



Astoria District

Implementation Plan

March 2003

This implementation plan describes the management approaches and activities that the Astoria 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 *Astoria District Implementation Plan* (and earlier drafts) guides forest management for all forest resources on the Astoria District from July 1, 2002, through June 30, 2011.

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

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District Overview

Land Ownership

Astoria District is comprised of a little more than 136,000 acres of state forest lands, the vast majority (more than 99 percent) of which are within Clatsop County, at the northwest corner of Oregon. Also, 1,218 acres are in Tillamook County, and 40 acres are in Columbia County, as shown in Table 1 below. The lands within Clatsop and Columbia counties are part of the Clatsop State Forest. The state forest lands located in the southeastern corner of Clatsop County (Sunset Wayside Area) and remaining state lands in Columbia County are technically part of the Clatsop State Forest, but are administratively managed from the Forest Grove District. In addition, the state lands located in the Cronin Creek area of south Clatsop County are technically part of the Clatsop State Forest, but are administratively managed from the Tillamook District.

About 98.5 percent of these lands are Board of Forestry (BOF) lands, with the remainder being Common School (CSL) lands. State forest lands are interspersed among other forest lands throughout the county, in ownership blocks ranging from several hundred to over 50,000 acres. Other forest lands in the county are predominantly held by large private timber companies: Weyerhaeuser, Longview Fibre, Hampton Tree Farms, John Hancock Insurance, and Stimson Lumber Company. Individuals and families (non-industrial private landowners) hold a small percentage of the forest lands.

The Clatsop State Forest surrounds agricultural lands located in the Nehalem Valley (central, east Clatsop County) and Columbia River Area (north, east Clatsop County).

In addition, state forest lands border the city of Astoria and rural residential areas in: lower Highway 53 area, the Elsie-Jewell area along the Nehalem River Valley, and the northeast county area in the Knappa-Brownsmead-Wauna communities.

Table 1. District Acreage Breakdown by County and Fund

County	Board of Forestry	Common School	Total Acres
Clatsop	132,532	2,350	134,882
Tillamook	1,218	0	1,218
Columbia	40	0	40
Total	133,790	2,350	136,140*

*Acres were generated from the Astoria District Landbase Geographic Information System (GIS).

Land Management Classification System

The Land Management Classification System (LMCS) 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 in Table 3 were totaled, the total would be greater than the actual number of acres in the district. On the other hand, Table 1 shows the actual acres in the district and Table 2 shows the dominate management classification. Some lands may be “special” for one reason and “focused” for another reason.

Tables 2 and 3 below show the Astoria District’s final draft of the land management classification system. Table 2 shows the classified acres in each of the three stewardship classes. Table 3 shows the acres in the Focused Stewardship and Special Stewardship subclasses, including overlapping acres.

Table 2. Astoria District Acres, by Stewardship Class and Fund

Classification	BOF	CSL	Total Acres
Focused Stewardship	40,844	1,026	41,870
Special Stewardship	39,826	230	40,056
General Stewardship	53,060	936	53,996

Table 3. Draft Land Management Classifications for Astoria District – Focused and Special Subclasses (Acres)

	Focused	Special
Administrative Sites	0	34
Agriculture, Grazing	0	9
Aquatic & Riparian	36,777	12,781
Domestic Water Use	1,358	0
Energy & Minerals	0	298
Operationally Limited	0	171
Plants	0	60
Recreation	399	31
Research/Monitoring	229	0
Salmon Anchor Habitat	30,053	0
Transmission	0	259
Visual	10,808	109
Wildlife Habitat	19,826	37,032

*Acres in Table 2 and Table 3 include overlapping classifications.

History

Most state forest lands in Astoria District were acquired during the 1930s, 1940s, and 1950s when the counties deeded over tax-foreclosed timberlands to the state. These lands were largely cutover, sparsely roaded if at all, and were covered with brush, grass, or low value hardwoods. Forest management activities began in the 1950s in the form of commercial timber sales, and have continued to the present. During the 1970s many thousands of acres of young (40- to 60-year-old), naturally regenerated conifer stands were commercially thinned. These stands are now 60 to 80 years old. In contrast, much of the present-day commercial thinning is in stands that were hand-planted in the 1960s.

Physical Elements

Geology and Soils

Volcanism and sedimentation created the parent rocks from which the soils of northwest Oregon were formed. In later ages these geologic materials were uplifted, folded, and faulted. Through time, the agents of erosion—principally running water, frost action, and gravity—sculptured them into the distinctive landforms of the present.

The major geologic formations of the Astoria District are the Astoria Formation and the Tillamook Volcanics to the south. The Astoria Formation is a major river alluvial fan deposited in the Miocene time. The Tillamook Volcanics are in contact with the Astoria Formation in the south. The sedimentary fan was invaded by Columbia River basalt flows about 15 million years ago. The igneous rock mixed with the sediments and are now classified as flows and invasive intrusives. The entire area was uplifted and eroded into its current position, resulting in the landforms of today.

Major soil types within Astoria District include Astoria, Mist, Aldrich, Wauna, Tillamook, Grindstone, and Pinochle. The majority of these soils are deep, well-drained, colluvial soils, characterized by high clay content and very high productivity. Some of the soils are more characteristic of mountainous terrain, have a high rock content, and are poorer in productivity factors. The average site index for the district is 130 (high Site II).

Because of the abundance of colluvial soils, presence of steep terrain, and frequent rainstorms, natural land flows and slides are common throughout the forest. It is important to recognize these features and minimize increased risks of mass soil movement. This is done by employing the best management practices outlined in the *Northwest Oregon State Forests Management Plan* (ODF, January 2001) and the *Forest Roads Manual* (ODF, July 2000).

Topography

Astoria District lands are located in the northern Oregon Coast Range, and so are characterized by slopes, ridge tops, and drainage features. In general, the Coast Range in Clatsop County is not as steep, nor are the slopes as long, as in many parts of the Coast Range. Nevertheless, there are some areas of precipitous slopes on state forest lands. Over

50 percent of state forest lands are suitable for ground-based logging operations, on slopes of 25 to 30 percent or less. Elevations range from near sea level to about 3,000 feet, with most lands being lower than 1,500 feet. Drainage patterns are generally dendritic (branching).

Water

Major streams that drain these forest lands are: Gnat Creek, Plympton Creek, and the Klaskanine River, which flow into the Columbia River; and the Nehalem, North Fork Nehalem, and Necanicum Rivers, which flow directly into the Pacific Ocean. Some of the larger streams that feed the Nehalem and North Fork Nehalem Rivers include: Fishhawk Creek, Beneke Creek, Northrup Creek, Sager Creek, Buster Creek, Humbug Creek, Fall Creek, and Sweethome Creek. These major watershed basins define the basin planning areas in the section entitled **Management Basins**. There are also several shallow lakes on state forest lands, the largest of which is Soapstone Lake. Beaver ponds and other wetlands are scattered throughout the district. One community watershed is located in the northeast corner of the district encompassing about 1,300 acres of state forest land, serves the Columbia River community of Westport. The Fishhawk Basin contributes to the Fishhawk Lake community water system. Some springs in the Osweg Creek Area of the Buster Basin, supplies the community water for the Elderberry Area residents. Refer to the **Map Section** for the location of these features.

Climate

Astoria District's lands are in the hemlock zone. West of the Coast Range summit, the climate is characterized by cooler summer temperatures and frequent fogs during the growing season. The remaining half of the district is east of the Coast Range and mostly in the Nehalem Valley; this area is dominated by Douglas-fir and hardwoods, and warmer, drier summers, with less fog. Rainfall averages 80 inches annually in lower elevations and 120 inches annually in the Coast Range area. Heavy rainstorms and windstorms are common occurrences during the winter and cause significant natural disturbances.

Because of the frequently occurring rainstorms, combined with colluvial soils and steep terrain, natural land flows and slides are common throughout the forest.

Biological Elements

Vegetation

The Astoria District is located within the hemlock zone, in which western hemlock, western red cedar, and Sitka spruce are the major climax tree species. Within this zone are large stands of Douglas-fir, hemlock, hemlock/spruce, Douglas-fir/spruce, Douglas-fir/hemlock, and Douglas-fir/spruce/western red cedar. There are also numerous acres of hardwood-dominated stands, characterized mainly by red alder.

Most of these hardwood stands also have clumps of conifers and large, individual, emergent conifers intermixed. In the western part of the district, Sitka spruce, western hemlock, and

western red cedar commonly grow beneath red alder stands, and emerge gradually into the overstory once the alder are about fifty years old and begin to decline.

The eastern portion of the district is characterized by pure stands of Douglas-fir and mixed stands of Douglas-fir and hardwoods. Once again, these hardwoods are dominated by red alder, but big leaf maple can also make up a large component of hardwoods.

At the higher elevations of the Coast Range, noble fir and silver fir stands are found. These species are also found in association with hemlock and Douglas-fir stands at the mid and higher elevations, generally above 1,500 feet.

Shrub species range from dense salal and salmonberry near the coast to vinemaple, sword fern, huckleberry, elderberry, cascara, and bitter cherry over much of the district. These shrubs generally flourish under open stands or in regeneration stands, but die out under the low light conditions of closed conifer stands.

There are currently no known T&E plants located on state forest lands in the district. According to the Oregon Natural Heritage Database, listed plant species may exist on these lands as shown in the **Plants** section.

Noxious weeds occur throughout the county. The most common are: gorse, English ivy, tansy ragwort, purple loosestrife, Himalaya knotweed, Japanese knotweed, giant knotweed, spartina grass, Scotch broom, and Canadian thistle. The two that occur regularly on ODF lands are Scotch broom and tansy ragwort. The *Clatsop Weed Management Area Committee (CWMAC)* is a multi-agency and multi-landowner committee formed to coordinate and address the problems associated with noxious weeds in Clatsop County, and the district actively participates on the committee.

Insects and Disease

Laminated root rot (*Phellinus weirii*) is a moderate concern throughout the district. It is unknown exactly how widespread the disease is. However, surveys have detected it in most basins, with some basins believed to be seriously infected. The disease spreads by root contact with an infected host and can be devastating to younger stands of Douglas-fir. The disease usually kills patches of trees, not entire stands. The disease destroys the roots of Douglas-fir and true fir trees, and is a heartwood disease for hemlock and red cedar. It can be a fatal disease to these coastal conifer trees.

Swiss needle cast (SNC) disease is becoming a serious concern throughout the district, particularly within about 12 miles of the Pacific Ocean and/or within about 8 miles of the Columbia River. It is unknown exactly how widespread this disease is or if it is cyclic in its life history. It affects only Douglas-fir and seems to slow growth significantly. It is unknown if the effects are long-lived, fatal to individual trees, or significant to a forest stand.

To help get answers to some of these questions, the district is cooperating and actively participating with ongoing research in the Swiss Needle Cast Cooperative, and has set up monitoring plots in young stands throughout the district.

In addition, all precommercial and commercial thinning proposals and plans are being evaluated for the potential effects of Swiss needle cast on the trees and stands being

considered. These plans are adjusted to minimize the potential effects of Swiss needle cast on the trees and stands located in higher risk areas.

The district will manage stands documented to have Swiss needle cast in accordance with Department's SNC Strategic Plan and the Board of Forestry's intent statement concerning the disease.

Fish and Wildlife Resources

The forest lands on Astoria District are host to a variety of wildlife species, including Roosevelt elk, black-tailed deer, black bear, coyote, bobcat, mountain lion, and many smaller mammal and bird species.

Threatened and endangered (T&E) wildlife species within the Astoria District include northern spotted owls, marbled murrelets, and bald eagles. In 2003, there were 6 spotted owl pairs and 1 resident singles found on the district. Approximately 1,130 acres are designated as marbled murrelet management areas. The presence of T&E species has required modifications to management activities on the forest during the past decade, and has increased the number of annual surveys to determine species presence, location, and breeding status. Currently, management of about half the total state forest ownership in Clatsop County is influenced by threatened and endangered species.

Streams and rivers within the forest are home to important fish species, such as coastal cutthroat trout, which is found in most streams in the forest and listed as a state sensitive/critical species; and coho salmon, which is listed as a federally threatened species. In addition, other locally present species, including chum salmon, lower Columbia steelhead, and lower Columbia fall chinook are listed as state sensitive/critical. Most streams also host varying populations of sculpin. It is unknown if any of the various warm water fish species are present in the lakes on state forest land. Approximately 286 miles of streams with known fish use are present on the district.

Human Uses

Forest Management

In recent years, the Astoria District has been operating under an interim implementation plan that included an average clearcut harvest level of 750 acres per year, of both conifer and hardwood stands. The partial cut level under this plan increased in acreage from the pre-1999 level of 1,800 acres, to 2,500 acres by 2003. The current level (Fiscal Year 2003) is 2,816 acres of partial cutting, which includes commercial thinning and partial harvest of older stands to advance structural objectives; and 722 acres of clearcut harvesting.

Since 1999, the district has averaged about 717 acres of clearcut harvest and 2,386 acres of partial cuts.

Roads

The Astoria District's road network is an established system that has been in place for 10 to 40 years. It provides access for forest management activities, fire suppression and public travel.

The roads are classified into three separate road use standards as defined in the *Forest Roads Manual* (ODF, July 2000). These standards provide guidance on how roads are constructed, improved and maintained:

Low Use Standard —Roads that are used for a short term, intermittently and / or experience low volume traffic. Road use may be temporary, subject to seasonal use restrictions and / or vacated (closed) following road use.

Medium Use Standard —Permanent and semi-permanent roads that serve to collect low use standard roads. The roads may receive moderate use by the public.

High Use Standard — Roads that receive the highest traffic volumes and provide primary forest access.

The district's road system consists of 840 miles of single-lane roads. Some of the roads were originally built as railroads and then converted to truck roads. Over the past couple of decades many of these roads have been upgraded and now have improved drainage structures, crushed rock surfacing and improved alignment.

Table 4 shows the approximate number of miles by road type.

Table 4. Astoria District Road System

Road Use Standards	Miles
Low Use	202
Medium Use	335
High Use	303
Total Miles	840

It is estimated that an additional 35 miles of non-active roads exist throughout the district. The non-active roads are no longer used for forest management activities, were abandoned and/or have become impassable to traffic.

Recreation

The Clatsop State Forest is within two hours of Portland, via Highway 30. Highways 26, 30, and 202 border or cross through the forest, allowing easy access to most of the forest. Recreation resources on the forest are primarily used by Clatsop County citizens, many of whom value the freedom of unregulated settings. Users from out of the county often use the forest for camping, hunting, or fishing, or visit on their way to the coast. 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), that evaluated the Forest Management Plan and included recreation. This report stated that recreation had a low impact on the local economy when compared to other counties. However, the impact is expected to grow as the Willamette Valley population grows. The economy is benefited through products sold to recreation users as well as money spent in Astoria and surrounding areas through hotels, restaurants, etc. ODF also benefits from volunteer hours, fee day use areas and campground fees collected. While these fees do not completely support the recreation department, it does assist in project implementation.

The Clatsop State Forest has two designated campgrounds: Spruce Run Campground in the Sweet Home Basin and Gnat Creek Campground in the Davis Basin.

Management of Spruce Run Campground was relinquished from Clatsop County back to ODF in May 2002 and is undergoing renovation at this time. Spruce Run Campground offers camping and fishing on the Nehalem River.

Gnat Creek Campground is a day-use picnic and fishing area, adjacent to Gnat Creek and Highway 30. This campground offers camping, a short interpretive trail, and a trailhead with a trail leading to Gnat Creek Fish Hatchery.

The 7-acre demonstration forest and established arboretum, located adjacent to the district office, are managed as an outdoor classroom for local schools and groups interested in forest related issues. The site provides nature trails accessible to all people, and interpretive signs.

Much of the forest is used for dispersed recreation. Off-highway vehicle (OHV) trails exist across the forest landscape. Unfortunately, these trails were developed with no department involvement or planning. The district maintains a few non-motorized trails for hiking. Dispersed camping, hunting, fishing, mountain biking, and horseback riding on forest roads are popular activities.

With the development and approval of the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report* in October 2000 (ODF, 2000b), other potential recreation sites have been identified on the Astoria District, and will be developed as project plans and funds become available. See **Management Activities — Recreation**, for more information.

Scenic

Scenic resources are found generally along the highways that traverse the forest. Highways 101, 26, and 30 are designated in the Forest Practices Act (FPA) as scenic highways. Highways 103 and 202 also provide scenic views of the forest. Some of the Astoria Basin forest land is also visible from the city of Astoria and the Astoria Column viewpoint.

Cultural Resources

Cultural resources are scattered throughout the forest, mostly from the early logging that took place on the Clatsop State Forest. Cultural resources are defined as any human-created sites, structures, or objects that are of historical significance to the local area, region, state, or nation, in providing information and education of ethnic, religious, or social groups, activities, or places.

The *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report* provides the first inventory of cultural resources on the Clatsop State Forest (ODF, 2000b). This inventory is not absolutely complete and accurate; however, it provides a foundation of information the district can use in management planning.

Forest Stand Structure: Current Condition

The current stand condition is summarized in the graphs on the next page, and displayed 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 OSCUR stand inventory was screened to determine the current condition stand structure array in conjunction with some photo and field truthing. This inventory was developed in the late 1970's and early 1980's primarily to track the growth and yield of forest stand types for timber production. Using OSCUR may result in mistyping of forest stand types due to the lack of complete stand structure information (understory species composition, nonmerchantable tree species, layering, etc.). In an effort to account for any mistypes during pre-operational analysis and planning, all silvicultural prescriptions will be applied according to actual field reconnaissance or updated Stand Level Inventory (SLI) rather than these initial OSCUR screens.

The new Stand Level Inventory is currently being used on the District and includes the additional information necessary to accurately assess forest stand structure. To date, about 60 stands have been inventoried using this new system, covering approximately 3 percent of the district lands. Plans are to have SLI data for all upland stands in the district within the next 7-8 years. District personnel are planning to accomplish about 40% of the SLI work, whereas the remaining inventory work will be accomplished by private contractors. In the meantime however, several determinants of forest stand structure recorded in the current OSCUR inventory allow for adequately portraying the current condition for planning purposes. These determinants include tree species composition, stand age, stand density, and stand management history.

Figure 2 shows the current age distribution of the forest, regardless of structure, by acreage and percentage.

