway travelers. Dispersed camping occurs throughout the basin but is concentrated in the Ben Smith, North Fork, Cedar Creek, and Jordan Creek sub-basins. Law enforcement activity has shifted largely to the dispersed camping areas.

Hiking and mountain biking are increasing in popularity as new trails are constructed and established trails rehabilitated.

Day use is very popular within the basin and is concentrated primarily along the Wilson River. Along the Wilson River, the ODPR owns most river access sites. A land exchange is planned that will transfer these sites to the Department of Forestry. The Wilson River Basin receives considerable fishing use. Fishing is mostly restricted to the main stem.

The Tillamook Ridge area is located close to Tillamook and has a high level of local use, including hunting, hiking, mountain biking, OHV use, hang gliding, and para-sailing.

Table 3-15. Wilson Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR	OFS	NSC
Current Condition	2	72	23	2	<1	<1
Post Implementation Plan Condition ¹	20	55	22	2	<1	<1
Desired Future Condition ⁴	10	15	25	25	25	<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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Severe SNC symptoms have been observed on approximately 40 percent of ODF ownership in the basin.
- There is a portion of an NSO cluster in the lower basin (1,980 acres), and an NSO Activity Center on BLM ownership, which influences a small portion of state forest land.
- There are 271 acres designated as marbled murrelet habitat and buffers influence an additional 184 acres.
- Tributaries to Wilson River are important salmonid spawning habitat. Core coho salmon areas are located within this basin. SAHs are designated in the Little North Fork Wilson

River, Cedar Creek, and Ben Smith sub-basin encompassing 21,123 acres of Tillamook District.

- Twenty-two domestic water sources are located on or within 100 feet of state forest land.
- Approximately 11,000 acres of state forest land are visible from Highway 6 and have a visual sensitivity level of 1.
- There is heavy use of the basin's campgrounds, hiking trails, and OHV trails.
- Dispersed camping threatens water quality at some sites.
- An interpretive center is to be built near Jones Creek.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 730-1,045 acres of partial cut and 9,050-12,930 acres of clearcut will take place. The basin will provide a range of habitat types, from large patches of complex habitat to highly fragmented areas. Large areas of complex habitat will be located in different focus areas, including the Little North Fork Wilson where there is a portion of an owl cluster; the Jordan Creek sub-basin where older, mixed conifer stands already exist; and the Highway 6 corridor. The viewshed from the interpretive center site is part of the Highway 6 corridor. Complex habitat will vary in size from 200 acres to over 2,000 acres.

Regeneration structure will be developed through harvest of conifer stands with severe symptoms of SNC, and small openings in partial cuts. Future partial cut opportunities, in pure Douglas-fir stands, are limited due to SNC. Stands partial cut in the early 1990s will not be available for second entry thinning due to SNC and slowed growth. The Cedar Creek and Ben Smith SAH designation is not expected to impact management during the planning period since there is low percentage of REG structure in the sub-basin, and many of the stands have already been partial cut. The SAH designated in the Little North Fork of the Wilson will limit clearcuts in the sub-basin.

Road construction/improvement — Road construction and improvement will be completed only to access timber sales. The mainline roads will require some upgrades like culvert installation and surfacing. Spur roads built for timber sale access will be considered for closure after use.

Recreation — Recreation management will focus on maintaining and upgrading existing facilities, addressing recreation-related resource concerns, developing new non-motorized and motorized trail opportunities, and increasing volunteer contributions. Specific projects over the next five years are: (1) improving Keenig Creek campground; (2) designation and signing of OHV trails in the Diamond Mill area; (3) improvement of the Diamond Mill OHV Area; (4) trail improvements and upgrades by volunteers, inmate crews, and the SWECO trail machine will be ongoing; (5) continue planning and coordination efforts on the interpretive center; (6) coordinate with State Parks to design and upgrade Wilson River Footbridge for parking, signage and sanitation; (7) improve size of Jones Creek day use area and install restrooms; and (8) develop river corridor plans. Long-term recreation projects will be listed in the *Tillamook State Forest Recreation Action Plan*.