In addition, current stand conditions were predicted from OSCUR 2 timber inventory data. The predictions were based on assumptions about stand structures from stand age, density, species, and past management history. For example, all conifer plantations from ages 1 to 12 were considered to be in the regeneration (REG) stand structure. However, if these young stands had been precommercially thinned, it was assumed that this management practice delayed the closing of the tree crowns for about 6 more years, so any conifer plantations that had been precommercially thinned were considered REG until age 19.

Abbreviations for Forest Stand Types

REG	Regeneration
CSC	Closed Single Canopy
UDS	Understory
LYR	Layered
OFS	Older Forest Structure
NSC	Non-Silviculturally Capable

Figure 1 shows the current stand structure acreage, and percentage for Astoria District forest lands. Also see the current stand structure map in the map section.

Figure 1. Current Stand Structure, by Acres and Percent

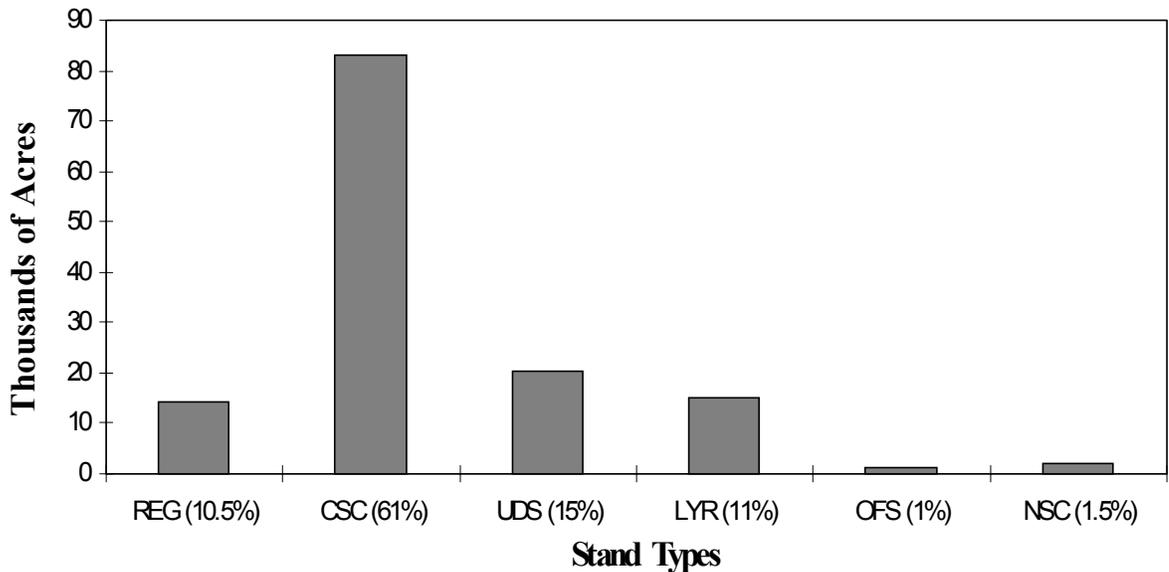
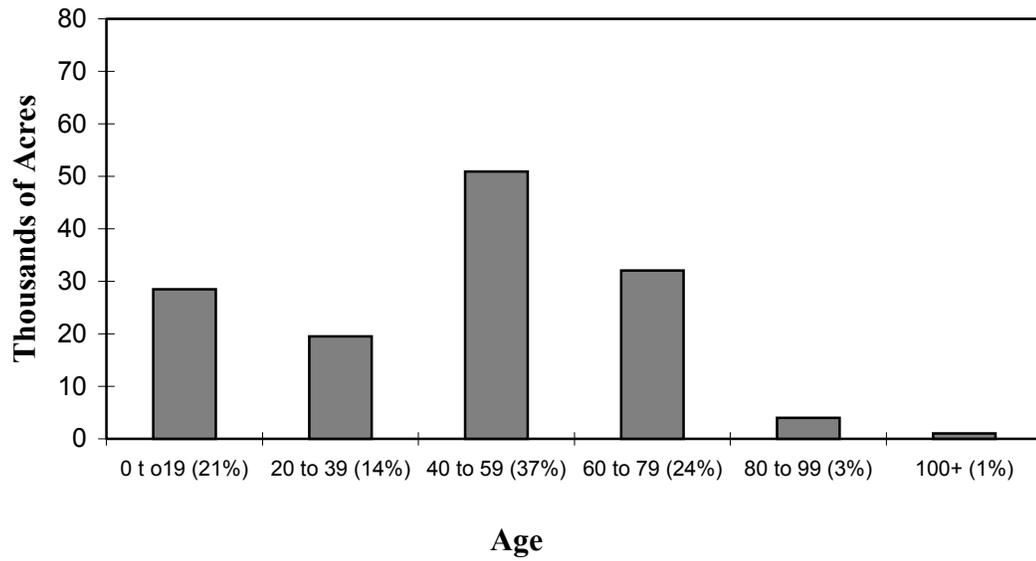


Figure 2 shows the current age distribution of the forest on Astoria District, regardless of stand structure.

Figure 2. Forest Stand Age Distribution, by Acres and Percent



Management Activities

Current Condition Analysis

Most forest lands in the Astoria District were logged in the early to mid-twentieth century, while privately owned, and then allowed to revert to county ownership due to non-payment of taxes. The county eventually deeded these lands to the state. When timber harvest began in the early 1950s on state forest lands in Astoria District, almost all the forests were already second-growth forests.

During the 1950s and 1960s, most timber harvest consisted of clearcut harvesting and salvage of windthrown and insect-killed trees. A big salvage harvest was done after the 1962 Columbus Day windstorm, which toppled thousands of acres of trees on the forest. Clearcut harvesting continued throughout the 1970s, 1980s, and 1990s. Significant partial cutting was done in 40- to 60-year-old Douglas-fir (and some hemlock) stands during the 1970s. Due to unfavorable economic conditions, partial cutting was largely discontinued during the 1980s, but resumed again in the 1990s after a rebound in timber prices.

Currently, about 89 percent of the Astoria District lands have conifer stands, with the remainder in merchantable hardwood stands. There are about 1,200 non-forested acres, either non-silviculturally capable or in other uses (e.g., transmission lines, administrative sites).

Regeneration

The regeneration (REG) stand structure comprises about 13,000 acres, or 10 percent of the district. Management practices for young stands will be applied to these areas in order to obtain the greatest value of this structure, including rapid tree growth, big game forage, and wildlife habitat. Refer to the next section, entitled **Management Activities in Each Stand Type** and Appendix A, for an expanded discussion of young stand management activities.

Closed Single Canopy

The closed single canopy (CSC) structure covers the largest percentage of the district (approximately 70,000 acres or 51 percent). This structure is characterized by the closed crowns of the overstory trees that prevent light from reaching most of the forest floor. This low light level precludes the introduction of both brush and shade-tolerant conifers in the understory, thus leaving the forest floor sparsely vegetated.

Of all the structure types, CSC is the least used by wildlife species, especially species requiring more complex habitats such as northern spotted owls and marbled murrelets. The overabundance of this stand structure can be attributed primarily to the highly successful reforestation projects and natural reforestation processes common in a coastal forest,

coupled with the small amount of stand density management in the overstocked conifer stands.

Hardwoods

All of the hardwood stands within the Clatsop Forest (approximately 14,500 acres or 11 percent) are categorized into the CSC stand structure. Most hardwood stands have resulted from past logging followed by natural seeding from surrounding trees. This major component of the CSC stand structure is often found in large blocks, and contains conifers in clumps or scattered throughout the stand. These stands are good candidates for moving into UDS and LYR stands in a relatively short period of time, by converting to conifer while favoring the residual conifer as leave trees. In several decades, this strategy creates a two-layered conifer stand with a large residual overstory.

Not all hardwood stands, however, will be scheduled for harvesting or converted into conifer stands over time. They will be harvested at 1.8% per year of the inventory or 266 acres/year. Or on a planning period level, 18% in the next decade. To promote a diversity of species and stand conditions, it is important to have hardwood trees and stands across the landscape in a properly functioning and healthy forest. Some hardwood stands are naturally found on certain soils, such as high water table conditions in riparian areas, saturated soil conditions, or exposed/disturbed soils. They serve as good site protection in these areas and will be protected.

In addition, in order to minimize the impacts of some prevalent conifer tree diseases such as *Phellinus weirii*, the promotion of hardwood stands in infected sites has proven to be very effective. Finally, with the increase in commercial value of red alder lumber/veneer over the past decade, the growing and culturing of hardwood species throughout the forest can also be a reasonable economic decision.

Understory

The understory stand structure, which accounts for about 34,200 acres or 25 percent of the district, is the second most predominant stand structure. This structure occurs where normal tree mortality, previous density management, poor stocking, low growth sites, root disease, or a combination of these factors have prevented the overstory canopy from fully closing. As a result, an understory of herbs, shrubs, and small conifer trees has developed. On good sites in this structure type, large, healthy conifer trees with large crowns characterize the overstory. Some of these stands began in a low stocked condition with the overstory canopies eventually closing enough to shade out some of the brush and allow young conifer regeneration to occur.

Poor site class also contributes to the occurrence of this structure across the forest landscape. Site class is usually lowest on rocky, south-facing slopes where both water and nutrients are limited to support forest tree species.

Diseased stands with advanced degeneration caused by *Phellinus weirii* root rot may fall into the UDS structure category. These infected stands are characterized by the presence of both standing and fallen dead trees with a brush understory, surrounded by the surviving

forest canopy. The fallen trees, dead from root disease, usually do not have roots attached to their trunks.

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

Layered and Older Forest Structure Stand Types

Currently, the complex stand structures, layered (LYR) and older forest structure (OFS) are below the desired target percentages. As shown in Figure 1 and illustrated in the current condition map, these two structures combined to comprise approximately 17,600 acres, or 13 percent, of the district. The shortage of these two structures will be the primary factor considered in stand management and landscape design decisions applied across the district.

Some of these current stands have achieved their structural components due to *Phellinus weirii* root rot infection. The stands are sparse, with abundant snags and dying trees.

Non-Silviculturally Capable and Non-Forest Types

Approximately 1.5% of the lands in the district (or about 2,040 acres) is categorized as Non-Silviculturally Capable or as Non-Forest types. Non-Silviculturally Capable lands are not capable of growing forest tree species, as defined in OAR 629-035-0040. Non-Forest lands are those areas, greater than 5 acres, that are maintained in a permanently non forest condition, such as: administrative sites and power line right-of-ways.

Management Activities in Each Stand Type

Regeneration Stands

Reforestation

Reforestation promptly follows all clearcut harvests and patch cuts. Spacing, species, and stock type depend on site-specific conditions and availability. Site preparation and vegetation management activities are done in conjunction with stand establishment and maintenance. These are very site-specific prescriptions and may include herbicide treatments, manual release, or mechanical work.

REG stands also contain standing green trees, and both new and old down woody material and snags from the previously existing stand. These components will add structure for future stands. REG stands should have the potential to move through all the stand types to OFS, depending on the stand location in the landscape design. Within the Swiss Needle Cast zone, recently harvested areas will be replanted with a variety of species, including hemlock, spruce, true firs, and alder, to minimize future growth reductions due to Swiss Needle Cast.

Precommercial Thinning

Precommercial thinning (PCT) is an important practice, which thins young trees to provide more water, light, and nutrients to the residual trees. Also, PCT keeps the canopy from closing, thus preserving the growth of herbaceous vegetation required by big game. Within the Swiss Needle Cast zone, PCT will be conducted so as to favor non-Douglas-fir conifers. This strategy is intended to reduce future growth losses and accelerated infection caused by the SNC disease.

Pruning

Pruning will be used in more specialized situations. Pruning removes the lower limbs on the residual trees, thus increasing their wood quality; reducing their attraction to black bears, which can inflict bole damage; and, maintaining big game forage for a longer period of time. Pruning of stands within the Swiss Needle Cast zone will generally be avoided, to avoid accelerating growth losses caused by this disease.

Closed Single Canopy Stands

For both conifer and hardwood CSC stands, there are two management options:

Partial Cut

First, past management experience has found that the majority of the conifer stands respond very well to partial cutting. Not only do the residual trees grow faster, but also complex structures and diverse habitats develop more rapidly with the retention of snags and down wood, and the creation of space for a shade-tolerant conifer understory, including western hemlock and western red cedar. Site-specific prescriptions will be developed for each stand. Prescriptions may specify the deliberate creation of snags and down wood, based on the existing condition of the stand and its desired future stand structure type. The effects of partial cutting improve forest health by increasing stand vigor, and lowering susceptibility to damage from insects, disease, and windthrow. This management option also produces timber, revenue, and enhancements to other resources like scenic and wildlife resources. Therefore, the majority of current conifer CSC stands will be managed using partial cutting pathways.

Clearcut

In Department of Forestry management, clearcut refers to a harvest that removes most overstory trees but leaves an average of 5 green trees per acre, at least 2 hard snags per acre, and 600 to 900 cubic feet of hard conifer logs per acre, to provide structure (habitat) in the new stand. In less complex stands with smaller average trees, additional trees (above the 5 per acre average) may be maintained where necessary to supplement snag or down wood recruitment goals. Results will be monitored in accordance with the draft *Monitoring Implementation Plan* (ODF, in progress). The following five subheadings further define the CSC stands that may be considered for clearcutting as a silvicultural treatment.

- ***Phellinus weirii*-infected stands** — One management option for conifer CSC stands is to cut areas infected with diseases. The *Phellinus weirii* root disease, which can be

found in a variety of stages and spatial configurations in all stand structures, is fatal to Douglas-fir, true fir, and western hemlock. Infected stands may gradually develop significant openings and patches dominated by hardwoods and/or brush. A management alternative is to treat patch-sized infected areas by removing all diseased trees and planting the opening with disease-resistant tree species, such as western red cedar, western white pine, red alder, or big leaf maple. One benefit of treating root rot disease pockets will be increased habitat diversity through the creation of small patches or openings of one-half acre to five acres, and the incorporation of more diverse tree species into Douglas-fir-dominated stands.

However, it is not intended nor practical that all *Phellinus* patches will be treated. Small amounts of the disease will continue to exist across the landscape, and will contribute snags and down woody debris to the forest.

- **Swiss needle cast-infected stands** — The second management option for conifer CSC stands is to harvest stands infected with Swiss needle cast. This needle fungus has the effect of drastically slowing the growth of Douglas-fir trees in the coastal areas of the western hemlock zone. In the most extreme areas of infection, Douglas-fir stands may slow so dramatically in growth as to never reach merchantable harvest size. In accordance with the principles and assumptions contained in OSU model run 1C-2, the district plans to aggressively treat Swiss Needle Cast, consistent with the *SNC Strategic Plan*. Therefore, in these areas of extreme infection, the district plans to harvest these immature stands, retaining any viable conifers of resistant species, such as hemlock, spruce, and red cedar, and to reforest these stands with resistant conifers or red alder. Most of these harvest units will be less than 50 acres. However, if the disease continues to decimate older Douglas-fir plantations, larger units may be planned for harvest.
- **Overdense stands** — The third management option for conifer CSC stands is to harvest stands that have been left too dense for too long. Stands in this category have small crowns, are less vigorous, and are susceptible to poor health conditions. Based on historical evidence, these dense stands have a low likelihood of being able to respond to partial cutting. Partial cutting these stands usually leads to a high percentage of mortality due to windthrow and breakage. Trees that do not die take a long time to respond to the additional light and nutrients available after the partial cut. In these overly dense stands, any gains made by partial cutting are usually negated by the increase in mortality and the slow growth response.
- **Big game foraging habitat opportunities** — The fourth management option for conifer and hardwood CSC is to create openings for big game species and other open area-dependent wildlife species through clearcut harvesting. This management option will be used where landscape design and habitat analyses indicate the need for regeneration (REG) habitat types. This management option, in conjunction with forage seeding, is important for the health of big game populations.
- **Opportunities to create complex structure in hardwood stands** — The fifth management option for hardwood CSC stands is to harvest logical operational units and leave much of the residual conifer within the stands. As noted above, this will

create a two-storied conifer stand in a relatively short period of time. This option would be particularly beneficial for achieving complex stand structures in a timely manner in locations that supplement or complement developing LYR or OFS stands.

In some cases, where a sufficient conifer understory exists in a hardwood stand, some partial cutting of the hardwoods may release the understory. This opportunity would also move a stand toward complex structures rapidly.

Pruning

Pruning may continue in some of the younger (15- to 25-year-old) CSC stands, especially those that may have been pruned earlier. Generally, pruning will not be done above 25 feet on the tree bole. Pruning is applied in selected Douglas-fir stands, in areas not prone to Swiss needle cast infection, where it is planned that stands will be at least 60 years old before clearcut harvest.

Understory Stands

Due to the various ways that UDS stands have developed and the differing vegetation compositions of the understory, a variety of stand management options will be pursued in order to address stand-specific conditions. Options are described on the next page.

Partial Cut

Some UDS stands with a healthy conifer understory are poorly stocked, are on lower site soils, or are the result of partial cutting. In these stands, the preferred management option will be to manage these stands to develop them into the layered structure. In the majority of cases, these stands will be monitored until the overstory begins to shade out and suppress the understory. At that time, a partial cut will be implemented to release the understory while maintaining the health and vigor of the remaining overstory. This prescription will maintain the growth rates of both the overstory and understory, while advancing the stand into the next level of structure complexity. Where appropriate, snags and down woody debris will be developed in accordance with the *Northwest Oregon State Forests Management Plan* strategies.

Clearcut

In UDS stands that are poorly stocked or infected with either *Phellinus weirii* or Swiss needle cast, and have a brushy understory, the preferred management option is to clearcut and regenerate with a healthy stand of trees. Due to the lack of a conifer understory, partial cutting these types of stands is unlikely to produce future stands with multi-layered tree canopies. It is difficult to underplant in stands with a brushy understory, and difficult to develop the complex forest stand type. Hand application of herbicides would likely be required to suppress competing vegetation, and is economically inefficient on a large scale.

In poorly stocked stands, the emphasis will be to reforest the site with a well-stocked plantation using a combination of native species. In diseased stands, the emphasis will be to remove the diseased conifer and reforest with hardwoods, western red cedar, and/or western

white pine. In these cases, the sites will be converted to vigorous young stands while providing foraging habitat for big game.

Additionally, UDS stands that are not consistent with the landscape design may be clearcut. Where appropriate, snags and down woody debris will be developed in accordance with the *Northwest Oregon State Forests Management Plan* strategies.