Non-motorized trail construction will continue, along with improvements to existing trails. Improvements to dispersed campsites are planned. Fire grates have been installed at selected popular dispersed sites, and sites have been modified to protect riparian areas and deter site expansion and hardening. Details of projects can also be found in the *Tillamook State Forest Recreation Action Plan 2000*.

Tillamook River Basin

The basin has a total of 38,917 acres, with state forest land consisting of 3,465 acres (9 percent). Most land in the basin is industrial forest land.

State Forest Land in the Basin

The basin contains 25 miles of roads; Munson Creek Road and Simmons Ridge Road are the two main roads. Additional spur roads were built for harvesting operations. Additional work has been completed on the main roads with upgrading drainage structures and surfacing.

An MMMA has been designated in the Southwest portion of the basin. Fawcett Creek and Simmons Creek are large fish-bearing streams. The City of Tillamook Watershed (Skookum Lake) affects approximately 1,500 acres of state forest land.

The stands are dominated by mixed conifer species. Approximately 40 percent of ODF ownership in the basin is showing severe symptoms of SNC infection. Current management is focusing on partial cutting of 40- to 60-year-old hemlock stands.

At present minimal recreation management occurs in this basin. Efforts are directed at inappropriate dispersed camping, illegal dumping, and four-wheel drive abuse.

Table 3-16. Tillamook River Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	9	79	9	1	2	0
Post Implementation Plan Condition ¹	6	45	46	1	2	0
Desired Future Condition ⁵	10	10	20	30	30	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Douglas-fir is showing severe symptoms of SNC infection on 40 percent of ODF ownership in the basin.

- There are 339 acres designated as marbled murrelet habitat with buffers influencing an additional 482 acres.
- Core coho salmon areas are located within this basin.
- Two domestic water sources are located on or within 100 feet of state forest land.
- City of Tillamook municipal water supply is in the basin (Skookum Lake).

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 800-1,145 acres of partial cut and 20-200 acres of clearcut will take place. State land is contiguous within the basin. The Tillamook City Watershed influences management of roughly half the state forest land. The stands are mixed conifer and could move rapidly to complex structures with management. The basin will be managed to retain and enhance LYR and OFS within the City of Tillamook Watershed and MMMA, and create areas of complex habitat over 1,000 acres in size. This management focus will also review private industry management in the basin on short rotations.

Treating SNC infected Douglas-fir should not create high REG percentages in the basin. Many stands contain enough other conifer that removal of Douglas-fir will leave most of the area as a partial cut.

Road construction/improvement — Road work will focus on culvert installation and upgrade as well as surfacing. Some short access roads will be built for harvest operations and considered for closure when operations are complete. Maintenance of drainage structures and surfacing of Simmons Creek Road is a priority due to its proximity to Simmons Creek.

Recreation — To protect the Tillamook municipal watershed, recreation development is not planned for this basin.

Trask Basin

The basin has a total of 85,481 acres, with state forest land consisting of 56,387 acres (66 percent). Both private industrial and federal forests are in this basin.

State Forest Land in the Basin

The basin contains approximately 254 miles of road. The mainline roads or high use roads are the North, East, and South Fork Trask roads, Toll Road, and Bark Shanty Road. In the past 5 years, these roads have been upgraded with culvert installation and surfacing.

There are 58 miles of fish-bearing streams in the basin, and the major sub-basins are North, East, and South Forks of the Trask River. SAHs are designated in the Elkhorn and East Fork of the South Fork Trask River. A small portion of the Kilchis Cluster falls within the lower Trask basin, to create connectivity of NSO habitat on the district.

The stands are dominated by Douglas-fir 26- to 45-years old (90 percent) throughout the basin. There are pockets of older conifer stands in the upper portion of the basin, which have had multiple entry thinnings. Density management has been completed on 12 percent of the

basin. Approximately 40 percent of ODF ownership in the basin is showing severe symptoms of SNC.

Recreation activities in the Trask Basin include hunting, OHV use, fishing, dispersed camping, day use, hiking, equestrian use, mountain biking, kayaking, and scenic driving. The Trask Basin is popular with local residents and accessed from the upper end by users from the Willamette Valley. The basin offers scenic river canyons, rolling forested hills, and a few high peaks. The basin is zoned for motorized off-road use. Hembre Ridge, Gobblers Knob, and Gold Peak offer scenic vistas, and Cruiser Creek Falls can be accessed easily from Cruiser Creek Road. Lake Tahoe, a four-acre impoundment, offers stocked trout fishing and has potential for trail and day-use development. The basin has been a popular OHV trail riding area for over forty years, and currently has a moderate level of use.