In those stands infected with Swiss Needle Cast, as described in the *Closed Single Canopy* section preceding, the district plans to aggressively treat SNC, consistent with the SNC Strategic Plan and Board of Forestry's Intent Statement.

Layered Stands

Partial Cut

Conifer stands at least 61 years old with a lower relative density, or any conifer stands over 80 years old that have been commercially thinned, have been classified as layered stands. True layered stands are characterized by having 60 percent or more of the vertical space in the forest filled with foliage. Thus, many of the stands shown currently as LYR in our inventory do not actually fit this category. As our inventory becomes more refined, our record of true LYR stands will be more accurate. We are moving many CSC and UDS stands toward layered conditions by a well-planned partial harvest program. Actual LYR stands will be partial cut to enhance tree growth and biodiversity within the stand, or to move stands toward OFS stand structure goals in an efficient and timely manner.

Clearcut

Some stands classified as LYR, but determined in the field to be CSC or UDS, may be clearcut if they are not in a location consistent with the desired future condition landscape design strategy. In LYR stands infected with *Phellinus weirii* or Swiss needle cast, which have an understory of tree species susceptible to disease, harvesting and regenerating with a healthy stand of resistant trees may be the most efficient way to develop complex forest conditions. Additionally, if the percentage of LYR stands exceeds the desired future condition and the LYR stands are not needed to produce other stand structure types or are not consistent with the landscape design strategy, they may be clearcut.

Swiss Needle Cast Disease

Some layered stands may be infected with Swiss Needle Cast (SNC) disease. In LYR stands which may have high level of SNC infection present, the district plans to aggressively treat these stands, consistent with the SNC Strategic Plan. Such treatment may include light to very heavy partial cutting to remove infected Douglas-fir, patch cuts, or even clearcutting of seriously infected LYR stands

Older Forest Structure Stands

There are very few stands of older forest structure on the district. Conifer stands over 110 years old, or stands over 80 years old that have been previously thinned, have been classified as OFS. As with the LYR category, some of the 1,000 acres currently classified

OFS do not meet all of the criteria for this category. None of these stands are currently planned for any clearcut harvest. However, some stands may be partial cut to improve or maintain their ability to function as OFS stands over time.

Proposed Management Activities

Silvicultural Activities

Table 5 lists silvicultural activities for Astoria District lands for fiscal years 2002 to 2011. Refer to **Appendix A** for a detailed discussion of how these activities were calculated.

**Table 5. Proposed Annual Silvicultural Activities
for Fiscal Years 2002 to 2011**

Activity	Estimated Annual Acres
Conifer Partial Cut	2,100 – 3,200
Conifer Clearcut	400 – 600
Hardwood Partial Cut	0 – 200
Hardwood Clearcut	0 – 500
Reforestation	600 – 1,700
Precommercial Thinning	400 – 1,300
Fertilization	0
Pruning	200 – 700

For planning purposes, about one-sixth of the annual clearcut acres are planned for interplanting with multiple conifer species. The interplanting will also compensate for increased browsing losses on planted western red cedar. Additionally, about one-tenth of the annual partial cutting is estimated to require some underplanting, in order to establish the desired conifer understory and move these stands toward more complex structures in a reasonable time frame. However, with the abundance of shade-tolerant conifer species on the district and the site preparation done after logging, most understory re-initiation is expected to occur naturally.

Roads

The desired future condition of the road system is one that provides access for fire protection, forest management and public access, while minimizing the overall density of roads on the landscape and the potential impacts to other resources. During the planning period, four types of road work will be accomplished:

- **Construction** — New roads will be constructed to provide or enhance forest access.

- **Improvement** — Existing roads will be upgraded to meet current and future needs, correct unsatisfactory conditions, meet desired road standards and prevent environmental damage.
- **Maintenance** — Road maintenance will be performed as necessary to minimize adverse environmental impacts, ensure continued forest access, protect investments and comply with the Oregon Forest Practices Act.
- **Vacating** — Roads that are temporary or that are determined to not be a component of the permanent transportation system will be vacated (or closed).

Guidance for achieving the desired condition will come from the *Forest Roads Manual* (ODF, July 2000) and the *Astoria District Transportation Plans* (ODF, in progress). The majority of Level I and Level II transportation planning required by the *Forest Roads Manual* (ODF, July 2000) has already taken place across the district during the development of the district's current forest road network. Level III transportation planning will be conducted in conjunction with the development of annual operation plans and timber sale design. As road activities are planned, the following issues will be considered:

- **Location** — New roads will be located to the greatest extent possible on ridge tops or near the 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 (and that the risk of resource damage in the event of 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 road use.
- **Surfacing** — High use standard roads will be surfaced with hard rock to a depth sufficient to allow all-weather use. Medium and low use standard roads may also be surfaced with hard rock materials where road use is permanent and surfacing is necessary to support planned management activities. Some temporary roads may not be surfaced and use only during dry weather then vacated (or closed) upon completion of use.
- **Drainage** — Drainage structures will be installed as necessary to provide proper drainage and minimize delivery of sediment to streams. All installed stream-crossing structures will be designed to pass a peak flow that at least corresponds to the 50-year return interval. All installed stream-crossing structures in Type F (fish-bearing) streams will be designed to allow the migration of juvenile and adult fish during conditions when fish movement in the stream normally occurs.
- **Excess sidecast** — Roads will be assessed to identify sites that present a significant risk of sidecast failure with a significant risk of resource damage. These sites will be reconstructed to minimize the risk.
- **Road maintenance** — Purchasers of timber sales will be responsible for maintenance on active roads providing access to timber sales. Maintenance on all other roads will be performed by Department of Forestry personnel and by road maintenance contracts. Landslides and washouts will be repaired if they will not

cause additional instability. If repairs would cause additional instability, then consideration will be given to vacating the road and/or relocating access.

- **Road vacating** — Roads will be assessed to identify segments that may be vacated for the purpose of minimizing overall road density or potential resource damage. Non-system (abandoned) roads will also be assessed and vacated where determined to be a priority.
- **Inventory** — A detailed road inventory will be initiated, completed and updated on an ongoing basis to reflect any road improvements or changes to the road system. Major elements of the inventory include assessments of road drainage, surfacing, stability and vegetation conditions. Information will be used to identify risks and prioritize road maintenance and road improvement needs.

Potential road activities were computed by analyzing updated harvesting objectives, historical trends and Basin Descriptions, and, are summarized in Table 6.

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

	Low Use	Medium Use	High Use
Current Miles of Road	202 miles	335 miles	303 miles
New Road Construction	107 – 139 miles	62 – 81 miles	9 – 12 miles
Road Improvement	72 – 119 miles	72 – 119 miles	96 – 158 miles
Road Closure and Vacation	13 – 38 miles	7 – 19 miles	2 – 6 miles
Estimate Miles of Road in 2011	270 – 327 miles	378 – 409 miles	306 – 312 miles

To accomplish the district’s silvicultural objectives, it is estimated that between 178 and 231 miles of new road construction and between 240 and 396 miles of road improvement will be necessary over the entire district during the planning period. Road construction and improvement identified in this plan will be primarily achieved through project work connected with timber sales. Additional details can be found in the **Management Basins** section of this document.

Approximately 5 percent of the roads to be constructed will be high use standard roads as it is anticipated that some existing roads or portions of roads will be relocated away from streams to more stable ridge top locations. Approximately 60 percent of the roads to be constructed will be low use standard access roads as needed to provide access to timber sale areas. The medium use (collector type) roads make up the remaining 35 percent, and in most cases, will be used for numerous forest management activities over the next several decades.

Between 22 and 64 miles of road will be vacated (or closed) during the planning period.

Slope Stability

Unstable geologic formations and soil types occur naturally throughout forests. Many of these features are readily identified in the *Soil Survey (Steinbrenner, et al)* document.

During the annual operations planning process, the Area Geotechnical Specialists review all planned road and harvesting operations for the presence of unstable land formations. Small features are also identified during field reconnaissance at the time of specific road and/or harvest planning. Generally, when these unstable features are identified, they are avoided when planning roads and/or harvesting operations. If they cannot be avoided, then local foresters and engineers consult with the Area Geotechnical Specialists to assess options, risks, and/or mitigating actions. The Area Geotechnical Specialists document their review, findings, and recommendations.

Recreation

The *Astoria District Recreation Management Plan* (ODF, 2000c), adopted in October 2000, defines planned recreation management activities for next decade. The two-year recreation planning process involved assistance from a technical planning team and a 13-member citizen advisory committee.

The district's approved Recreation Management Plan consists of three components: 1. short-term action plan, 2. role of Clatsop State Forest as a recreation provider, and 3. designation of activity zones.

An ongoing recreation advisory committee was established in spring 2001 to assist the district in the implementation of the approved Recreation Management Plan. This citizen's advisory committee reviews site development plans and proposed policy changes, assists with prioritizing actions identified in a short-term action plan, reviews activity zoning designations, and assists in developing a volunteer program to maintain sites, facilities, and trails.

The Plan's short-term action plan is implemented based on priorities and available funding. An implementation matrix established priorities for all objectives and actions identified in the short-term action plan.

The short-term action plan identified six specific recreation themes: 1. recreation management; 2. motorized recreation; 3. non-motorized recreation; 4. camping; 5. day use activities; and, 6. hunting and fishing. The Recreation Management theme addressed objectives at a broad level relating to all recreation activities, rather than being activity specific. The remaining five themes focus on specific recreation activities. Each theme is organized to provide objectives relating to that theme. For each objective, actions are identified. These actions will be implemented during this planning period, based on priority and available funding. The action items are not listed in priority.

Following is a summary of the six identified recreation themes, specific objectives related to the recreation theme, and the action items for each respective objective planned for the next decade:

1. RECREATION MANAGEMENT

- Objective #1- Implement maintenance standards and procedures regarding public use activities on the forest.
 - Implement ODF's "Facility Standard's Manual" on Clatsop State Forest; redesign, upgrade, and build designated trails to minimize adverse resource impacts; inventory and identify abandoned trails, roads, sites, and historic routes that can be utilized as trails and trail linkages, and provide opportunities for loop trails; and, implement a district wide trash and garbage clean-up program.
- Objective #2- Enforce statutes and rules governing recreation use of state land.
 - Utilize the Oregon State Police and Clatsop County Sheriffs Department to patrol the forest and enforce recreation rules and regulations governing recreation; and, utilize ODF employees to make public contacts to promote compliance with regulations and raise awareness of forest management contributions.
- Objective #3- Establish a program of informing and educating users about recreation rules, opportunities, and a general orientation to the forest.
 - Develop a program to educate the forest users on forest etiquette, the working forest concept, and compliance with the recreational activity; construct and install informational kiosks at day-use areas, campgrounds, staging areas, and trailheads describing ODF activities and interpreting cultural and natural history of the forest; include the use of "yield" signs to improve public awareness of trails that specific activities can use; develop a process to name and map established trails; establish a district policy for publicizing of recreation opportunities, and evaluate the need for developing and publishing guides, brochures, and/or maps; and, establish a Clatsop State Forest website, and incorporate recreation opportunities within the forest including GIS maps and links to complimentary sites.
- Objective #4- Increase user group participation in recreation projects in the forest.
 - Form a Recreation Advisory Committee to help advise the district in development and implementation of the action plan and update activity zoning; and, implement a volunteer program with user groups to establish, develop, maintain sites and facilities, and patrol trails and other high use areas.
- Objective #5- Improve the safety and management of recreational target shooting in the forest.
 - Inventory, evaluate, and designate areas of the forest for target shooting; and, establish no shooting zones around day-use areas, campgrounds, trailheads, and staging areas.
- Objective #6- Integrate recreation management with forest operations, fire season, regulations, adjacent landowners, and other management activities.
 - Coordinate with other state lands programs to integrate all management activities; promote an open gate policy on state land, wherever feasible and reasonable; evaluate seasonal road closures in non-motorized zones during hunting season; and, identify and mark property boundaries in critical or sensitive areas.
- Objective #7- Determine desirability and feasibility of collecting recreational fees.
 - Conduct a study to assess the feasibility of implementing user fees. Assess similar programs in other public land management agencies and in other states.

- Objective #8- Pursue acquisitions and land exchanges that promote unique recreation opportunities.
--Resolve ownership issues in Astoria Basin concerning Pipeline Road and land consolidation that would result in more diverse recreation opportunities, efficient recreation management, and effective land management strategies; and, promote efforts to acquire high priority recreational sites adjacent to state land.

2. **MOTORIZED RECREATION**

- Objective #1- Establish motorized use zones to separate conflicting users and provide motorized recreation opportunities.
-- Designate activity zones that identify types of activities and/or facilities provided; conduct a planning process to determine activity zoning within the Astoria Basin; and resolve safety and environmental concerns associated with Pipeline Road.
- Objective #2- Establish a system of designated trails and road classes to better manage motorized use and redesign, upgrade, and/or build designated trails to minimize adverse resource impacts.
-- Construct, upgrade, or re-route OHV trails consistent with ODF's Facility Standards Manual; develop an OHV trails inventory and comprehensive trails plan that considers designated trails; install barriers on motorized trails to eliminate impact from vehicles not capable of safely using the trail; monitor and evaluate OHV impacts on riparian areas and sensitive habitats and adapt management plans accordingly; and, reduce OHV use of active quarries, pits, road banks and sensitive areas.
- Objective #3- Provide trailheads and staging areas to reduce conflicts and improve user experience.
--Apply a standard design for staging areas that provides ample parking and trail/visitor information; consider installing loading and unloading ramps, restroom facilities at high use areas, and garbage containers; consider staging areas in Knappa/Svensen, Nicolai Mountain, and/or Walluski.

3. **NON-MOTORIZED RECREATION**

- Objective #1- Upgrade existing trails to comply with ODF's Facility Standards Manual. Establish ongoing inspection and maintenance program to keep trails up to standards.
-- Continue trail system development by Oregon Equestrian Trails behind Clatsop County Fairgrounds for horse trails and other non-motorized use; and, explore the feasibility of designating the Taylorville Mountain Bike trails for all non-motorized activities.
- Objective #2- Provide trailheads and staging areas to reduce conflicts and improve user experience.
-- Apply a standard design for staging areas that provides ample parking and trail/visitor information; also include: restroom facilities at high use areas, make staging areas for horse areas adequate for many trailers (group rides) along with manure disposal area, and garbage containers; consider trailheads and staging areas in the following locations: Jewell (equestrian), Shingle Mill Road (all non-motorized uses), Quartz Creek Bridge area (all non-motorized uses), and along Hwy 53 near Soapstone Lake trail.

- Objective#3- Establish new or connector trails within areas identified for potential hiking, equestrian, and mountain bike use. Develop comprehensive trails plans.
 -- Develop more opportunities for non-motorized activities in Astoria Basin; explore North of Hwy 30 near John Day for hiking/day-use/boating; mountain bike opportunities along Pipeline Road (above Emerald Heights); fairgrounds horse trail system that would go from Hwy 202 to Hwy 30; expand Spruce Run Park in linear park concept along the Lower Nehalem River to include non-motorized trails; trail along Nehalem River near Spruce Run Park; develop hiking trails in Soapstone and Bloom Lake areas; build a non-motorized trail from Gnat Creek Fish Hatchery to Gnat Creek Falls; develop trail along Gnat Creek to Gnat Creek Falls; consider the following trail development locations and attributes at North Fork Nehalem River (hiking/fishing access), Fertile Valley, Knappa/Svensen (equestrian), Northrup Creek Meadows (equestrian), Elk Mountain, maintain access and use of the Walluski and Powerline trails, and incorporate viewpoints into trail system design.

4. **CAMPING**

- Objective #1- Provide low amenity, high quality camping facilities in accordance with ODF's Facility Standards Manual.
 -- Designate and manage Gnat Creek Park as an undeveloped semi-primitive campground with walk-in tent sites and hiking trails within area, and establish a non-motorized trail to Gnat Creek Fish Hatchery; expand Spruce Run Park in linear park concept along the Lower Nehalem River providing opportunities for camping sites on west side of Nehalem River for canoeing/kayaking; designate and manage Bloom Lake for semi-primitive camping with access by foot or horse trails; designate and manage North Fork Nehalem River bridge area as undeveloped semi-primitive camping with access by foot or horse trails (camping along Sweethome area); explore Jewell area for camping and trail opportunities; designate Northrup Creek Meadows for camping; explore Jewell area for a horse camp and staging area; explore developing a horse camp at Side Camp on Beneke Creek Road with linking trails; explore Jewell area for equestrian trail system; provide dispersed camping in conjunction with non-motorized trails near Soapstone Lake; explore Plympton Basin for potential camping opportunities; repair and continue area of the Plympton Basin as a Boy Scout/Youth semi-primitive camp; evaluate east county for suitable horse camp and coordinate with equestrian user groups; and, develop a process to close certain areas of the forest to promote reserved camping and/or the use of a staging area, and charge a recreational permit fee.
- Objective #2- Establish a maintenance and operation program to prevent deterioration and to maintain standards of camping areas.
 -- Apply procedures, schedules, and processes consistent with ODF's Facility Standards Manual; install boulders for barriers at campgrounds and campsites to reduce impact of areas. Install fire rings at dispersed campsites; and, implement a fee system for overnight use at developed campgrounds.

5. **DAY-USE ACTIVITIES**

- Objective #1- Address need for day-use areas near Highways 26 and 30.

- Designate and establish day-use areas adjacent or near to current or potential campgrounds close to Hwy 26 and 30 (Spruce Run Campground and Gnat Creek Campground); and, provide group picnic areas and information kiosks.
- Objective #2- Improve access to the Nehalem River.
 - Locate and develop potential drift boat sites on the Nehalem River.
- Objective #3- Establish future direction for archery range.
 - Work with the Saddle Mountain Archers to develop future strategies for management of archery range.

6. HUNTING and FISHING

- Objective #1- Coordinate with ODF&W to maintain hunting and fishing opportunities.
 - Continue to provide open areas for hunting and establish Travel Management Areas that are consistent with non-motorized activity zones; evaluate seasonal road closures to improve quality of experience and escapement for animals; communicate with ODF&W on stocking of fish on or adjacent to ODF recreation sites; the Clatsop State Forest has been identified within the Recreation Opportunity Spectrum (ROS) as roaded-natural and roaded-modified; and, the facilities and infrastructures developed will maintain the aesthetic nature of these recreation settings.

The Clatsop State Forest has designated motorized and non-motorized activity zones, as determined during the recreation planning process. Trails in a non-motorized zone will be only for hiking, mountain biking, and equestrian riding. Opportunities exist for all non-motorized uses to occur on a single trail; however, there are occasions where use is limited to a single activity. Trails in a motorized zone will focus on motorcycles, all-terrain vehicles (ATV), and four-wheel drive vehicles. Trails may be designated for all three activities, or ATV and motorcycle only. Activity zones will be updated on an ongoing basis.

A uniform system of rules on recreational forest use was adopted in 1995. These rules will be revised and updated by 2010 to accommodate increased use and changes in recreational use of the forest. One Clatsop County deputy sheriff patrols the Astoria District on a part-time basis. As use increases over the years, the district plans to increase law enforcement and patrol the entire forest on a full time basis.

Over the next 10 years, the focus of the recreation program is to implement the short-term action plan. A more specific description of planned development is in the **Basin Descriptions** section of this document.

Public Safety and Law Enforcement

Public safety on the forest and especially in recreation sites such as campgrounds will be achieved through use of the Clatsop County Sheriff. Currently ODF contracts with the county sheriff to provide security and law enforcement on the forest and will continue this practice in the future as long as it remains feasible.

Public safety will be further enhanced when the recreation program establishes a sign program that will help direct various recreational uses.

Areas of active management on the forest will be posted at key information areas such as campgrounds, trailheads, and kiosks. Information will describe current forest operations in the area, and any closures in affect. Recreation users can also monitor vehicle traffic on mainline roads using a CB radio, the district posts a CB channel on most mainlines allowing for easy communication between vehicle traffic.

Aquatic Resources: Stream Enhancement Projects

Surveys conducted by the Oregon Department of Fish and Wildlife (ODFW) identified approximately 4 miles of streams within the Clatsop State Forest that are high priority candidates for in-stream habitat enhancement. Enhancement projects have been completed on all 4 miles; the projects will be monitored for effectiveness.

In addition, 6 lower priority in-stream habitat enhancement opportunities have been identified, and are scheduled to be completed in the near future.

Ten culverts have been identified for high priority replacement of fish barriers. These will be replaced or vacated in the near future, with structures or vacating that allow fish passage.

Stream surveys will continue throughout the planning period, and will refine fish presence maps and track stream habitat conditions. Specific projects on candidate streams will be finalized in a cooperative effort between district personnel and ODFW biologists. ODFW will provide input relating to design and location of enhancement work. The Department of Forestry will confirm feasibility, provide necessary materials, appraise the cost of work, and prepare and administer the stream enhancement contracts.

All projects will be conducted in accordance with the Forest Practices Act and Army Corp of Engineers requirements.

Cultural Resources

Cultural resource inventories will be developed and completed within the 10-year planning period and incorporated into a GIS theme or layer. 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

Most of the Clatsop State Forest has been surveyed for the presence of natural gas reserves, and a few wells have been drilled. However, commercial quantities of natural gas or other minerals have not been removed from these state forest lands. If commercial quantities are discovered, they will be available for sale and removal, under strict controls by the

Department of Forestry for the protection of forests, soils, water quality, fish, wildlife, and other surface resources.

Hard rock is removed from state forest lands for road surfacing on an ongoing basis. These sites, called rock pits or quarries, are in specific locations, generally less than three acres. They are used for ten or more years before being exhausted of suitable surfacing rock. Most often the hard rock from these sites is crushed to produce surfacing rock of specific size and grade for forest roads. This crushed rock is either applied directly to existing or newly constructed roads, or is stockpiled at a nearby location for future application. When quarry sites are exhausted, they are vacated by providing water drainage, reducing the slope of the quarry walls, and sometimes filling them in with topsoil and reseeding the surface with annual and perennial plants.

Future Information Needs

The Department of Forestry plans to develop a partnership approach with the Division of State Lands to provide for the exploration and development of mineral and energy resources while providing necessary protection and reclamation of surface resources and resource values. A plan will also be developed to minimize the impact to surface resources when developing mineral and energy resources. The district will continue to assess future rock needs and plan accordingly.

Lands and Access

The district will continue to pursue land exchange opportunities when: 1. the transaction results in the consolidation of state forest lands, or makes management of state-owned forest lands more economically feasible; 2. 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, 3. 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.

The district will also continue to follow current Board of Forestry policies for land acquisitions and exchanges. Since the current land exchange and acquisition plan is about 10 years old, then the district will update the land exchange and acquisition plan to cover this IP period.

In addition, the district will develop an inventory of needed land survey work, and a land survey plan to accomplish the work identified in the inventory within a specified timeline.

Activities needed to develop and maintain an access system were discussed above, under **Roads.**

Scenic Resources

Scenic resources within the Astoria District include land adjacent to Highways 30, 26, and 101, which are designated scenic highways in the Forest Practices Act (FPA). Other visually sensitive areas include recreation areas such as Spruce Run Campground and the Lower Nehalem River; the Fishhawk Lake community viewshed; Jewell Wildlife Meadows; the

Astoria basin viewshed from the Astoria Column; Highways 202, 103, and 53; and major forest roads that are driven recreationally.

Management Opportunities

Scenic resources are site-specific viewsheds that can be seen from highways, major access roadways, trails, waterways, community viewsheds, and viewpoints. Viewshed management opportunities will exist when timber sale harvests are planned for areas near scenic resources. Timber sale harvests may also be planned that enhance scenic resources.

Special Forest Products

Special forest products include major resources such as: mushrooms, ferns, moss, salal, cascara, firewood, small alder poles, vinemaple, and noble fir boughs. Currently, these products are managed using an in-district policy and a price list compatible with other northwest Oregon districts. Customers either call or come to the office with information on the area where they want to harvest special forest products. Most permits cannot be issued on a same-day basis, with the exception of certain free use permits. Customers must wait until their permit is processed, usually within 5 to 7 work days. Once the customers are issued a permit, they are on the honor system to record the date and time of activity, and amount of materials harvested. Once they have finished harvesting, they are to call the district and inform the sale administrator that they have finished. Free personal use permits are issued on a case-by-case basis.

Future Information Needs

To achieve the management goals for special forest products, a planned approach will be developed and implemented for special forest products sales. This plan will take into consideration the concerns of long-term resource sustainability and customer service. An inventory of special forest products will be developed, to insure the availability and sustainability of these resources. A sales policy, sales guide, and an accountability process for the removal of products will also be developed to facilitate customer service and assure the receipt of fair market value of special forest products. An inventory that delineates logical sale areas and free personal use areas will be considered for future management. This inventory will also help to insure the sustainability of the resources.

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 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.

In addition, the district will contribute to statewide efforts to reduce the quantity and range of invasive, non-native plant species.

Table 7. Astoria District Endangered, Threatened or Candidate Plant Species

Genus	Species	Common name¹	Status	Record exists²	Potential to be present
Threatened and Endangered Plants					
<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>Delphinium</i>	<i>oreganum</i>	Willamette Valley larkspur	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: ST – State Threatened; SC – State Candidate; SP – Special Concern

Noxious weed regulations are under the coordination of the *Clatsop Weed Management Area Committee (CWMAC)*. The goals of the committee are to address the problems of noxious weeds in Clatsop County in a coordinated effort to: 1. increase public awareness through outreach and education; 2. identify, survey, and map incidence of priority weed species; and, 3. control or eradicate infestations of priority weeds.

Current staff members of the CWMAC group include: 1. Project Manager – David Ambrose, Clatsop Soil and Water Conservation District; 2. Project Manager – Glenn Ahrens, Staff / Forester, Oregon State University Extension Service; and, 3. Surveyor and Weed Specialists – Lee Wunder, Clatsop Soil and Water Conservation District.

Current participants, cooperators, and members of the Clatsop Weed Management Area Committee members: Clatsop Soil and Water Conservation District; Oregon State University Extension Service; Clatsop County; City of Astoria; USDA Natural Resource Conservation Service; Oregon Department of Forestry; Fort Clatsop Natural Monument; Lewis and Clark Natural Wildlife Refuge; Fort Stevens State Park; Clatsop Watershed Councils; U.S. Coast Guard; Weyerhaeuser Company; and, National Fish and Wildlife Federation.

Several noxious weeds have been identified by the CWMAC as those on which to focus attention. They include: gorse, English ivy, tansy ragwort, purple loosestrife, Himalaya

knotweed, Japanese knotweed, giant knotweed, spartina grass, Scotch broom, and Canadian thistle.

Specific conditions and strategies for state forests are:

- GORSE- found in small, isolated patches in a few locations throughout the County. The only significant areas of infestation are in the Clatsop Spit area and East and West Sand Island on the northern side of the mouth of the Columbia River.
- ENGLISH IVY- is endemic to the urban area of the County. Uncontrolled growth is beginning to affect trees that are slowly being overgrown.
- TANSY RAGWORT- present countywide in open areas – roadside, vacant lots, and in particular pastures. Established populations of two bio-control agents – cinnabar moth and the ragwort flea beetle – have kept the infestation at reasonable levels. However, a drop-off in the effort to distribute these bugs in recent years has led to an expansion of tansy ragwort infestations.
- PURPLE LOOSESTRIFE- infestations continue to gain ground in the estuary areas of the county along the Columbia River. Intensive mechanical control in the Youngs Bay area has made progress in eradicating the population there. Several of the islands in the Columbia River have been completely taken over to the point where mechanical eradication is impractical.
- HIMALAYAN, JAPANESE, AND GIANT KNOTWEED- These knotweed varieties have been found countywide and are rapidly spreading. The most severe infestation are along the Nehalem and Necanicum River where patches reach a quarter acre. Significant patches are found in vacant lots of the urban areas of Astoria, Seaside, Gearhart, and Cannon Beach. Patches have been documented in every watershed of the county.
- SPARTINA GRASS- No spartina grass has been documented in Clatsop County. None has been discovered during aerial surveys over the past two years of the most likely beach heads.
- SCOTCH BROOM- prevalent throughout the County. Particularly high concentrations exist in the Clatsop Plains Area.
- CANADIAN THISTLE- exists throughout the County on open pasture land. Control and eradication is difficult unless adjacent landowners cooperate to eliminate plant infestations at the same time.

The current efforts for controlling noxious weeds on ODF lands are focused on Scotch broom and tansy ragwort. The other noxious weeds in the county are being monitored. Aerial applied herbicides are utilized to target Scotch broom in conifer plantations. In addition, when Tansy Ragwort growing in conjunction with Scotch broom, then tansy ragwort is also controlled. In the past, ODF has cooperated and provided locations for the release of the Cinnabar moths and the ragwort flea beetles to help control ragwort.

Roadside herbicide applications/operations generally target alder and salmonberry, but when Scotch broom and tansy ragwort grow in conjunction with these species then additional control of these noxious weeds is achieved.

Landscape Design Overview

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. Previous forest management sometimes aimed at goals different from the desired future condition now envisioned.

Therefore, as the landscape design principles were applied to the forested landscape, current stand condition was not always the primary factor for developing the desired future condition stand structure array. Rather, the stand's location and potential contribution to landscape design goals were given greater consideration. Thus, the design calls for some young stands to be developed into OFS and LYR stand structures; and some older, more complex stands are not scheduled for development into these stand types.

A desired future condition map can be found in the **Map Section**. The district intends to achieve this goal by designating areas for older forest structure and layered stand types across the landscape, ensuring a variety of forest patch sizes and shapes that provide connectivity between watersheds and dispersal habitat for wildlife. In addition, about 6,100 acres of riparian areas are being managed for mature forest condition, and are delineated across the landscape outside OFS and LYR areas. The riparian areas will supplement the designated complex stands and serve as linking corridors across the landscape. The design will also include habitats necessary for those species needing more open conditions.

Throughout the Clatsop State Forest, interior habitat areas (IHAs) were arrayed in a variety of sizes and shapes. The IHAs are combinations of future LYR and OFS stands, as planned in the desired future condition. As described in the *Northwest Oregon State Forests Management Plan*, these varying sizes and shapes will serve many wildlife habitat needs. The landscape design has approximately 77 IHA patches, in a variety of shapes and sizes: 24 patches 0 to 80 acres; 7 patches 81 to 120 acres; 16 patches 121 to 200 acres; 7 patches 201 to 320 acres; 6 patches 321 to 520 acres; 8 patches 521 to 840 acres; 3 patches 841 to 1,360 acres; 2 patches 1,361 to 2,180 acres; and 4 patches larger than 2,180 acres.

Three main strategies will be used in the placement of these future complex structures within basins. One strategy will be to place large contiguous areas of 500 acres or more of OFS with linking corridors in basins containing northern spotted owl cluster management areas and/or marbled murrelet management areas. The second strategy will be to place medium-sized areas of 250 to 500 acres and smaller areas of 60 to 250 acres throughout an identified basin. The third strategy will be to place small OFS areas throughout a basin. Layered stands will be placed adjacent to OFS areas to increase interior habitat, provide linked habitat corridors between patches of larger interior habitat, and minimize the negative effects of high contrast edge. This design will provide a diversity of OFS and LYR habitat patches across the landscape in accordance with the landscape design concepts and guidelines found in the *Northwest Oregon State Forests Management Plan* and proposed *Western Oregon State Forests Habitat Conservation Plan*.

District strategies will place OFS and LYR on a variety of sites where resource protection can be maximized, or where other resource values have a higher management priority. Examples of these resources include riparian areas, large interior habitat areas, owl cluster areas, marbled murrelet areas, important salmonid streams, municipal watersheds, significant wetlands, low site quality areas, precipitous and/or unstable slope areas, Level 1 identified visual management areas, and high-use recreational areas. (See the **Scenic Resources** section of the *Northwest Oregon State Forests Management Plan*.) Areas having steep slopes, low site, and poor access were factored into the strategies. In cases where conventional road-building and timber harvest operations may not be feasible, the development of complex forest types may take longer to achieve.

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

In some cases, some minor amount of LYR stands (as classified according to the current inventory) may be further analyzed and reclassified into another structural condition. If the placement of these stands is determined to be inconsistent with the landscape design, then they may not be considered for retention on the landscape.

Other forest lands surrounding the Astoria District consist mostly of large tracts of industrial forest lands. These forest lands are managed for different objectives than the state forest lands. There is virtually no federal forest land in Clatsop County. A major factor in the landscape design for complex forest structures is to complement and balance the management on other forest lands in the basins. This will be accomplished by managing for OFS and LYR structure stands along property boundaries with private lands.

Management Basins

Management Basins Overview

In general, management basins were delineated by choosing, in consultation with the local fisheries biologist, the medium-sized drainage basins on the district. There are several exceptions to this rule, however. For planning purposes, it was deemed desirable to not exceed a total of 15 to 18 basins for the district (136,140 acres). Therefore, the average basin would be around 8,000 to 9,000 acres. We did not want to designate any land block less than about 4,000 acres as a management basin. In addition, we felt that some boundaries, such as major highways, would serve as better basin boundaries than the actual ridge separating 2 or 3 major stream drainages. For example, the drainage boundary between the Gnat and Davis basins, in the northeast part of the district, would parallel Highway 30, about one-half mile north of the highway. Instead, the district designated Highway 30 as the basin boundary, based on greater ease in planning and management.

The result on Astoria District is 17 management basins, including one scattered tract basin, ranging in size from a low of 4,204 acres (Louisgnot) to a high of 19,218 acres (Buster).

**Table 8. Astoria District Planning Basins
(listed in alphabetical order)**

Management Basin	Acres	District Percent
Astoria	4,450	3%
Beneke	9,715	7%
Buster	19,218	14%
Crawford	4,215	3%
Davis	7,000	5%
Fishhawk	5,075	4%
Gnat	10,020	7%
Hamilton	6,805	5%
Klaskanine	6,270	5%
Lousignot	4,204	3%
N. Fork Nehalem	7,880	6%
Northrup	7,196	5%
Plympton	10,435	8%
Quartz	6,339	5%
Sager	10,568	8%
Scattered	5,730	4%
Sweet Home	11,020	8%

Basin Descriptions

The following 17 basin descriptions are presented in alphabetical order.

Astoria Basin

This management basin consists of 4,450 acres, and is located in northwest Clatsop County. The majority of these lands are drained by Mill Creek and Crosel Creek into the Columbia River. Elevation ranges from 20 to 650 feet, with an average of 250 feet above sea level. Site index (King’s 50-year growth curve) ranges from 130 to 140 and averages 139 for the basin.

This basin is adjacent to the largest populated area in the county (the city of Astoria), and to a designated scenic highway (Highway 30). Therefore, a significant percentage of this basin has visual considerations. In addition, its proximity to urban areas contributes to the high incidence of illegal activities, including garbage dumping and vandalism. There are numerous overhead transmission lines, accounting for about 4 percent of the acreage, precluding growth of mature forests on those lands. Two bald eagle sites and one great blue heron nesting site are key resources, to be maintained and managed for OFS conditions. Several fish-bearing streams drain directly to the Columbia River or Youngs Bay. This basin is comprised almost entirely of accessible young forest plantations, some of which are infected with Swiss needle cast, on high site quality lands. Therefore, 11 percent of this basin is designated for future OFS stands, and 10 percent is designated to be REG stands.

This basin receives a high level of recreational use due to its location near Astoria. Both motorized and non-motorized activities use trails established with no department management or planning, which cause resource damage. Illegal garbage dumping is high in this basin. A target archery range has been established near the Walluski area with a special use permit. Only the local archery club members and their guests are allowed to use the site.

Table 9. Astoria Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	8	52	24	7	1	8
Post Implementation Plan Condition ¹	11	14	59	7	1	8
Desired Future Condition	10	13	18	41	11	7

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

Key Resource Considerations for Astoria Basin

- Bald eagle and great blue heron nesting sites.
- High use for recreational trail development, and target archery range.
- Level 1 scenic resources.
- Sitka spruce swamps.
- About 9 miles of Type F streams used by coho salmon and steelhead.
- Close to Astoria urban area.
- Swiss needle cast in Douglas-fir stands.
- Hemlock progeny site.

Desired Future Condition and Landscape Design

The table on the previous page shows the percentages in the different stand types for the desired future condition. The lands to be managed toward older forest structure conditions are located in 5 blocks. Rationale for these locations include scenic concerns, protected wildlife concerns, and locations of existing OFS stands.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 200 to 250 acres of clearcutting and 1,600 to 2,000 acres of partial cutting is planned in this basin over the next 10 years, the majority (80 to 90 percent) of which will be in young conifer stands. This will reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor, making it possible for these stands to move into an understory stand structure condition. The remaining partial cutting will be in older conifer stands, with the objective of moving these stands toward a layered stand structure condition. The *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast* will be followed in selecting stands for partial cutting.