Areas of special focus include Stones Road boat launch; Peninsula Park boat launch and trail; Hollywood Camp, a well-used dispersed camping area and staging area; and Trask Park, a 100-site campground and day-use area on state forest land that is managed by Tillamook County through an agreement with the Department of Forestry.

Table 3-17. Trask Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR	OFS	NSC
Current Condition	<1	82	16	1	<1	<1
Post Implementation Plan Condition ¹	26	53	19	1	<1	<1
Desired Future Condition ⁴	10	15	25	30	20	<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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Approximately 40 percent of ODF ownership in the basin is showing severe symptoms of SNC.
- The adjacent private industrial forest land to the west is managed on short rotations, with the majority of the land in REG and CSC structures.
- The adjacent BLM ownership to the south is managed as a LSR.
- Portions of the Kilchis Cluster falls within the Trask Basin on 602 acres.
- Coho salmon core areas are located in the North Fork, South Fork, and East Fork of the Trask River. SAHs are designated in the East Fork of the South Fork Trask and Elkhorn sub-basin encompassing 19,867 acres of Tillamook District.
- Fifteen domestic water supplies are located on or within 100 feet of state forest land.

- Adjacent BLM land north of the Nestucca River is managed to limit OHV use and trail development to existing roads and trails.
- Recreation use is considerable and varied. An OHV trail system exists throughout the basin.

Desired Future Condition and Landscape Design

Harvest — During the planning period it is estimated that approximately 320-455 acres of partial cut and 10,160-14,515 acres of clearcut will take place. Many of the conifer acres have been thinned or are under contract for thinning. Due to the number of acres in a narrow age range dominated by CSC structure and affected by SNC, it is difficult to plan for OFS and LYR structure development. The stands' response to density management will affect future management decisions about OFS and LYR pathways. Some stands are available for first and second entry thinnings in the planning period. The OFS and LYR structures are focused in the mixed species stands that have already had one partial cut. Areas of complex habitat in this basin will range from 200 to over 2,000 acres, similar to the Wilson Basin.

REG structures will come from Douglas-fir stands severely affected by SNC. The basin contains less than one percent REG at this time, which allows many opportunities for landscape design. The presence of SAH designation in sub-basins of the Trask should not impact harvest levels during this planning period. The two sub-basins with SAH designations in the basin are not expected to impact management during the planning period. Some planned clearcuts will be focused to areas outside the East Fork of the South Fork Trask to treat SNC.

Road construction/improvement — Due to past partial cutting, mainline roads have been improved and upgraded. Therefore much future road work will be maintenance and focus on short spurs to access timber sales. Road work will take place throughout the basin. Spur roads built for timber sale access will be considered for closure at the end of each sale.

Recreation — Recreation management will focus on OHV trail rehabilitation, improvement of dispersed campsite conditions, and non-motorized trail development in the more remote sub-basins. The Peninsula Day Use Area, Stones Road Boat Ramp, and Hollywood Camp will receive regular maintenance and upgrades to trails, signs, and roads. Development of a river corridor for the Trask River is also planned. ODF will continue a partnership with Tillamook County for the management of Trask County Park. OHV trail development will address construction of new trails that link existing trails and reduce road riding. Details of projects are in the *Tillamook State Forest Recreation Action Plan 2000* (ODF, March 2001).

Nestucca Basin

The basin has a total of 139,895 acres, with state forest land consisting of 7,493 acres (5 percent). Federal forest lands in this basin total over 89,000 acres (64 percent).

State Forest Land in the Basin

Access to this basin varies due to the scattered parcels. Many lands are accessed via East Beaver Creek Road and Nestucca River Road. Many of the roads in this basin are managed

by USFS or BLM and improved through agreements or permits for state forest harvest activities.

State forest management has little impact on the Nestucca River, but does influence the Clarence Creek and East Creek sub-basins. State forest land in the basin is mostly Douglas-fir with small pockets of hemlock. Approximately 45 percent of ODF ownership in the basin is showing severe symptoms of SNC infection.

Table 3-18. Nestucca Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR	OFS	NSC
Current Condition	16	70	10	3	1	<1
Post Implementation Plan Condition ¹	14	67	15	3	1	<1
Desired Future Condition ⁴	20	20	60	0	0	<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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Approximately 45 percent of ODF ownership in the basin is showing severe symptoms of SNC infection.
- Approximately 80 percent of the basin is federally owned (USFS and BLM), with the majority managed as LSR and AMA.
- NSO Activity Centers have been designated on BLM land in Moon Creek and East Beaver Creek area and influence management on ODF land.
- Core coho salmon areas are located within this basin.
- Seven domestic water supplies are located on or within 100 feet of state forest land.

Desired Future Condition and Landscape Design

During the planning period it is estimated that approximately 40-55 acres of partial cut and 100-600 acres of clearcut will take place. In this basin, the large areas of federally owned forest, which will be managed primarily as a LSR, will provide large acreages of complex structure types. The scattered parcels of state forest land are small, fragmented, and would not make significant contributions to areas of complex habitat. However, areas provide connectivity between basins. In this basin, the management focus for most stands will be timber production with stand by stand consideration of health and opportunities to create complex characteristics. Existing LYR or OFS will not be harvested in this ten year planning period.

Little Nestucca Basin

The basin has a total of 33,783 acres, with state forest land consisting of 791 acres (2 percent) in scattered parcels. Federal ownership is over 17,000 acres (51 percent).

State Forest Land in the Basin

Access to this basin varies due to the scattered parcels. Most of the state land is accessed by Highway 22 at Sourgrass summit.

State forest lands have very little influence on the Little Nestucca River. Stands are dominated by Douglas-fir, with 80 percent of the stands less than 20 years old. The basin's forests are mostly in two age classes: less than 30 years old and over 50 years old. Approximately 35 percent of ODF ownership in the basin is showing severe symptoms of SNC infection.

Table 3-19. Little Nestucca Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR	OFS	NSC
Current Condition	8	77	9	0	6	0
Post Implementation Plan Condition ¹	5	80	9	0	6	0
Desired Future Condition ⁴	20	20	60	0	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, it may take 20 to 30 years for layering to develop.
4. DFC is at least 50 to 80 years away, so it is difficult to be more precise at this time.

Key Resource Considerations

- Approximately 35 percent of ODF ownership in the basin is showing severe symptoms of SNC infection.
- Approximately 75 percent of the basin is federally owned.
- Private and USFS land surround state forest parcels.
- There is an NSO Activity Center in the Van Duzer Corridor (ODPR land) within two miles of the largest parcel of state forest land.
- Core coho salmon areas are located within this basin.

Desired Future Conditions and Landscape Design

No harvest is anticipated in this basin during the planning period. Due to the large federal ownership in the basin, the scattered parcels of state forest land would not make significant contributions to complex habitat development. The management focus in this basin is timber production. Existing LYR or OFS will not be harvested in this ten year planning period.

Information Summary for All Management Basins

Table 3-20. 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
N. Fork Nehalem	7,390	0	0	5	10	65	15	29	25	1	25	0	25
Lower Nehalem	58,236	1	1	3	10	89	15	5	25	1	30	1	20
Short Sands ¹	309	0	0	0	20	57	30	16	0	15	0	12	50
Miami	13,921	<1	<1	3	10	90	15	2	25	4	25	1	25
Kilchis	34,846	1	1	6	15	80	20	4	10	5	30	4	25
Tillamook Bay	1,950	0	0	19	10	59	15	10	25	4	30	8	20
Wilson	65,723	<1	<1	2	10	72	15	23	25	2	25	<1	25
Tillamook River	3,465	0	0	9	10	79	15	9	25	1	20	2	30
Trask	56,387	<1	<1	<1	10	82	15	16	25	1	30	<1	20
Nestucca ¹	7,493	<1	<1	16	20	70	20	10	60	3	0	1	0
Little Nestucca ¹	791	0	0	8	20	77	20	9	60	0	0	6	0
District Total²	250,511	<1	<1	3	10	80	15	14	25	2	25	1	25

** NSC/Non-Forest (Non-Silviculturally Capable and Non-Forest lands). Non-Silviculturally Capable lands are 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).