Approximately 40 years will be required to meet forest structural goals for this basin.

Road Construction and Improvement

Only a small amount of new road construction (4 to 6 miles) is planned over the coming 10-year period, as this basin is already sufficiently roaded. The district plans to upgrade its road infrastructure during the coming 10-year period, by improving an estimated 7 to 14 miles of existing roads. Additionally, a few spur roads will be constructed, to adequately access these stands for thinning operations.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Conduct a planning process to determine activity zoning within the basin. Resolve safety and environmental concerns associated with Pipeline Road.
- Continue trail system development by Oregon Equestrian Trails behind Clatsop County Fairgrounds for horse trails and other non-motorized use.
- Develop more opportunities for non-motorized activities.
- Work with the Saddle Mountain Archers to develop future strategies for management of the archery range.
- Explore North of Hwy 30 near John Day for hiking and mountain bike opportunities.

Beneke Basin

This management basin consists of 9,715 acres located in the east-central part of Clatsop County. The majority of these lands are drained by Beneke Creek and Sarajarvie Creek into the Nehalem River. Elevations range from 720 to 2,000 feet with an average of 1,250 feet above sea level, and site index ranges from 120 to 140, averaging 131 for the basin.

A major focus of management in this basin is a northern spotted owl cluster area, as identified in the draft *Western Oregon State Forests Habitat Conservation Plan*, and a marbled murrelet management area. On over 50 percent of this basin, management goals will be planned to protect and enhance these resources.

The basin receives recreational use for hunting, fishing, wildlife viewing, and dispersed camping.

Table 10. Beneke Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	8	77	8	7	0	<1
Post Implementation Plan Condition ¹	9	60	24	7	0	<1
Desired Future Condition	14	18	10	23	35	<1

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

Key Resource Considerations for the Beneke Basin

- Northern spotted owl cluster area.

- Northern spotted owls.
- Marbled murrelets.
- This basin is designated for non-motorized recreational activities only.
- Remnants of railroad logging trestles.
- About 19 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- Three research sites (SNC, Douglas-fir progeny, and Douglas-fir fertilization study).

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward older forest structure are located in 5 blocks ranging from about 50 acres to over 2,000 acres in size. Rationale for choosing these locations include: inclusion of a marbled murrelet management area; protection of spotted owl habitat; development of contiguous, blocked, large interior habitat areas contributing to the northern spotted owl cluster management strategy; adjacency to private lands that are not managed for older forest conditions; providing complex forest conditions throughout the basin at differing elevation ranges and vegetative communities; and, additional protection for Sarajarvie Creek, Beneke Creek, and other significant streams.

Proposed Management Activities

Harvesting

To move toward the desired future condition stand structure goals, about 1,800 to 2100 acres of partial cutting and 750 to 950 acres of clearcut harvesting are planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 30 acres to approximately 100 acres.

The majority of the partial cutting activity will be in densely stocked conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This activity makes it possible for these partial cut stands to move into an understory stand structure. Some partial cutting will be in older conifer stands, with the objective of moving these stands toward a layered or older forest stand structure. The majority of the planned clearcut harvests are in closed single canopy stands.

Approximately 60 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Over the next decade road construction will be fairly extensive, as several miles of roads are needed to access planned harvests. The mainline road system is currently in good condition with the exception of one mainline road that will be relocated for approximately 2 miles. This road relocation is necessary to vacate an existing section of road that is in a deteriorating condition. This section of road to be vacated will eliminate two stream crossings with high fills, one in a Type F stream. An estimate for road construction during the coming decade is about 9 to 12 miles of new construction. Existing roads will continue to be improved, as needed. An estimated 14 to 28 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock, replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

The proposed management activity is identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Explore developing a horse camp at Side Camp on Beneke Creek Road, with linking trails.

The basin offers opportunities to interpret railroad logging through a road tour route (Beneke Creek-Crawford Ridge Loop) and to convert abandoned roads into interpretive trails. The loop passes the Beneke Creek portion of the Jewell Wildlife Management Area, which offers wildlife viewing of Roosevelt elk.

Buster Basin

This management basin consists of 19,218 acres, located in the south part of Clatsop County. The majority of these lands are drained by Buster Creek, Klines Creek, and Cow Creek into the Nehalem River. Elevations range from 500 to 2,500 feet, averaging 1,600 feet above sea level, and site index ranges from 100 to 140, averaging 131 for the basin.

A major focus of management in this basin is fish and wildlife habitat. A northern spotted owl cluster management area encompasses over 60 percent of this basin, and portions of two proposed Salmon Anchor Habitat (SAH) areas, Buster Creek and Upper Rock Creek, are located within the basin. Management goals will be planned to protect and enhance these fish and wildlife habitat resources. A designated scenic highway (Highway 26) runs parallel to portions of the southern basin boundary. Therefore, this portion of the basin has additional visual considerations that will be factored into planning. A water system for the Elderberry community is located within this basin.

Fishing and hunting are the prevalent uses in the basin. Dispersed campsites are common throughout the basin and some are highly used. For example, "B" Camp was originally Buster Side Camp for the Kerry Timber Company, and since then has had over 40 years of use as a general camping area, and as a large group elk hunting camp. Additionally, abandoned railroad grades can be found throughout the basin. Unfortunately, there is also a high incidence of garbage dumping and vandalism in this basin.

Table 11. Buster Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC²	UDS³	LYR⁴	OFS	NSC
Current Condition	12	52	15	20	1	<1
Post Implementation Plan Condition ¹	10	41	27	20	2	<1
Desired Future Condition	12	20	15	17	36	<1

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

Key Resource Considerations for the Buster Basin

- Northern spotted owl cluster area.
- Northern spotted owls.
- Level 1 scenic resources along State Highway 26.
- This basin is designated for non-motorized activities only.
- Highly used for dispersed recreation.
- 1 individual domestic water source and 1 community water system on State land.
- About 43 miles of Type F streams and watersheds important for coho salmon, steelhead, and cutthroat trout.
- About 55% (10,658 acres) of this basin is within the proposed Buster Creek Salmon Anchor Habitat (SAH) area.
- About 8% (1,478 acres) of this basin is within the proposed Upper Rock Creek Salmon Anchor Habitat (SAH) area.
- Two research sites (Douglas-fir progeny site, and a Forest Practices stream temperature monitoring project on Stanley Creek, near the confluence of Buster Creek).
- *Phellinus weirii* infection in portions of the basin, a fungus that causes root rot and is fatal to Douglas-fir.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The majority of lands to be managed toward OFS conditions are located in one contiguous block of over 6,000 acres. In addition, other blocks of OFS are located to provide smaller dispersed interior habitat areas on the landscape. Layered stands were located adjacent to OFS stands to increase interior habitat area for spotted owls. Additional layered stands are distributed in locations to provide diversity on the landscape, protection for the Elderberry community watershed, and protection for Buster Creek.

Proposed Management Activities

Harvesting

To move toward the desired future condition stand structure goals, about 3,000 to 4,000 acres of partial cutting and 1,100 to 1,400 acres of clearcut harvesting is planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 30 acres to approximately 110 acres.

The majority of the partial cutting activity will be in densely stocked conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This activity makes it possible for these partial cut stands to move into an understory stand structure condition. Some partial cutting will be in older conifer stands, with the objective of moving these stands toward a layered or older forest stand structure condition. The majority of the planned clearcut harvests are in closed single canopy stands.

Harvesting in stands with *Phellinus weirii* will be done in accordance with policy recommendations contained in *Laminated Root Rot in Western North America* (Thies and Sturrock, 1995).

Approximately 80 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Over the next decade road construction will be fairly extensive, as several miles of roads are needed to access planned harvests. The mainline road system is currently in good condition. During the next decade, an estimated 18 to 22 miles of new road will be constructed. Existing roads will be improved, as needed. An estimated 42 to 56 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock, replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

Developed recreation opportunities exist for this basin; however, specific proposed management activities were not identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*. Dispersed campsites will be maintained in accordance with the Department of Forestry's standards for facilities.

Crawford Basin

This management basin consists of 4,215 acres, located in the eastern part of Clatsop County. The majority of these lands are drained by Squaw Creek and the West Branch of Squaw Creek into the Nehalem River. Elevations range from 600 to 1,200 feet, averaging 800 feet above sea level, and site index ranges from 126 to 140, averaging 130 for the basin.

The major management focus in this basin is a northern spotted owl cluster management area. Management goals on this entire basin will be planned to develop interior habitats and

enhance this wildlife resource. This basin holds some of the oldest stands on the district, many associated with historical use by northern spotted owl. There are abundant scenic opportunities in this basin with large, older trees, old railroad trestles, and plentiful wildlife. Additionally, the Crawford-Squaw Ridge Loop is a highly used route for hunting and scenic day driving.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	6	46	21	17	10	0
Post Implementation Plan Condition ¹	0	51	17	22	10	0
Desired Future Condition	0	0	0	35	65	0

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

Key Resource Considerations for the Crawford Basin

- Northern spotted owl cluster area.
- Northern spotted owls.
- This basin is designated for non-motorized activities only.
- About 5 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- Three SNC research sites.
- Remnants of railroad logging trestles.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward OFS are located in 3 blocks ranging from about 200 acres to over 1,800 acres. Rationale for these locations includes: protection of spotted owl habitat; the promotion of large, contiguous, blocked interior habitat areas contributing to the northern spotted owl cluster management area; and adjacency to privately owned lands that are not managed for older forest conditions. Layered stands were located adjacent to OFS stands to increase interior habitat area for spotted owls.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 600 to 1,000 acres of partial cutting is planned in this basin over the next 10 years. Most partial cutting activity will be in young conifer

stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This activity makes it possible for these thinned stands to move into an understory stand structure condition. Some partial cutting will be in older conifer stands, with the objective of moving these stands toward a layered or older forest stand structure.

Approximately 70 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Over the next decade, road construction will be moderate. Some additional roads will be needed to partial cut stands that were clearcut in the 1960s and 1970s. The mainline road system is currently in good condition. During the next decade, about 5 to 7 miles of new road will be constructed. Existing roads will be improved, as needed. An estimated 7 to 14 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

Specific proposed management activities for this basin were not identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*, although recreational opportunities exist.

Davis Basin

This basin is 7,000 acres and has several rural residential areas (Davis Bottom, Anderson Creek, and Peterson Creek valleys; and the Fertile Valley area). A scenic highway (Highway 30) forms the southern boundary of this basin, and the Columbia River forms the northern boundary. Therefore, a significant percentage of this basin has visual considerations. In addition, its proximity to numerous residences contributes to the high incidence of illegal activities, including garbage dumping and vandalism. The lower reaches of a major Type F stream, Gnat Creek, will be managed for fisheries concerns. These stream reaches are all downstream from the state fish hatchery. Along the Columbia River slopes, there are 2 or 3 bald eagle nesting areas. The immediate stands around them will be managed for OFS conditions. Because this basin is predominantly comprised of fully accessed young forest plantations on high site quality lands, some of which are infected with Swiss needle cast, the landscape design designates 11 percent of this basin for future OFS, 33 percent as LYR, and 15 percent as REG stands.

Gnat Creek Campground is located in this basin. It is a designated day-use area and is also used for camping, although it is not officially a campground.

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

	REG	CSC²	UDS³	LYR⁴	OFS	NSC
Current Condition	10	64	21	4	0	1
Post Implementation Plan Condition ¹	14	58	24	4	0	1
Desired Future Condition	15	17	23	33	11	1

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

Key Resource Considerations for the Davis Basin

- Bald eagle nest sites.
- River shore wetlands.
- Gnat Creek Campground.
- This basin is designated for non-motorized activities only.
- About 15 miles of Type F streams and watersheds for salmon and steelhead habitat.
- There are 5 Individual domestic water sources on State land.
- Two research sites (Douglas-fir progeny and SNC thinning).
- Level 1 scenic resources along Hwy. 30.
- Swiss needle cast in Douglas-fir stands.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward older forest structure conditions are located in 3 blocks. Rationale for these locations includes scenic concerns, protected wildlife concerns, important fish streams, a developed recreation area, and locations of existing older conifer stands already on their way toward developing OFS structural characteristics.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 600 to 650 acres of clearcut harvesting and about 800 to 900 acres of additional partial cutting are planned in this basin over the next 10 years, including about 150-200 acres to harvest the most severely infected stands with Swiss Needle Cast. These partial cuts will reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor, making it possible for these stands to move into a UDS stand structure condition. For older conifer stands, these partial cuts will encourage the development of these stands into LYR structure.

Partial cutting will be done in accordance with the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast* (ODF, January 2000).

Approximately 40 years will be required to meet forest structural goals for this basin.

Road Construction and Improvement

Very little new road construction (3 to 5 miles) is planned over the next decade, as this basin is mostly roaded at present. However, some of the existing roads are not in suitable condition for active log hauling. Therefore, most of these older roads will be upgraded. We estimate 6-12 miles of road improvement over the decade.

Recreation

Gnat Creek Campground is located in this basin. It is a designated day-use area and is also used for camping. The Department of Forestry designated Gnat Creek as a forest park in 1971 and managed it as a park until 1980, when funding problems made the department discontinue management and the park facilities were dismantled. Management of the park increased in the late 1990s. The district has posted an informational sign board and interpretive signs, improved a parking area, built new trails, installed picnic tables and fire pits, and installed a vault toilet. Also, the Fertile Valley area receives OHV and hiking use. The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*:

- Designate and manage Gnat Creek Campground as a semi-primitive campground with walk-in tent sites and hiking trails, and establish a non-motorized trail to Gnat Creek Fish Hatchery.
- Designate and establish day-use areas near current or potential campgrounds close to Highway 30 (Gnat Creek Campground). Provide group picnic areas and information kiosks.
- Consider non-motorized trail development in Fertile Valley.

Fishhawk Basin

This management basin consists of 5,075 acres, located in the northeast part of Clatsop County. The majority of these lands are drained by Fishhawk Lake Creek into the Nehalem River. Elevation ranges from 1,000 to 1,760 feet, averaging 1,200 feet above sea level. Site index ranges from 110 to 140, averaging 126 for the basin. This basin abuts the Plympton Basin to the north, the Northrup Basin to the west, and the Louisignot Basin to the south. To the east is the Clatsop-Columbia county line, and the adjacent forest land to the east is industrial forest land. Fishhawk Lake, a man-made lake surrounded by residences, abuts the southeast corner of this basin. These are generally high site lands, fairly well accessed, with relatively minor identified threatened or endangered species concerns. For these reasons, the objectives for this basin are for 14 percent to be managed for OFS, while 15 percent is to be maintained in REG stands. Recreational use that does occur is mostly from the residents who live around Fishhawk Lake, and consists of hiking on forest roads.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	12	74	5	8	1	<1
Post Implementation Plan Condition ¹	12	43	27	17	1	<1
Desired Future Condition	15	17	35	19	14	<1

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

Key Resource Considerations for the Fishhawk Basin

- Level 2 scenic resources near Fishhawk Lake.
- About 11 miles of Type F streams and watershed important for coho salmon.
- About 95% (4810 acres) of this basin is within a proposed Salmon Acre Habitat (SAH) area.
- *Phellinus weirii* infection in portions of the basin.
- This basin is designated for motorized recreational activities.
- The Fishhawk Lake community (about 150 residences) uses Fishhawk Creek as a source of drinking water, with a water intake located about 4 miles downstream of ODF land.

Desired Future Condition and Landscape Design

About 14 percent of the basin is planned for future OFS stands. OFS areas are located on the basin in 6 blocks, ranging from about 30 acres to 150 acres. Rationale for these locations includes using one stand that is currently 90 to 100 years old, a stand partial cut during the 1970s and now a LYR stand, and several younger stands that have low stocking levels and therefore larger individual trees. One block is located adjacent to the Fishhawk Lake community and is in their viewshed. LYR areas are located adjacent to most OFS blocks, in order to add more interior habitat to each block, as well as to provide future OFS when OFS stands are ready to be harvested. Current stands within this block consist mainly of CSC stands of conifer and alder, and a LYR conifer stand older than 80 years. The CSC stands will be partial cut soon, to move them into a UDS structure. This variety of OFS stand sizes and locations should provide for a range of habitat types scattered over the landscape.

There are 3 LYR stands and 3 older stands (80 years or older) within the basin that are not included in these blocks. They are excluded because they are not in a desirable location for complex stand development. Average size of these excluded stands is only 19 acres.

Proposed Management Activities

Harvesting

To move toward achieving these structural goals, about 250 acres of clearcut harvests are planned in this basin over the coming decade, and about 2,000 to 2,500 acres of partial cutting is planned over the same period. Of this total, about 600 to 700 acres will be initial partial cutting of conifer plantations. The remainder will be in older stands, aged 55 to 95, with the objective of moving these stands into more complex stand structures. Harvesting in stands with *Phellinus weirii* infection will be done in accordance with policy recommendations contained in *Laminated Root Rot in Western North America*.

Approximately 25 years will be required to reach forest structural goals for this basin.

Road Construction and Improvement

Road construction will be fairly extensive over the next decade, because an estimated 8 to 10 miles of new roads are needed to access planned harvests. The mainline road system is currently in good condition. Existing roads will be improved, as needed. This improvement will consist of adding surfacing rock and replacing culverts. About 10-15 miles of road improvement is anticipated over the decade.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*:

- Provide perimeter motorized trails in Gnat, Lousignot, Fishhawk, and Plympton basins.

Gnat Basin

This management basin consists of 10,020 acres, located in the northeast part of Clatsop County. The majority of these lands are drained by Gnat Creek into the Columbia River. Elevation ranges from 100 to 3,000 feet, averaging 1,400 feet above sea level, and site index ranges from 110 to 140, averaging 132 for the basin.

A management focus in this basin is a scenic area along the Highway 30 scenic corridor.