1. Desirable for exchange.
2. These percentages are landscape averages for the entire district. Since DFC is at least 50-80 years away, it is difficult to be more precise.

The *Northwest Oregon State Forests Management Plan* (page 4-48) ranges for the desired future condition of stand structure types are:

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

The Tillamook District's DFC is based on the landscape design (Table 3-20 above). The response of stands to management will determine how quickly these estimates can be

achieved. Management will be made on a stand by stand basis keeping the landscape perspectives in mind.

The state forest lands in Short Sands, Nestucca, and Little Nestucca basins are scattered parcels that are desirable to exchange. However, these parcels will be managed for biological concerns first. The upper Kilchis Basin has difficult access for partial cutting and little complex forest structure, making it unfeasible to manage that land to achieve biodiversity in an acceptable time frame.

It will take 50 to 80 years to achieve the DFC for the district. This estimate assumes that 2 or more partial cut entries will be required, plus 10 to 20 years after the last partial cut, to achieve OFS. The estimate also assumes that total stand ages of 90 to 110 years will be required to produce OFS and that SNC will limit development of some stands. The largest factor on the district, which will make the timeline longer to achieve DFC complex, is SNC. This disease could both limit opportunities in Douglas-fir and require clearcutting to establish mixed conifer stands, or slow growth and individual tree development.

Expected Outputs and Habitat Achievements

Timber Outputs

The expected average annual timber outputs for fiscal years 2001 to 2010 are listed in the following tables. Table 3-21 below shows the current stand structures, desired future condition and expected stand structure at 2010; Table 3-22 shows the harvest objectives for this Implementation Plan period. Volumes for these estimates are based on historical averages for these types of harvest within the district. These tables show the midpoint and/or range of expected outputs. These estimates are based on the Board of Forestry Intent Statement Number 6 to aggressively harvest SNC infected stands in a 20 year time period.

(MBF = thousand board feet; MMBF = million board feet.)

Table 3-21. Anticipated Stand Structure Development by 2011

	REG	CSC ²	UDS ³	LYR	OFS
Current Condition	3	80	14	2	1
After Implementation Plan Period ¹	17	62	18	2	1
Desired Future Condition	10	15	25	25	25

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, it may take 20 to 30 years for layering to develop.

Table 3-22. Annual Partial Cut and Clearcut Harvest Objectives, by Volume and Acres¹

Fiscal Year	Partial Cut ^{2,3}		Clearcut ^{2,3}		Total
	Acres	MMBF	Acres	MMBF	MMBF
2002 ¹	2,146	18.2	2,316	24.5	42.7
2003-2011	1,000 – 1,400	7 – 9.8	3,500 – 6,200	42 – 68.9	49 – 78.7

1. FY 2002 acres are outside the planning period range because of the impacts of SNC. 2002 AOP was a period of transition to clearcut harvest, SNC impacts and increase of personnel to implement the Forest Management Plan.

2. Calculations are based on ranges for harvest levels. Hardwood harvest is not a high priority at this time in order to deal with concern for SNC. Therefore, hardwood acres may fall to zero some years. See Appendix A for more details.

3. Partial cut assumes 7mbf/acre; conifer clearcut assumes 12 mbf/acre; hardwood assumes 7mbf/acre.

The severity of SNC is increasing in many stands based on field observation. The differences in the 2002 operations plan and harvest objectives reflect the district's change of

focus to harvest SNC-infected stands. The opportunities for partial cutting are fewer because symptoms on all Douglas-fir stands are more severe.

Habitat Achievements

Table 3-23. Estimated Annual Habitat Achievements for Partial Cuts and Clearcuts for Fiscal Years 2002 to 2011

Harvest Type ¹	Structure Development (acres)	Snag Retention ² (snags)	Down Wood Recruitment ³ (thousand cubic feet)	Green Tree Retention ⁴ (trees)
Clearcut⁵	3,500 – 6,200 ⁶	7,000 – 12,400	2,625 – 4,650	17,500 – 31,000
Partial Cut	1,000 – 1,400	1,500 – 2,100	2,000 – 2,800	Not Applicable

1. SNC harvest will vary, see **Management Activities by Stand Type** for more detail.
2. 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.
3. Down wood recruitment levels – average of 200 cubic feet per acre in partial cuts, and average of 750 cubic feet per acre in clearcuts.
4. Green tree retention level – average of 5 trees per acre
5. Clearcuts will create REG structure.
6. Clearcut acres include the range for conifer and hardwood clearcut. Since hardwood harvest is not a priority at this time in order to deal with SNC, the hardwood harvest may fall to zero some years.

Partial cutting is the primary silvicultural activity to advance stands toward the next level of structural complexity. More complex structures will not be achieved immediately after a partial cut. Historical evidence suggests that it may take 10 to 20 years after the partial cut for a more complex stand structure to develop.

For partial cuts, a small percentage of the ten year harvest acreage will be in stands more than 55 years old. The other 90 percent of the partial cut harvest acreage will be in stands less than or equal to 55 years old. Partial cutting in stands both younger and older than 55 years will help CSC and UDS stands move toward the more complex LYR stand structure.

Some younger stands will receive multiple partial cut entries on a 15- to 20-year interval to develop the components of a LYR stand. Most LYR stands will 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.).

During this initial ten-year planning period, stands in the following conditions will be assessed for conversion into the REG structure:

- Stands in poor forest health (e.g., SNC-infected stands with less than 2 years needle retention or *Phellinus weirii*-infected stands greater than 5 acres).
- 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 (poor height to diameter ratios).

- For the ten-year planning period, stands currently identified as OFS and LYR will not be considered for clearcut harvest.
- The AOP will include a projection of how the planned silvicultural activities in a given fiscal year will contribute toward meeting desired future condition goals.

Recreation Outputs

Outputs for the first half of the planning period are listed below. Additional details are in the *Tillamook State Forest Recreation Action Plan 2000* (ODF, March 2001).

Non Motorized Trails

- Five to eight miles of new non-motorized trail will be constructed, focused on the Wilson River basin.
- One to two miles of mountain bike trail constructed in North Fork Nehalem basin.

Motorized Trails

- Three to eight miles of new motorized trail will be constructed.
- Six to ten miles of trail will be rehabilitated.
- One to two miles of trail will be closed.

Campgrounds

- Rehabilitate Diamond Mill OHV Area.

Day Use Area

- Day use area developed at Keenig Creek Campground.

Trailheads

- Develop trailhead at Keenig Creek Campground.

OHV Staging Areas

- Develop and improve Hollywood Camp OHV area.

Dispersed Camping Sites

- Install fire grates at 25 sites and protect riparian areas.

River Access Sites

- Develop plan for ODPR land along Wilson River corridor as land exchange concludes

Planned and Existing Sales

The table below summarizes sold (not completed as of the IP date) and the planned timber harvest activities for the fiscal years 2000-2003. Past timber harvest plans have focused heavily on first-entry partial cut. Clearcut harvest was focused on hardwoods, SNC-infected stands, dense unstable conifer stands, and combination harvests where hardwoods are removed and conifers are thinned. Future sale plans and sales will focus on clearcutting SNC severely infected stands. Road construction projects are usually limited to roads necessary to access sale areas. Road work is defined as construction where no previous road bed existed, and as improvement when a previous road bed existed. Improvement also includes surfacing and drainage work.

Table 3-24. Summary of Current and Planned Timber Sales as of January 1, 2003.

Harvest Type	Clearcut Acres	Partial Cut Acres
FY 2000*	465	1,059
FY 2001*	1,040	2,738
FY 2002	2,268	2,146
FY 2003	3,692	1,194

* 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.

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 *Tillamook District Implementation Plan*. Levels for harvest and other silvicultural activities were determined utilizing the Department of Forestry'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, March 6, 2001* (ODF, March 2001b).

Results

Table 3-25 summarizes the estimated annual objectives for harvests and other silvicultural treatments for the period from fiscal year 2002 to fiscal year 2011.