This basin is characterized generally by CSC stands of dense, 50- to 60-year-old conifer and scattered alder; interspersed with REG areas resulting from clearcut harvesting during the past 25 years; and LYR conifer stands 60 to 70 years old, resulting from partial cutting over the past 25 years. There are no stands over 80 years old in this basin. The Gnat Creek canyon divides this basin roughly in half, east to west, and a fish hatchery is located on the lower reaches of Gnat Creek. The upper reaches have several high waterfalls and a large cedar swamp above the falls. Recreational use is mainly hunting. There is additional recreational potential in the Gnat Creek Canyon for a trail system to the waterfalls and for fishing access. The Bonneville Power Administration overhead power lines cross the northern part of this basin, east to west, cutting a swath 400 feet wide, 3 miles long.

This basin is characterized by accessible conifer plantations on high site land, some of which are infected with Swiss needle cast. It is located near a major state highway, and has a steep creek canyon (Gnat Creek) that drains toward a fish hatchery. This has led to the

objectives of 14 percent of this basin to be managed toward OFS, while 15 percent is to be maintained in REG stands.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	11	56	19	12	1	1
Post Implementation Plan Condition ¹	11	43	34	11	1	1
Desired Future Condition	15	18	25	27	14	1

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

Key Resource Considerations for the Gnat Basin

- About 26 miles of Type F streams and watershed important for salmon, steelhead, and cutthroat trout; and maintaining water quality for downstream salmon hatcheries.
- There are 2 domestic water sources (wells) on State land.
- Level 1 scenic resources along Highway 30.
- Swiss needle cast in Douglas-fir stands.
- Two research sites (Douglas-fir progeny and Stand Mgt. Coop spacing study).
- Approximately 5,028 acres are designated for non-motorized recreational activities only.
- Approximately 4,992 acres are designated for motorized recreational activities.

Desired Future Condition and Landscape Design

In this basin, the lands to be managed toward older forest structure conditions are located in 6 blocks, ranging from about 80 to 300 acres. Rationale for these locations includes: Type F stream habitat in the Gnat Creek Canyon area and upper headwaters, from the fish hatchery at the downstream end to the cedar swamps near the headwaters; a natural noble fir stand at higher elevations on Knob Point; a conifer stand partial cut in the 1960s and 1970s that is currently in LYR structure and is also adjacent to industrial timber lands; and a sparsely stocked conifer stand at a higher elevation near Little Nick.

There are 4 LYR stands not included in these blocks. They are excluded because they are not in a desirable location for complex stand development. Average size of these excluded stands is 24 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 600 to 700 acres of clearcut harvest and about 2,600 to 2,800 acres of partial cutting are planned for this basin in the next decade. All partial cutting will be done in accordance with the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast*.

Precommercial Thinning

Precommercial thinning (PCT) in this basin is expected to continue, with about 400 to 500 acres thinned during the next decade to promote more rapid growth on the residual trees and maintain these stands in a more open structure for a longer time.

Approximately 25 years will be required to meet forest structural goals for this basin.

Road Construction and Improvement

Extensive road construction is planned for the southern (higher elevation) portion of this basin over the next 10 years, to access the planned partial cutting. The northern portion of the basin generally has good access, and the roads are in good condition. An estimated 25 to 30 miles of road construction will be done in this basin over the next 10 years. Additionally, about 10-20 miles of road improvement is anticipated during the decade.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*:

- Build a non-motorized trail from Gnat Creek Fish Hatchery to Gnat Creek Falls.
- Provide perimeter motorized trails in Gnat, Lousignot, Fishhawk, and Plympton basins.

In addition, the district is working with the Gnat Creek Fish Hatchery, managed by the Oregon Department of Fish and Wildlife, to develop educational and interpretive programs within the basin.

Hamilton Basin

This management basin consists of 6,805 acres, located in the central part of Clatsop County. The majority of these lands are tributary to Fishhawk and Hamilton creeks, and drain into the Nehalem River. Elevation ranges from 600 to 1,800 feet, averaging 1,100 feet above sea level, and site index ranges from 90 to 140, averaging 128 for the basin.

A major management focus in this basin is a portion of the Jewell Spotted Owl Cluster, and the West Tidewater and Tidewater Marbled Murrelet Management Areas. For this reason, on approximately 35 percent of this basin, management goals will focus on the protection and enhancement of the wildlife habitat resource.

The Hamilton Basin has minimal recreational use. Dispersed camping, hunting, and fishing occur on Hamilton Creek. Jewell Meadows Wildlife Area is adjacent to the basin, which contributes to recreationists viewing wildlife in the basin. There are many railroad-logging lines throughout the basin, including Tidewater Headquarters Camp and Tideport Logging remains. Lee Wooden County Park, adjacent to the basin, encompasses Fishhawk Falls and provides day-use activities within the area.

Table 16. Hamilton Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	7	58	9	25	1	<1
Post Implementation Plan Condition ¹	9	54	11	24	2	<1
Desired Future Condition	12	20	11	26	31	<1

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

Key Resource Considerations for the Hamilton Basin

- Northern spotted owl cluster area.
- Northern spotted owls.
- Marbled murrelets.
- This basin is designated for non-motorized activities only.
- There are 2 individual domestic water sources on State land.
- About 18 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- One SNC research site.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward older forest structure conditions are located in 4 blocks ranging from about 85 acres to approximately 1,300 acres. The largest block of OFS will link with other OFS and LYR areas in the adjacent Beneke Basin, to create a large interior habitat area for the northern spotted owl cluster management area. The other OFS areas were selected to protect and develop habitat for marbled murrelets.

In addition, 5 blocks of layered stands will be located to supplement the OFS areas. Rationale for these locations includes: marbled murrelet habitat; adjacent to private lands that are not managed for older forest conditions; and additional protection for Hamilton Creek, Fishhawk Creek, and other significant streams.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 300 to 1,300 acres of partial cutting and 400 to 600 acres of clearcut harvesting is planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 25 acres to approximately 90 acres.

Some partial cutting activity will be in young conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This will make it possible for these partial cut stands to move into a UDS stand structure condition. In addition, much of the partial cutting will be in older conifer stands, with the objective of moving these stands toward a LYR stand type. The majority of the planned clearcut harvests are in closed single canopy stands.

Approximately 60 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Road construction will be moderate over the next decade. An estimated 8 to 11 miles of new roads are needed to access planned harvests. The mainline road system is currently in good condition. Existing roads will be improved, as needed. An estimated 11 to 21 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

Developed recreational opportunities exist for this basin. However, no specific management activities were identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

Klaskanine Basin

This management basin consists of 6,270 acres, located in the northwest part of Clatsop County. Most of these lands are tributary to the North Fork Klaskanine River, which flows into the Columbia River. Elevation ranges from 400 to 2,500 feet, averaging 1,000 feet, and site index ranges from 100 to 140, averaging 127 for the basin. This basin does not abut any other state forestland basins. The adjacent land is largely forest industry land.

Because this basin contains many hardwood or mixed conifer-hardwood stands and many fully accessed conifer plantations, the stand structure objectives are to develop about 13 percent of the basin into OFS stands, while maintaining 18 percent in REG stands.

OHV trails have been developed in the basin with no department management or planning. OHV use is high. Hunting, fishing, and dispersed camping are also popular in this basin.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	15	72	11	2	0	0
Post Implementation Plan Condition ¹	14	48	29	9	0	0
Desired Future Condition	18	20	33	16	13	0

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

Key Resource Considerations

- Marbled murrelet management area.
- About 12 miles of Type F streams and watershed important for cutthroat trout, and maintaining water quality on downstream salmon hatchery.
- There is 1 individual domestic water source on State land.
- Level 1 scenic resources along Highway 202.
- Swiss needle cast in Douglas-fir plantations.
- This basin is designated for motorized recreational activities — OHV and motorcycle activities.

Desired Future Condition and Landscape Design

The lands to be managed toward the OFS stand type are located in 10 blocks, ranging from about 30 to 320 acres. The largest OFS block is a contiguous forest of dense 55- to 65-year-old hemlock forest in which there is currently a marbled murrelet management area. The smaller OFS blocks are distributed throughout the basin, and consist mainly of stands that can be developed into OFS conditions rapidly through managed harvest activities. Five OFS blocks are located adjacent to private forest industry land, in order to provide some OFS along areas that are not expected to have any older forests.

The basin has 1 LYR stand that is not included in these blocks. It is excluded because it is not in a desirable location for complex stand development. The excluded stand is 26 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 500 to 700 acres of clearcut harvest and 1,700 to 1,900 acres of partial cutting are planned during the next decade. Most of the clearcut harvesting is planned for alder-dominated stands that are not growing into complex stand

structures. Also, the alder on these acres is economically mature and will not add much more volume and value after 2010. Of the partial cutting, only 300 to 400 acres are planned in younger conifer stands. This partial cutting will be done in accordance with the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast*. The rest of the partial cutting is in older conifer stands or mixed conifer-hardwood stands; the objective is to move these stands more rapidly toward the more complex stand structures.

Precommercial Thinning

Precommercial thinning in this basin will continue, with an estimated 400 to 500 acres available during the next decade. Because of concerns with Swiss needle cast infection in Douglas-fir, however, not all of these acres are likely to be thinned.

Approximately 35 years will be required to meet forest structural goals for this basin.

Road Construction and Improvement

Over the next ten years, an estimated 10 to 12 miles of new road will be constructed, and an estimated 10 to 15 miles improved. The road work will access harvest areas, maintain existing roads for heavy hauling, and maintain clean water in streams.

Recreation

Trails in this basin will be upgraded to comply with Department of Forestry standards. A motorized staging area will be developed.

Lousignot Basin

This management basin consists of 4,204 acres, located in the central east part of Clatsop County. The majority of these lands are drained by Lousignot Creek into the Nehalem River. Elevation ranges from 600 to 1,200 feet, averaging 800 feet above sea level, and site index ranges from 110 to 140, averaging 130 for the basin. A portion of a proposed Salmon Anchor Habitat (SAH) area, Fishhawk Lake Creek, is located within the basin.

This basin is characterized by stands that regenerated naturally after extensive harvest during the 1930s and 1940s. After this time period, the area was grazed by cattle under the oversight of an agricultural experiment station. These stands now provide clearcut harvest opportunities as well as partial cutting opportunities. This basin is bounded by well-used forest roads that provide the public with opportunities to drive, hunt, fish, and cut firewood. Unfortunately, illegal uses also occur, such as theft, vandalism, and garbage dumping. This basin is used heavily during hunting seasons. Dispersed campsites are scattered throughout.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
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Current Condition	17	59	19	5	0	0
Post Implementation Plan Condition ¹	19	43	27	11	0	0
Desired Future Condition	19	35	22	16	8	0

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

Key Resource Considerations for the Lousignot Basin

- This basin is designated for motorized activities.
- About 7 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- About 13% (538 acres) of this basin is within the proposed Fishhawk Lake Creek Salmon Anchor Habitat (SAH) area.
- *Phellinus weirii* infection in portions of the basin, a fungus that causes root rot and is fatal to Douglas-fir.
- Three research sites (SNC, Douglas-fir progeny, and Underplanting).

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward older forest structure are located in 6 blocks ranging from about 40 acres to over 130 acres. Rationale for these locations includes: adjacent to private lands that are not managed for older forest conditions; and providing smaller blocks of OFS on the landscape for diversity. Layered stands are also located along private lands and to provide a connectivity corridor to the large interior habitat areas in the Northrup Basin.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 1,100 to 1,300 acres of partial cutting and 400 to 650 acres of clearcut harvesting are planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 25 acres to approximately 85 acres.

Some of the partial cutting activity will be in young conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This will make it possible for these partial cut stands to move into a UDS stand type. In addition, much of the partial cutting will be in older conifer stands, moving these stands toward a LYR condition. The majority of the planned clearcut harvests are in closed single canopy and understory stands.

Harvesting in stands with *Phellinus weirii* will be done in accordance with policy recommendations contained in *Laminated Root Rot in Western North America* (Thies and Sturrock, 1995).

Approximately 40 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

There will be moderate road construction over the next decade. An estimated 7 to 9 miles of new roads are needed to access planned harvests. The mainline road system is currently in good condition. Existing roads will be improved, as needed. An estimated 14 to 28 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Provide motorized perimeter trails in Gnat, Lousignot, Fishhawk, and Plympton basins.

North Fork Nehalem Basin

This management basin consists of 7,880 acres, located in the southern part of Clatsop County. The majority of these lands are tributary to Fall Creek and Soapstone Creek, which flow into the North Fork Nehalem River. Elevation ranges from 350 to 1,350 feet, averaging 650 feet above sea level. Site index ranges from 110 to 140, averaging 125 for the basin. Adjacent to this basin on the southeast side is the Sweet Home Basin. On the other sides, adjacent lands are largely in forest industry ownership.

This basin is characterized by very high site lands, a well-developed road system, a generally young forest, and a fairly fragmented ownership. Therefore, the stand structure objectives are to develop OFS on 13 percent of the basin, while maintaining about 12 percent in REG stands.

The district maintains a one-mile hiking trail to Soapstone Lake. Fishing, OHV, and equestrian use occur throughout the basin. Dispersed camping is popular in this basin.

Table 19. North Fork Nehalem Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	12	59	19	9	1	<1

Post Implementation Plan Condition ¹	11	51	30	7	1	0
Desired Future Condition	12	20	37	17	13	<1

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

Key Resource Considerations

- About 18 miles of Type F streams and watersheds important for coho salmon, steelhead, and cutthroat trout; maintaining water quality for a downstream salmon hatchery.
- About 58% (4,514 acres) of the basin is within a proposed Salmon Anchor Habitat (SAH) area.
- There are 9 individual domestic water sources on State land.
- Level 1 scenic resources along Highway 53.
- Swiss needle cast in Douglas-fir stands.
- Three research sites (SNC, Douglas-fir progeny, and Spruce Weevil study).
- This basin is designated for non-motorized recreational activities only.
- High use for dispersed camping.
- Non-motorized trail to Soapstone Lake.

Desired Future Condition and Landscape Design

The stands to be managed toward OFS stand types are located in 9 blocks, ranging from about 30 acres to approximately several hundred acres. The largest OFS blocks are located adjacent to forest industry land in the southwestern part of the basin. Another block abuts an OFS block in the adjacent Sweet Home Basin, with the North Fork Nehalem River as the connecting edge. Other blocks complement a dispersed recreation area, and are comprised of older stands that can be managed toward OFS more rapidly. These OFS blocks serve scenic, recreational, and fisheries protection functions, as well as the wildlife benefits from this type of stand structure.

Three LYR stands are not included in these blocks. They are excluded because they are not in desirable locations for complex stand development. Average size of these excluded stands is only 18 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 500 to 600 acres of clearcut harvest and 1,600 to 1,700 acres of partial cutting are planned during the next decade. Clearcut harvest is planned in older stands of conifer, hardwoods, or mixed conifer-hardwoods. Early harvest of

severely infected (Swiss needle cast) conifer stands will occur, as well. About 650 to 700 acres of partial cutting are planned for older stands, to advance them into more complex structures, and 950 to 1,200 acres are planned in younger conifer stands.

Precommercial Thinning

Precommercial thinning will continue in this basin, with an estimated 400 acres available during the next decade. However, due to concerns with Swiss needle cast infection in Douglas-fir, not all of these acres are likely to be thinned.

About 30 years will be required to meet forest structural goals for this basin.

Road Construction and Improvement

An estimated 10 to 12 miles of new roads will be constructed over the next decade, and an estimated 8 to 12 miles will be improved. The road work will access planned harvest areas, keep existing roads functioning for heavy hauling, and maintain clean water in streams.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*:

- Provide dispersed camping in conjunction with non-motorized trails near Soapstone Lake.
- Designate and manage North Fork Nehalem River bridge area as undeveloped semi-primitive camping with access by foot or horse trails.
- Consider trail development at North Fork Nehalem River.
- Consider a non-motorized trailhead and staging area along Highway 53 near Soapstone Lake trail.
- Develop hiking trails in Soapstone Lake area.

Northrup Basin

This management basin consists of 7,196 acres, located in the eastern part of Clatsop County. The majority of these lands are drained by Northrup Creek into the Nehalem River. A very small portion of a proposed Salmon Anchor Habitat (SAH) area, Fishhawk Lake Creek, is located within the basin. Elevation ranges from 500 to 2,000 feet, averaging 1,100 feet above sea level, and site index ranges from 100 to 140, averaging 132 for the basin.

A major management focus in this basin is to develop a large interior habitat area for spotted owl dispersal and colonization. On approximately 60 percent of this basin, management goals will focus on developing complex forest structures for this future wildlife habitat resource.

The most common recreation activities include dispersed camping, hunting, fishing, and scenic viewing. There are several meadows adjacent to Northrup Creek that are used frequently throughout the year by people for recreational activities. Maps verify that Big Creek Logging Company had side camps in this drainage, but the sites have not been field checked. Some portions of the railroad trestle that ran along Northrup Creek are still visible.

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

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	4	71	15	9	1	<1
Post Implementation Plan Condition ¹	13	44	31	11	1	<1
Desired Future Condition	13	17	9	36	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 and/or underplanting, it may take 20 to 30 years for layering to develop.
4. The time it takes to develop LYR stands into OFS is highly variable and depends on many factors, including (but not limited to): snag and down wood recruitment; development of trees greater than 32 inches in diameter.

Key Resource Considerations for the Northrup Basin

- Future spotted owl dispersal area.
- This basin is designated for non-motorized activities only.
- Highly used for dispersed recreation.
- About 14 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- Less than 1% (11 acres) of this basin is within the proposed Fishhawk Lake Creek Salmon Anchor Habitat (SAH) area.
- One SNC research site.
- Remnants of railroad logging trestles.
- *Phellinus weirii* infection in portions of the basin, a fungus that causes root rot and is fatal to Douglas-fir.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward the OFS stand type are in one large contiguous block of about 1,800 acres. In addition, 2 blocks of future LYR stands were located to supplement the OFS areas, and contain about 2,600 acres. Rationale for these locations includes: providing linkage to other blocks of OFS and LYR in Gnat Basin to the north and Fishhawk Basin to the west; developing a large interior habitat area outside the proposed northern spotted owl cluster area; and additional protection for Northrup Creek and Cow Creek.

There are 6 LYR stands not included in these blocks. They are excluded because they are small stands that are not in desirable locations for complex stand development. Average size of these excluded stands is only 38 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 2,500 to 3,000 acres of partial cutting and 900 to 1,100 acres of clearcut harvesting are planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 30 acres to approximately 100 acres.

Some of the partial cutting will be in young conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This will make it possible for these stands to move into the UDS stand type. Much of the partial cutting will be in older conifer stands, with the objective of moving these stands toward LYR and OFS stand types. The majority of the planned clearcut harvests are in closed single canopy and understory stands.