Table 3-25. Annual Objectives/Estimates

Silvicultural Activity	Annual Objective Acres / Year
Conifer Partial Cut Harvest ¹	1,000 – 1,400
Conifer Clearcut Harvest ²	3,500 – 5,100
Hardwood Partial Cut Harvest	N/A
Hardwood Clearcut Harvest	0 – 1,100
Rehabilitation	0
Reforestation	
Initial Planting ³	1,500 – 3,500
Underplanting	
Precommercial Thinning ⁴	0 – 500
Fertilization ⁴	0
Pruning ⁴	0

1. Patch cuts less than five acres in size will count toward the annual conifer partial cut objective.
2. Patch cuts greater than five acres in size will count toward the annual conifer clearcut objective.
3. 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.
4. Precommercial Thinning, Fertilization and Pruning may fall to zero due to SNC during the planning period.

Step 1. Allocate 100% of the District Acreage into 4 Categories.

Table A-2 on the next page summarizes the acreage on the district according to availability for commercial operation. The narrative following the table documents how the acreages in Step 1 were determined.

Table 3-26. Determination of Stands Capable of Supporting a Commercial Operation

Category	Acres
Total District Acres	250,511
Roads and Streams ¹	28, 286
Non-Commercial ²	38,782
Commercial Conifer ³	157,048
Commercial Hardwoods ⁴	26,395

1. **Roads and Streams** – Acres in roads were determined by multiplying the total road length of all roads on the district (1,224 miles) by the average road right-of-ways (40 feet) and results in 5,935 acres of roads. Acres in streams represent special stewardship stream buffers and were calculated from GIS (22,351 acres).
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., NSO clusters, NSO core areas outside of clusters, and MMAs, recreation sites, operationally limited), very low site or bad terrain, or because the site is grass, brush, or a noncommercial hardwood vegetation type. Severe needle cast-infected non-merchantable Douglas fir stands (10-20 years old) are included in this category.
3. **Commercial Conifer** – Conifer stands that will support a commercial operation in the next 30 years. Basal area of the stand is at least 30 percent conifer.
4. **Commercial Hardwoods** – Hardwood stands that will support a commercial operation in the next 30 years. Basal area of the stands is less than 30 percent conifer.

Step 2. Determine ANNUAL CONIFER HARVEST OBJECTIVES. Allocate 100% of the District Commercial Conifer Acreage into 2 Objectives.

GROSS CONIFER PARTIAL CUTTING OBJECTIVE

Approximately 35,286 acres are available for partial cutting. These are hemlock stands or a component of hemlock mixed with Douglas-fir, or Douglas-fir stands with 3 or more years needle retention and older than 20 years. A small portion of these acres will be second entry partial cuts and will focus on stands that had been partial cut between 1970 and 1990. Stands partial cut after 1990 won't be available for a second entry for at least 15 years.

$$35,286 \text{ acres} / 15 \text{ year re-entry period} = 2,352 \text{ acres/year}$$

GROSS CONIFER CLEARCUT HARVEST OBJECTIVE

Approximately 121,762 acres of stands dominated by Douglas-fir or Douglas-fir/alder are available for clearcutting. Aerial surveys and field observations show SNC affecting most of the Douglas-fir on the district. The harvest level calculation is based on a 20-year clearcut planning period and maintains the 15 percent REG structure target across the landscape (in the long term). A 20 year planning period supports the BOF Intent Statement Number 6:

“The District Implementation Plans will reflect the principles and assumptions contained in OSU model run 1C-2, and will aggressively treat Swiss Needle Cast (SNC), consistent with the SNC Strategic Plan.”

121,762 acres / 20 year clearcut planning period = 6,088 acres/year

Step 3. Determine ANNUAL HARDWOOD HARVEST OBJECTIVES. Allocate 100% of the District Commercial Hardwood Acreage into 2 Objectives.

GROSS HARDWOOD PARTIAL CUT OBJECTIVE

The hardwood partial cut objective for Tillamook District is 0 acres.

GROSS HARDWOOD CLEARCUT OBJECTIVE

Approximately 26,395 acres of hardwood are available for clearcut.

26,395 acres / 30 year clearcut planning period = 880 acres/year

Step 4. Adjust Gross Objectives for Availability Factors

Conifer Partial Cutting Objective

There is an estimated 20 percent reduction in acres due to availability because the stands are conifer/hardwood stands and/or low density conifer stands (less than 170 TPA) that do not require partial cutting at this time. These stands may have a partial cut option after the initial 20-year thinning interval, which means that in 15 to 20 years the partial cut acres could increase by up to 20 percent. Available partial cut acres identified in this plan are those acres where density management will likely be used to retain future management options for developing LYR and OFS.