Harvesting in stands with *Phellinus weirii* will be done in accordance with policy recommendations contained in *Laminated Root Rot in Western North America* (Thies and Sturrock, 1995).

Approximately 80 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Road construction will be moderate over the next decade. An estimated 10 to 13 miles of new roads will be constructed to access planned harvests. The mainline road system is currently in good condition. Existing roads will be improved, as needed. An estimated 22 to 42 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Consider equestrian trail development at Northrup Creek Meadows.
- Designate Northrup Creek Meadows for camping.
- Create a non-motorized trail system to accommodate the equestrian development at Northrup Creek Meadows.

Plympton Basin

This management basin consists of 10,435 acres, located in the northeast part of Clatsop County. The majority of these lands are drained by Plympton Creek into the Columbia River. Elevations range from 100 to 3,000 feet, averaging 1,400 feet above sea level. Site index ranges from 110 to 140, averaging 120 for the basin. In the north portion of this basin, there are about 13 miles of shared property line with John Hancock Insurance Company, a large industrial landowner, and about 5 miles of shared property line with other private

landowners. The east boundary of the basin is the Clatsop-Columbia county line; the adjacent landowner in Columbia County is also an industrial forest landowner. The southern 7,500 acres of this basin are blocked in with other state forest ownership. Adjacent management basins are Gnat to the west, and Fishhawk to the south.

Because this basin contains no major threatened or endangered species sites, has a history of intensive forest management, and is located close to log markets, the stand structure objectives are to develop about 16 percent of the basin in OFS stands, while maintaining about 12 percent in REG stands.

This basin receives high levels of recreational use. The Taylorville mountain bike trails, off McFarlane Creek Road, were built by Wauna mill workers and are used regularly. OHV trails exist throughout the basin, but were developed with no department management or planning. Dispersed camping, hunting, and fishing are also common activities.

Table 21. Plympton Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	12	58	18	10	1	1
Post Implementation Plan Condition ¹	9	44	36	9	1	1
Desired Future Condition	12	20	36	15	16	1

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

Key Resource Considerations for the Plympton Basin

- Community water system.
- About 22 miles of Type F streams and watersheds important for chinook salmon and cutthroat trout.
- About 2% (155 acres) of this basin is within the proposed Fishhawk Lake Creek Salmon Acre Habitat (SAH) area.
- There is 1 domestic water source on State land that serves several residences.
- Level 1 scenic resources along Highway 30.
- Level 2 scenic resources along Nicolai Mainline; distant viewshed of Highway 30.
- Four ongoing research study sites (Hemlock progeny site, SNC, Uneven Aged Management, and Variable Tree Retention).
- Cultural sites from early to mid-century logging era.
- Bald eagle nest site.
- A total of 1,232 acres designated for only non-motorized recreational activities (Taylorville mountain biking area).
- A total of 9,203 acres designated for motorized recreational activities.
- High use for motorized trail development.

Desired Future Condition and Landscape Design

The lands planned for development into older forest structure are in blocks ranging from 30 acres to about 500 acres. In the northern portion of the basin where there are numerous parcels of adjacent industrial forest land, several smaller blocks of OFS will be developed. In addition, some extremely steep areas associated with the Plympton Creek canyon will be included in OFS areas. These areas already contain some old growth on slopes that have never been logged because of their steep slopes. The lower reaches of West Creek, near the community water intake, will be included as OFS, to reduce management activities in this sensitive area. Slopes visible from Highway 30, both in the foreground and background (east side of Nicolai Mountain), will be managed for OFS, as part of our scenic management. A large area on the slope and summit of Nicolai Mountain will be managed for OFS, to take advantage of some vegetation types that are in short supply on our district, such as noble fir and silver fir. In the gentle headwaters of Plympton Creek, a large area is targeted for future OFS development because there are beaver dams, marshes, and slack water associated with it. The OFS area on Nicolai Mountain also continues into the adjacent Gnat Basin.

There are 2 LYR stands and 3 older stands (80 years or older) that are not included in these blocks. These stands are excluded because they are not in a desirable location for complex stand development. Average size of these excluded stands is only 22 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 400 to 500 acres of clearcut harvest and about 2,700 to 3,000 acres of partial cutting are planned during the next decade. Much of the clearcut harvest is planned for alder stands growing on conifer sites, which are not growing toward more complex stand structures. Other clearcut harvests are planned in older CSC

stands not suitable for OFS or LYR development. Of the partial cutting, about half is planned in younger conifer stands, and the rest is in older conifer stands with the objective of moving these stands more rapidly toward the more complex stand structures.

Precommercial Thinning

Precommercial thinning in this basin will continue, with an estimated 300 to 400 acres available during the coming decade.

The forest structure goals for this basin will be met in about 25 years through structure-based management and natural stand growth,

Road Construction and Improvement

Over the next 10 years, an estimated 15 to 20 miles of new roads will be constructed, and an estimated 15 to 25 miles of roads will be improved. The road work will provide access for planned harvest areas, and maintain existing roads in good condition.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Repair and continue area of the Plympton Basin as a Boy Scout/youth groups camp.
- Explore Plympton Basin for potential camping opportunities.
- Develop an OHV staging area near Nicolai Mountain.
- Develop perimeter motorized trails in Gnat, Lousignot, Fishhawk, and Plympton basins.
- Look into the feasibility of designating the Taylorville mountain bike area for all non-motorized activities.

Quartz Basin

This management basin consists of 6,339 acres located in the south part of Clatsop County. The majority of these lands are tributary to Quartz Creek and Rock Creek, which flow into the Nehalem River. A portion of a proposed Salmon Anchor Habitat (SAH) area, Upper Rock Creek, is located within the basin. Elevation ranges from 800 to 2,300 feet, averaging 1,600 feet above sea level, and site index ranges from 100 to 140, averaging 126 for the basin.

This basin is characterized by forest stands that regenerated naturally after wildfires. These stands range in age from 35 to 55 years.

This basin is used by the public to access Lost Lake, a privately owned lake, and Bloom Lake. The district maintains a hiking trail to Bloom Lake. Other recreational use includes fishing, camping, OHV use, and wildlife viewing. Because this area is accessed from Highway 26, illegal hunting, vandalism, and garbage dumping occur frequently.

This basin is expected to gain approximately 2,100 acres as a result of a land exchange currently in progress and is expected to be complete by 2004. Once complete, the newly acquired lands will offer diverse recreational opportunities, including the acquisition of Lost Lake.

Table 22. Quartz Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	4	60	35	0	0	1
Post Implementation Plan Condition ¹	15	27	54	3	0	1
Desired Future Condition	15	35	28	4	17	1

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

Key Resource Considerations for the Quartz Basin

- Level 1 scenic resources along Highway 26.
- This basin is designated for non-motorized activities only.
- High level of dispersed recreational use.
- About 11 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- About 30% (1,921 acres) of this basin is within the proposed Upper Rock Creek Salmon Anchor Habitat (SAH) area.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. The lands to be managed toward OFS condition are in 2 large blocks totaling about 1,060 acres. Rationale for these locations includes: protecting water quality in Rock Creek, an important salmonid stream, and Quartz Creek. In addition, one LYR stand was located to supplement the OFS areas, and protect a major tributary of Rock Creek.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 1,600 to 2,400 acres of partial cutting and 600 to 1,000 acres of clearcut harvesting are planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 20 acres to approximately 100 acres.

Some of the partial cutting will be in young conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This activity makes it possible for these partial cut stands to move into a UDS stand type. In addition, much of the partial cutting will be in older conifer stands, with the

objective of moving these stands toward a LYR stand type. The majority of the planned clearcut harvests are in closed single canopy stands.

Approximately 70 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

Approximately 12 to 15 miles of new roads will be constructed over the next 10 years. The mainline road system is currently in good condition. Existing roads will be improved, as needed. An estimated 17 to 25 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

The proposed management activities for this basin are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report* and listed below:

- Consider trailhead and staging area near Quartz Creek Bridge area (Highway 26).
- Develop hiking trails in Bloom Lake area.
- Designate and manage Bloom Lake for primitive camping with access by foot or horse trails.

Sager Basin

This management basin consists of 10,568 acres, located in the southeastern part of Clatsop County. The majority of these lands are drained by Sager Creek into the Nehalem River. A small portion of a proposed Salmon Anchor Habitat (SAH) area, Buster Creek, is located within the basin. Elevation ranges from 500 to 1,400 feet, averaging 900 feet above sea level, and site index ranges from 100 to 140, averaging 131 for the basin.

A major management focus in this basin is a northern spotted owl cluster area. On over 60 percent of the basin, management goals will focus on protection and enhancement of this wildlife habitat resource.

This basin is used by the public primarily for hunting and camping. There are numerous dispersed camping sites throughout the basin. There is significant early logging history in this basin, but only a few sites remain. For example, the existing Buster Camp was a main camp for the Kerry Timber Company, a major railroad logging company that operated from the forest to Vernonia and Kerry along the Columbia River. There are many pictures and stories related to the area, and railroad grades and remains can still be seen. There is potential for the development of interpretive trails. There are many scenic viewpoints that look out over the Nehalem Valley.

Table 23. Sager Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	21	43	11	20	5	0
Post Implementation Plan Condition ¹	2	57	14	19	7	0
Desired Future Condition	7	18	11	30	34	0

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

Key Resource Considerations for the Sager Basin

- Northern spotted owl cluster area.
- Northern spotted owl.
- *Phellinus weirii* infection in portions of the basin, a fungus that causes root rot and is fatal to Douglas-fir.
- There is 1 individual domestic water source on State land.
- About 21 miles of Type F streams and watersheds important for salmon, steelhead, and cutthroat trout.
- About 2% (206 acres) of this basin is within the proposed Buster Creek Salmon Anchor Habitat (SAH) area.
- Seven research sites (3 SNC, 3 Bear damage control pruning, and 1 White Pine Blister Rust study).
- This basin is designated for non-motorized activities only.
- Highly used for dispersed recreation.
- Remnants of railroad logging sites.

Desired Future Condition and Landscape Design

The table above shows the percentages in the different stand types for the desired future condition. Most lands that will be managed for future OFS stands are located in one contiguous block of over 2,600 acres. In addition, 12 smaller blocks of future OFS are located throughout the basin. These blocks range from about 40 to over 260 acres, and will provide OFS adjacent to privately owned industrial forest lands, and will provide smaller dispersed interior habitat areas on the landscape. Layered stands were located adjacent to OFS stands to increase interior habitat area for spotted owls. Additional layered stands are distributed to provide diversity on the landscape, providing linkage to other complex stands in the Buster Basin to the south, and additional protection for Sager Creek and Deep Creek, and other important salmonid streams.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 2,500 to 3,000 acres of partial cutting and 300 to 600 acres of clearcut harvesting are planned in this basin over the next 10 years. Clearcut harvests in this basin will range in size from approximately 30 acres to approximately 100 acres.

The majority of the partial cutting will be in young conifer stands, to reduce individual tree competition and increase individual tree size, while allowing more sunlight to reach the forest floor. This activity makes it possible for these partial cut stands to move into the UDS stand type. Some partial cutting will be in older conifer stands, with the objective of moving these stands toward a LYR stand type. The majority of the planned clearcut harvests are in closed single canopy and understory stands.

Harvesting in stands with *Phellinus weirii* infection will be done in accordance with policy recommendations contained in *Laminated Root Rot in Western North America*.

Approximately 70 years will be required to meet the forest structural goals for this basin.

Road Construction and Improvement

An estimated 9 to 12 miles of new roads will be constructed over the next decade. The new roads are needed to access planned harvests. The mainline road system is currently in good condition. Existing roads will be improved, as needed. An estimated 22 to 36 miles of road improvement is planned over the next 10 years. This improvement will consist of adding surfacing rock and replacing culverts, and improving public safety. Newly constructed spur roads built to access harvest units will be evaluated for future usefulness, temporary closure, or permanent vacating upon completion of use.

Recreation

Developed recreational opportunities exist for this basin, but no specific activities were identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*. Dispersed recreational sites will be maintained in accordance with Department of Forestry standards.

Scattered Basin

This plan addresses 5,730 acres in scattered tracts that range in size from 40 acres to over 1,000 acres, located mostly in the western part of Clatsop County. These lands drain into the Columbia, Nehalem, and smaller rivers, and some are drained by small streams directly into the Pacific Ocean. Elevation ranges from sea level to 3,000 feet, and site index ranges from 80 to 140, representing the wide range of tracts included.

Management considerations include visual concerns, endangered plants, estuaries, and a community water system. An ongoing district land exchange program, with the objective of consolidating state lands, will move some of these scattered tracts out of state forest ownership over time.

All these factors affect the basin goals, which are 11 percent OFS stands and 8 percent REG stands.

Table 24. Scattered Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	8	66	14	3	1	8
Post Implementation Plan Condition ¹	7	47	34	3	1	8
Desired Future Condition	8	21	41	11	11	8

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

Key Resource Considerations

- Community water system (Ecola tract) located adjacent to state land.
- Level 1 scenic resources (Ecola and Hug Point tracts).
- River shore wetlands (Ivy Station, Cooperage tracts).
- Estuaries (Youngs Bay tract).
- Rare plants (Onion Peak tract).
- About 11 miles of Type F streams and watersheds important for coho and chinook salmon (Ecola, Humbug tracts).
- About 3% (175 acres) of this basin is within the proposed Coal Creek Salmon Anchor Habitat (SAH) area.
- Swiss needle cast in Douglas-fir plantations.
- A Forest Practices stream buffer study is in place on Fall Creek, near Hug Point State Park.

Desired Future Condition and Landscape Design

The lands to be managed for older forest structure are located in 4 major blocks on the Ecola, Onion Peak, Saddle Mountain, and Green Mountain tracts, and range in size from 63 to 310 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 200 to 250 acres of clearcut harvest and 1,500 to 1,600 acres of partial cutting are planned during the next decade. Clearcut harvest is planned for several units where mixed conifer-hardwood stands are not advancing rapidly

toward more complex stand structures. Most planned partial harvest consists of initial entry in younger conifer stands. Stands selected for partial cutting will be done in accordance with the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast*.

Precommercial Thinning

Precommercial thinning will continue in tracts where Swiss needle cast infection is not significant. An estimated 250 acres of precommercial thinning are available during the next decade.

Approximately 35 years will be required to meet forest structural goals for these scattered tracts.

Road Construction and Improvement

An estimated 10 to 15 miles of new roads will be constructed, and an estimated 5 to 8 miles of roads will be improved. The new roads are needed for access to timber harvest areas. Improvement will focus on drainage and surface upgrading.

Recreation

The Scattered Basin consists of scattered tracts that abut private ownership. Recreation management will not be focused in these tracts because of the ongoing land exchange program.

Sweet Home Basin

This management basin consists of 11,020 acres, located in the extreme southern part of Clatsop County. The majority of these lands are tributary to Sweethome Creek and North Fork Nehalem River, which flow into the Nehalem River. Elevation ranges from 350 to 1,750 feet, averaging 750 feet above sea level. Site index ranges from 110 to 140, averaging 127 for the basin.

A major management focus in this basin is a northern spotted owl cluster area, and also scenic resources along the Nehalem River. Timber production goals will be modified on approximately 74 percent of the basin. Stand structure objectives are to develop about 62 percent of the basin into OFS stands and about 11 percent in REG structure.

Spruce Run Campground is located in Sweet Home Basin. The campground provides 31 designated RV/camper campsites and 5 walk-in tent sites. During the fall hunters use the campground. Dispersed camping, fishing, and hunting occur throughout the basin. OHV trails exist without any department management or planning.

Table 25. Sweet Home Basin: Current Condition, Post Implementation Plan Condition, and Desired Future Condition, by Stand Structure and Percentage

	REG	CSC ²	UDS ³	LYR ⁴	OFS	NSC
Current Condition	5	77	7	11	0	0
Post Implementation Plan Condition ¹	9	65	16	10	0	0
Desired Future Condition	11	5	4	18	62	0

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

Key Resource Considerations

- Northern spotted owl cluster area.
- Marbled murrelet management area.
- Level 2 scenic resources along the Nehalem River.
- Swiss needle cast in Douglas-fir plantations.
- This basin is designated for non-motorized recreational activities only.
- Spruce Run Campground and future Spruce Run Recreation area.
- About 25 miles of Type F streams and watersheds important for coho salmon, steelhead, and cutthroat trout.
- About 51% (5,587 acres) of this basin is within a proposed Salmon Anchor Habitat (SAH) area.

Desired Future Condition and Landscape Design

Almost the entire Sweet Home cluster area for spotted owl habitat is designated for development of OFS. In the short term, no timber harvest activities are planned for 60 percent of the cluster acres; these acres are the best existing owl habitat in the cluster. As a result, no management activities will occur in these acres to develop OFS for at least 10 years. Also, within this cluster, no clearcut harvest will take place during the initial decade of the plan. There are about 2,860 acres of this basin outside the owl cluster. Almost all planned harvest activity will take place in this portion of the basin. There is only one designated OFS block outside the cluster boundary.

Five LYR stands or older stands (80 years or older) are not included in these blocks. They are excluded because they are not in desirable locations for complex stand development. Average size of these excluded stands is 18 acres.

Proposed Management Activities

Harvesting

To move toward these structural goals, about 800 to acres of clearcut harvest and 1,700 to 1,800 acres of partial cutting are planned during the next decade. Clearcut harvest is planned for mixed conifer-hardwood stands outside the owl cluster, with the objective of maintaining the desired level of REG stands within the basin. Most planned partial cutting is initial entry in younger conifer stands, and the remainder is within areas designated as the 40% least suitable spotted owl habitat within the cluster. Stands selected for partial cutting will be in accordance with the *Strategic Plan for Managing State Forests in Northwest Oregon Affected by Swiss Needle Cast*

Precommercial Thinning

Precommercial thinning in this basin will continue, both within and outside the owl cluster. However, the presence of Swiss needle cast infection in many Douglas-fir plantations will reduce the acreage of stands to be treated. There are an estimated 800 acres available for precommercial thinning in the next decade.

With the harvest restrictions within the spotted owl cluster, coupled with natural stand growth, 50 years or more will be required to meet forest structural goals for this basin.

Road Construction and Improvement

An estimated 15 to 20 miles of new roads will be constructed over the next decade; the new roads are needed to access the planned harvest areas. An estimated 20 to 25 miles of existing roads will be improved in order to improve surfacing and drainage, as well as to provide fish passage where existing culverts impede it.