An additional 10 percent reduction is made for stands that were planned for second entry thinning over the planning period but due to slowed growth from SNC may not be available for partial cutting and may move into the clearcut candidate pool.

The total reduction for availability is 30 percent.

Conifer Clearcut Harvest Objective

There is an estimated 20 percent reduction in acres due to availability because stands over 20 but less than 30 years old are not economically feasible to harvest at this time. SNC has slowed the growth of these stands and they may not grow to a merchantable size during the

10-year planning period. This factors in a reduction at the end of the planning period due to Salmon Anchor Habitat designations, which limits the amount of clearcut acres in some basins.

Hardwood Clearcut Objective

There is an estimated 20 percent reduction in acres due to availability because the harvest of those stands would not support the road construction costs or stands are not expected to grow to merchantable size in the planning period.

Step 5. Adjust Gross Objectives for Operability Factors.

Conifer Partial Cutting Objective

There is an estimated 5 percent reduction for operational restrictions, due to cable yarding distances in excess of 1,000 feet (conventional equipment limitations). There is an additional 5 percent reduction due to access limitations, because of roads that either cannot be constructed due to topography or should not be constructed simply to access partial cut acres. Helicopter yarding could be an option under more favorable market conditions, but was not considered for this analysis.

The total operability reduction is 10 percent.

Conifer Clearcut Harvest Objective

There is an estimated 5 percent reduction in acres for operational restrictions for specific sites, such as high risk sites where clearcutting is not an appropriate option. These areas are less than 5 acres and were too small to designate as operationally limited in the FLMCS.

Hardwood Clearcut Objective

There is an estimated 10 percent reduction in acres for operational restrictions because of excessive yarding distances, or hardwood stands that would have to be yarded through existing conifer stands and logically would be harvested in conjunction with the conifer stands.

Step 6. Adjust Gross Objectives for Logistical Factors.

An estimated 5 percent reduction was made for each harvest objective because of logistical factors. This reduction is based on the holding capacity of the road system and conflicts between road improvement projects, rock pit use, and log hauling.

Table 3-27. Summary of Availability, Operability, and Logistical Reduction Factors in Acres and Percent (%).

Harvest Objective	Gross Annual Objectives	Availability Reduction	Operability Reduction	Logistical Reduction	Net Annual Objectives
Conifer Partial Cutting	2,352	(30%)	(10%)	(5%)	1,293
Conifer Clearcut	6,088	(20%)	(5%)	(5%)	4,262
Hardwood Clearcut	880	(20%)	(10%)	(5%)	572
Hardwood Partial Cutting	NA	NA	NA	NA	NA

Step 7. Estimate the ANNUAL REHABILITATION ACREAGE.

The annual rehabilitation acreage for Tillamook District is 0 acres.

Step 8. Estimate the ANNUAL REFORESTATION ACREAGE.

The annual reforestation acreage is estimated as 1,500 to 3,500 acres/year.

This is the estimate for the average of the planning period and includes the anticipated lag period between sale preparation and completion of harvest. Additional acres are added into the estimate for portions of clearcuts where reforestation fails and must be replanted.

Step 9. Determine the ANNUAL PRECOMMERCIAL THINNING ESTIMATE.

The annual precommercial thinning estimate is 0 to 500 acres/year.

Observations in many young Douglas-fir stands suggest that density management may promote intensification of SNC symptoms, resulting in reduced growth response. Therefore, during the planning period spacing control focus will be on overstocked mixed conifer and/or young Douglas-fir plantations that are not impacted by SNC.

Step 10. Determine the ANNUAL FERTILIZATION AND PRUNING ESTIMATES.

The annual fertilization and pruning estimates on Tillamook District are 0 acres.

Step 11. Adjust Estimates for Logistical, Operational, and Availability Factors (for Steps 7 to 10).

No further adjustment is needed to account for logistical, operational, and availability factors for Steps 7 to 10.

Appendix B

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Map Section

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