Recreation

The following proposed management activities are identified in the *Clatsop State Forest Recreation and Cultural Resource Inventory and Assessment Report*.

- Expand Spruce Run Campground as a greenway along the Lower Nehalem River to include non-motorized trails and to provide opportunities for campsites on the river's west side for canoeing/kayaking.
- Locate and develop potential driftboat sites on the Nehalem River.

Information Summary for All Management Basins

Desired Future Condition

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

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

Table 26 on the next page shows Astoria District’s desired future condition. The planned percentages of stand structure types fall within the management plan ranges. Approximately 6,100 acres of riparian areas will also be managed for mature forest conditions, in addition to the desired future conditions summarized in Table 26.

The time required to achieve the desired future condition depends on site quality and density management. The achievement of the desired structure percentages is limited by the current shortage of OFS, which takes the most years to produce. On higher quality sites (site classes 1 or 2), active density management (partial cutting) should produce OFS in a relatively short time period. On lower quality sites (site classes 3 or 4), where little or no density management occurs, it will take longer to achieve OFS. Therefore, considering the current age distribution, it is estimated that on higher quality sites OFS stand characteristics can be attained in 20 to 50 years from now (minimum 80 years total stand age), and that on lower sites OFS can be attained in 50 to 80 years from now (100 to 110 years total stand age).

Table 26. 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
Astoria	4,450	8	7	8	10	52	13	24	18	7	41	1	11
Beneke	9,715	<1	<1	8	14	77	18	8	10	7	23	0	35
Buster	19,218	4	<1	12	12	52	20	15	15	20	17	1	36
Crawford	4,215	0	0	6	0	46	0	21	0	17	35	10	65
Davis	7,000	1	1	10	15	64	17	21	23	4	33	0	11
Fishhawk	5,075	<1	<1	12	15	74	17	5	35	8	19	1	14
Gnat	10,020	1	1	11	15	56	18	19	25	12	27	1	14
Hamilton	6,805	<1	<1	7	12	58	20	9	11	25	26	1	31
Klaskanine	6,270	0	0	15	18	72	20	11	33	2	16	0	13
Lousignot	4,204	0	0	17	19	59	35	19	22	5	16	0	8
N. Fork Nehalem	7,880	<1	<1	12	12	59	20	19	37	9	17	1	13
Northrup	7,196	<1	<1	4	13	71	17	15	9	9	36	1	25
Plympton	10,435	1	1	12	12	58	20	18	36	10	15	1	16
Quartz	6,339	1	1	4	15	60	35	35	28	0	4	0	17
Sager	10,568	0	0	21	7	43	18	11	11	20	30	5	34
Scattered	5,730	8	8	8	8	66	21	14	41	3	11	1	11
Sweet Home	11,020	0	0	5	11	77	5	7	4	11	18	0	62
District Total	136,140	1	1	11	13	61	18	15	20	11	22	1	26

* The Desired Future Condition will be achieved in an estimated 40 to 60 years.

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

Expected Outputs and Habitat Achievements

Partial cutting will be the primary silvicultural stand management activity to advance stands toward the next level of structural complexity. More complex structures will not be achieved immediately after a partial cut. Past experience suggests that it may take the full 5- to 30-year period after the management prescription for a more complex structure to develop. For partial cuts, approximately 35 percent of the annual harvest acreage will be in stands more than 55 years old. The other 65 percent of the partial cut harvest acreage will be in stands less than or equal to 55 years old. Partial cutting will help CSC and UDS stands develop toward the more complex LYR stand type. Some younger stands will receive multiple partial cut entries on 16-year intervals to develop the components of a LYR stand. Some LYR stands may require an additional partial cut entry to hasten the development of OFS characteristics (larger diameter trees, higher snag densities, greater down wood levels, etc.).

The harvest levels proposed in this implementation plan will contribute toward the desired future structure targets as outlined in Table 26, **Information Summary for all Management Basins**. The greatest risk for missing these structure targets would come from clearcutting too many stands. The long-term desired future condition for the REG structure is 12.5 percent across the district. However, this first 10-year implementation plan proposes an average of 766 acres of clearcut per year, which will yield 0.5 percent of the district in REG structure each year. This conservative approach will provide the opportunity to accumulate additional information about both current and desired future conditions and structure-based management. During this initial 10-year planning period, stands in the following conditions will be assessed for conversion into the REG structure:

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

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

The annual operations plan will include a projection of how the planned silvicultural activities in a given fiscal year will contribute toward meeting desired future condition goals. Not all stands will be managed toward OFS development. This plan calls for about 26 percent of the Clatsop State Forest to be in the OFS structure type at any given time, once structural goals are attained. Some stands will be clearcut harvested while still in the CSC, UDS, or LYR structures, although most LYR stands are to be carried on to the OFS structure.

Expected timber outputs are listed in Table 27. Volumes used for these estimates were based on historical averages for these types of harvest within the district.

Table 27. Annual Partial Cut and Clearcut Harvest Objective, by Volume and Acres

Partial Cut*		Clearcut**		Total
Acres	MMBF	Acres	MMBF	MMBF
2,100-3,200	29.4-44.8	400-1,100	11.6-31.9	41.0-76.7

* Partial cut harvests are used to move stands to more complex stand structures. Astoria District averages 14 mbf/acre harvested from partial cuts.

** Astoria District averages 29 mbf/acre harvested from clearcuts.

Table 28. Summary of Current and Planned Timber Sales as of January 1, 2003.

Harvest Type	Clearcut Acres	Partial Cut Acres
FY 2000*	730	2,566
FY 2001*	747	2,888
FY 2002	712	2,768
FY 2003	722	2,816

* The Annual Operations Plans for Fiscal Years 2000 and 2001 were approved prior to the adoption of the *Northwest Oregon State Forests Management Plan* 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.

The strategies used to develop snags and down wood will vary according to tree size, age, species, and type of management activity. In first entry commercial thinnings (generally between ages 25 and 40), no prescriptions will be used to develop snags and down wood, as trees this size do not make long-lasting snags or down wood. Some of the trees left in the partial harvest will naturally become snags, due to top breakage. This would also be the case in younger stands harvested early because of Swiss needle cast infections. In older partial cuts, if pre-harvest stand examinations do not indicate sufficient numbers of snags, then some trees may need to be topped during the operation, to become snags. Harvest prescriptions may also be needed to provide sufficient down wood in these older thinnings. If predicted volumes of defective or down wood do not reach the targeted 600 to 900 cubic feet per acre, then harvest prescriptions may require leaving additional down wood. In clearcuts, to obtain the objective of 2 to 3 snags and 600 to 900 cubic feet of down wood per acre, pre-harvest estimates and harvest prescriptions must be used to assure these levels are attained. In hardwood stands, it is often difficult to find enough large down wood and snags after the operation. Therefore, these structural elements must often come from whatever

conifer trees are present in the stand. Therefore, it is often necessary to leave most or all conifer trees for green trees, snags, and potential down wood in hardwood harvests. Likely the down wood objectives will have to be deferred in small diameter CSC and hardwood dominated clearcut harvest units. However, additional down wood and/or other structural components will be increased in other harvest units to mitigate the need for lower levels in other stands. Thus, the landscape level objectives will be achieved over time, but not necessarily in every individual harvest unit.

Expected habitat outputs are listed in Table 29. Average outputs used for these estimates were based on strategies within the *Northwest Oregon State Forests Management Plan*.

Table 29. Annual Habitat Achievement Breakdown for Partial Harvest and Clearcut Harvest

Harvest Type	Structure Development (acres)	Snag Retention¹ (snags)	Down Wood Recruitment² (thousand cubic feet)	Green Tree Retention³ (trees)
Clearcut	400-1,100	800-2,200	300-825	2,400-6,600
Partial Cut	2,100-3,200	4,200-6,400	977-1,488	Not Applicable

1. Snag Retention Levels – older partial cuts (age 55+ years) - 2 snags per acre; clearcuts 2 snags per acre. For OFS, 6 snags per acre.
2. Down Wood Recruitment levels – average of at least 600 cubic feet per acre in older partial cuts, and range of 600 to 900 cubic feet per acre in clearcuts.
3. Green Tree Retention Level – average of 6 trees per acre (this average allows for additional trees to fall down and add to down wood volumes.)
4. Note that these are landscape level objectives and averages will vary across the landscape and among individual harvest units.

Table 30. Anticipated Stand Structure Development by 2010

	REG	CSC²	UDS³	LYR⁴	OFS
Current Condition	11	61	15	11	1
After Implementation Plan Period¹	10	48	28	12	12
Desired Future Condition	13	18	20	22	26

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

Appendix A

Determining Levels of Harvest and Other Silvicultural Activities for Northwest State Forests

This document shows the results and outlines the steps and processes used to arrive at the activity levels in the *Astoria 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* (ODF, 2001a).

Results

Table A-1 summarizes the estimated annual objectives for harvests and other silvicultural treatments for the 10-year period from fiscal year 2002 through fiscal year 2011.

Table A-1. Annual Objectives/Estimates

Silvicultural Activity	Annual Objective (Acres/Year)
Conifer Partial Cut Harvest	2,100 – 3,200
Conifer Clearcut Harvest	400 – 600
Hardwood Partial Cut Harvest	0 – 200
Hardwood Clearcut Harvest	0 – 500
Rehabilitation	0
Reforestation	600 – 1,700
Precommercial Thinning (PCT)	400 – 1,300
Fertilization	0
Pruning	200 – 700

Step 1. Allocate the district acreage into 4 categories.

In Step 1 the acreage in roads, streams, and other lands that would not support a commercial operation in the foreseeable future were subtracted from the total district acreage to determine the acreage of stands capable of supporting a commercial operation.

Table A-2. Determination of Stands Capable of Supporting a Commercial Operation

Category	Acres
Total District Acres	136,140
Roads and Streams ¹	15,342
Non-Commercial Opportunities ²	41,660
Commercial Conifer ³	64,650
Commercial Hardwoods ⁴	14,488

1. **Roads and Streams** – Acres in roads were determined by multiplying the total road length of all roads on the district by the average acres/mile for road right-of-ways (3.597 acres/mile). Acres in streams represent special stewardship stream buffers and were calculated from GIS.
2. **Non-Commercial Opportunities** – Acreage that would not support a commercial operation in the foreseeable future due to non-silviculturally capable designation, special stewardship other than aquatic-riparian (i.e., northern spotted owl clusters, northern spotted owl core areas outside of clusters, and marbled murrelet management areas), very low site or bad terrain, or because the site is grass, brush, or a noncommercial hardwood vegetation type. Severe needle cast-infected non-merchantable Douglas fir stands are included in this category.
3. **Commercial Conifer** – Acreage in stands that are primarily conifer and would support a commercial operation some time in the foreseeable future (approximately 30 years). This acreage represents 100 percent of the district commercial conifer acreage.
4. **Commercial Hardwoods** — Acreage in stands that are primarily red alder and that would support a commercial operation some time in the foreseeable future (approximately 40 years). We estimated that 95 percent of hardwood acres met this category. 15,282 total district hardwood acres multiplied by 0.95 = 14,488 acres.

Step 2. Determine annual conifer harvest objectives.

Conifer Partial Cutting Objective

The Astoria District estimates that 73 percent of the current conifer stand acres are sound silvicultural candidates for partial cutting (the remaining 27 percent of the conifer stands will be considered candidates for clearcut harvest in the next objective for Step 2). This includes stands that could reasonably be managed for understory, layered, and older forest structure. This broad category would also include stands where future, specific silvicultural prescriptions may focus on timber characteristics rather than the development of understory, layered, or older forest structure.

In 30- to 40-year-old stands, the interval between commercial thinnings will be 8 to 10 years. In older stands being developed into the more complex stand types, the interval

between commercial thinnings will be 15 to 25 years. Averaging these numbers for all stands, we calculated that the average interval between commercial thinnings would be 16 years.

The annual partial cut objective is estimated to be 2,949 acres/year (73 percent of 64,650 acres, divided by the average entry interval of 16 years). Reductions for availability, operability, and logistical factors will be applied in steps 4 through 6.

Conifer Clearcut Harvest Objective

The remaining 27 percent of conifer acres are not considered to be good partial harvest candidates. These include:

- Stands that are not reasonable silvicultural candidates for development into complex stands, i.e., layered or OFS stands. Typically these are over-dense or over-sparse stands.
- Stands in poor condition in terms of forest health (genetics, Swiss needle cast, or other biological factors).
- In an undesirable location (i.e., a location that does not fit within the overall landscape design) to manage for or effectively function as layered or OFS.
- Surplus to the needs for the various stand types.

Stands planned for clearcuts and conversion into REG structure on the Astoria District are made up of these four general groups. None of these stands considered for clearcutting are in our landscape design as LYR or OFS stands. Existing conditions make most of these stands poor candidates for development into complex stands. Others are mature CSC or UDS stands that are not needed to attain our LYR and OFS objectives. An estimate of the total clearcut acreage that is included in each stand structure type is summarized in Table A- 3.

The total conifer clearcut harvest candidate pool is estimated to be 17,456 acres (27 percent of 64,650 acres). The annual conifer clearcut harvest objective is estimated to be 581 acres/year (17,456 acres divided by 30-year planning period). Reductions for availability, operability, and logistical factors will be applied in steps 4 through 6.

Table A-3. Estimated Conifer Clearcut by Stand Type

Stand StructureType	Percent by Stand Structure Type	Acres by Stand Structure Type
REG	20%	3,491
CSC	45%	7,855
UDS	30%	5,237
LYR	5%	873 ¹
OFS	0	0
Total:	100%	17, 456

1. Layered stands included in this estimate are stands in poor condition from a forest health situation, are in an undesirable location (i.e., a location that does not fit within the overall landscape design) to manage for or effectively function as layered.

Step 3. Determine annual hardwood harvest objectives.

Hardwood Partial Cut Objective

An estimated 15 percent of hardwood stands could enter a structure-based management pathway by means of partial cutting. These stands will be planned for treatment over the next 20 years.

15 percent of 14,488 acres = 2,173 acres / 20 years = 109 acres per year.

Hardwood Clearcut Objective

The remaining hardwood stands (85 percent) would be planned for clearcut over the next 40 years.

85 percent of 14,488 acres = 12,315 acres / 40 years = 308 acres per year.

Step 4. Adjust gross objectives for availability factors.

Availability — In addition to special stewardship lands in Step 1, these areas are focused stewardship and represent the 40 percent most suitable habitat that must be maintained within a 1.5-mile radius of a northern spotted owl activity center outside a northern spotted owl cluster, and portions of the 1.5-mile radius of owl circles outside owl clusters that have an activity center within an owl cluster. These acres are unavailable for clearcut. This is estimated to reduce the harvest objectives for conifer clearcut and hardwood clearcut by about 4 percent. Table A-4 summarizes all reductions made from gross available acres.

Step 5. Adjust Gross Objectives for Operability Factors.

Operability — These areas represent the site-specific areas that are unavailable for harvesting due to terrain, ownership, high risk sites, areas of active soil movement, and areas of shallow or fragile soils. This is estimated to reduce the harvest objectives by about 5 percent for all harvest objectives. Table A-4 summarizes all reductions made from gross available acres.

Step 6. Adjust Gross Objectives for Logistical Factors

Logistical — Logistical reductions include limitations due to the operational holding capacity of the district, log accountability, and sale adjacency. The operational holding capacity refers to the number of management activities or operations that can reasonably coexist due to limitations imposed by road systems or other limiting factors. This is estimated to reduce the harvest objectives by about 5 percent for all harvest objectives. Table A-4 summarizes all reductions made from gross annual harvest objectives.

Table A-4. Summary of Availability, Operability, and Logistical Reduction Factors

Harvest Objective	Gross Annual Objectives (Acres)	Availability Reduction 4% (Acres)	Operability Reduction 5% (Acres)	Logistical Reduction 5% (Acres)	Net Annual Objectives (Acres)
Conifer Clearcut	581	(23)	(29)	(29)	500
Hardwood Clearcut	308	(12)	(15)	(29)	266
Conifer Partial Cutting	2,949	0 ¹	(147)	(147)	2,655
Hardwood Partial Cutting	109	0 ¹	(5)	(5)	99

1. Availability reductions are due to NSO circles and apply only to clearcut objectives.

Step 7. Estimate the annual rehabilitation acreage.

Rehabilitation includes activities that require an investment to control existing vegetation, prepare the site for planting, and establish a new stand of trees. The Astoria District has none of these sites, other than those being regeneration harvested. Therefore, the annual rehabilitation acreage estimate is 0 acres.

Step 8. Estimate the annual reforestation acreage.

In addition to straightforward regeneration of clearcuts, reforestation will also be needed in hardwood partial cuts and conifer partial cuts where an understory of trees is desired. There is also a need to interplant sites where the initial planting was not entirely successful, or where a second species will be planted in a later season than the initial planting. For our estimates of initial planting, we used 100 percent of the annual harvest estimates for conifer and hardwood clearcuts. For interplanting estimates, we used one-sixth of the annual conifer and hardwood clearcut estimates, and for underplanting, we used one-tenth of the annual conifer and hardwood partial cut estimates. Table A-5 summarizes Astoria District’s annual reforestation estimates.

Table A-5. Estimated Annual Reforestation Acreage

Category	Acres
Initial Planting	766
Interplanting	120
Underplanting	260
Total	1,146

Step 9. Determine the annual precommercial thinning estimate.

To determine this estimate, we used the total district estimate of precommercial thinning (PCT) from the “Young Stand Management Program” report from April 1997. This report shows planned PCT for each 2-year interval for 2001 to 2010, which totals 8,771 acres. Divided by 10, the annual PCT estimate is 877 acres.

Step 10. Determine the annual fertilization and pruning estimates.

There are no plans for any fertilization projects on Astoria District, and none have been done in the past. Therefore the annual fertilization estimate is 0 acres. Pruning is being done on Douglas-fir stands in the 12- to 25-year age range, some to reduce bark removal damage by black bears, and some to increase ultimate timber value by creating knot-free wood. The annual estimate for pruning is 440 acres.

Step 11. Adjust estimates for logistical, operability, and availability factors (for Steps 5-8).

Annual reforestation estimates have already been adjusted with the harvest level adjustments. For precommercial thinning and pruning, a range of plus or minus 50 percent can be used to reflect the annual variability in these practices.

Appendix B

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Map Section

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