

# Executive Summary



This executive summary covers key points of the *Northwest Oregon State Forests Management Plan*. References are omitted from the summary.

## Chapter 1. Purpose, History, and Planning

The *Northwest Oregon State Forests Management Plan* provides management direction for all Board of Forestry Lands and Common School Forest Lands in the Northwest Oregon and Willamette Planning Regions. These two regions contain over 615,000 acres of state forest land, located in twelve northwest Oregon counties. The Board of Forestry owns 97 percent of these lands, and the State Land Board owns the other 3 percent. This plan supersedes and replaces the *Long-Range Timber Management Plan / Northwest Oregon Area Forests* (1984) and the *Long-Range Timber Management Plan / Willamette Region* (1989).

This plan takes a much more comprehensive, multi-resource approach to forest management than previous long-range plans for this region. It presents guiding principles, a forest vision, and resource management goals that set the direction for a new management approach. The plan describes each forest resource and explains the concepts for integrated forest management. Chapter 4 presents the resource management strategies, which are the heart of the plan. The resource management goals and strategies are intended to achieve a balance between the resources and achieve the greatest permanent value through a system of integrated management.

**Location** — Most state forest lands are in northwestern Oregon. These forests include three large blocks of land, in Tillamook, Clatsop, and Santiam State Forests. Smaller tracts of state forest land are scattered throughout the planning area. All state forest lands in the planning area total about 615,680 acres. Tillamook and Clatsop State Forests are in

the northern end of the Oregon Coast Range. The city of Portland is roughly 25 miles to the southeast. Santiam State Forest is in the Cascade Range, a little more than 25 miles southeast of Salem.

**Land ownership** — State forests were acquired in different ways, and the two types are owned by different entities within state government. Lands owned by the Board of Forestry are known as Board of Forestry Lands (BOFL). Some state forest parcels were granted to the state by the federal government when Oregon became a state in 1859. These lands are owned by the State Land Board and are known as Common School Forest Lands (CSFL).

Each land ownership has its own set of legal and policy mandates. These mandates are discussed under the heading “Land Base and Access” in Chapter 2, and also in Appendix D. Of the total 615,680 acres in the planning area, 597,340 acres, or 97 percent, are owned by the Board of Forestry; and 18,340 acres, or 3 percent, are Common School Forest Lands owned by the State Land Board.

**Origin of the state forests** — The Oregon Department of Forestry was created in 1911. Its main purpose was to control forest fires, but it was also authorized to acquire forest land to manage. However, the department did not actually acquire any lands until legislative actions in 1925 and 1939 made it more feasible.

**Tillamook State Forest** — Much of the area that is now Tillamook State Forest was burned in a series of wildfires in the years 1933, 1939, 1945, and 1951. After the fires, many landowners allowed the forestlands to be foreclosed by the counties rather than pay taxes. Counties began to deed land in the Tillamook Burn to the Board of Forestry in 1940. Land acquisition accelerated after the Legislature authorized bonds to rehabilitate the Burn.

The Department of Forestry carried out a massive reforestation and rehabilitation project in the Tillamook Burn between the years 1948 and 1973. In June 1973, the former Tillamook Burn was dedicated as the new Tillamook State Forest. The 364,000-acre forest includes 255,000 acres from the Tillamook Burn, and other unburned forest land.

**Clatsop State Forest** — The Clatsop State Forest is 98 percent Board of Forestry Lands. These lands were privately owned and logged between 1910 and 1940. Clatsop and Columbia Counties foreclosed when landowners didn’t pay their taxes. Eventually, the counties deeded these cutover and unmanaged forest lands to the Board of Forestry to manage as a state forest. The remaining 2 percent of the Clatsop State Forest are Common School Fund Lands.

**Santiam State Forest** — Much of the land now in the Santiam State Forest used to be owned by large timber companies. Some individuals and families also owned parcels of forest land. From about 1880 until 1930, most lands were logged by their owners. Forest fires burned large areas. During the Great Depression, many landowners allowed their forest lands to be foreclosed by the county in place of back taxes. Marion, Clackamas, and Linn Counties eventually deeded these lands to the Board of Forestry.

**West Oregon District** — During the Great Depression, most isolated farms in the West Oregon District were abandoned to Benton, Lincoln, and Polk Counties in place of back taxes. Between 1938 and 1948, most of this land was deeded to the Board of Forestry. During that same decade, several small parcels were also purchased. Currently, the West Oregon District manages approximately 38,000 acres of land. Of that total, 75 percent is Board of Forestry Lands, and 25 percent is Common School Forest Lands.

**Western Lane District** — In 1910, the Nelson Mountain Fire burned most areas that are now state forest lands in western Lane County. Large fires burned again in western Lane County in 1917, 1922, and 1929. With the timber gone, the Great Depression starting, and the land unsuitable for homesteading, many landowners allowed their land to revert to the county in place of back taxes. Lane County deeded these lands to the Board of Forestry in the mid-1940s. In the 1990s, two land exchanges reshaped the state forest lands in Western Lane District by exchanging one-quarter of the acres. These exchanges increased the land base by 10 percent and started to block up the state forest lands.

**Management planning for state forests** — Management planning for Oregon state forests involves ~~five main elements~~ three planning levels, and fiscal and biennial budgeting. As shown in the figure below, planning begins with broad-scale, long-range planning, ~~which may include a habitat conservation plan~~. Intermediate level planning is done at the district level and is documented through district implementation plans (IPs). Annual operations plans and budgets (both biennial and annual) are designed to achieve the IP objectives for shorter periods of time (1 or 2 years).

The long-range forest management plan provides overall direction for managing the state forests in the planning area. This plan is guided by legal and policy mandates and administrative rules, which are described in Chapter 1.



**Figure S-1. ~~Five Elements of Planning for Oregon State Forests~~**

## Chapter 2. Understanding the Forest: Planning and Resources

Managing a forest might be thought of as intelligent tinkering. This chapter describes the process used to develop this plan, and presents information about the forest resources.

**Northwest Oregon state forests planning process** — Previous long-range plans for this area were primarily timber management plans. During the late 1980s, there was growing concern about several wildlife species. The northern spotted owl was listed as a federal threatened species in 1990, and the marbled murrelet was listed in 1992, also as a federal threatened species. Recreation use was increasing. In response to these changes, in 1994 the Department of Forestry began work on a comprehensive, integrated forest management plan for the northwest Oregon state forests.

The core planning team, led by Ross Holloway, included both field and program staff from the Oregon Department of Forestry and a representative from the Oregon Department of Fish and Wildlife. The core team consulted many additional resource specialists. A steering committee provided policy direction to the core planning team, and a key link to district and program managers, the counties, and the State Land Board.

The forest management plan includes the following technical elements:

- **Guiding principles** — The overall rules, goals, and responsibilities that guide the planning process.
- **Resource descriptions** — Information about the resource's current status and future trends.
- **Resource management goals** — The goals describe broadly what we would like to achieve through the management of each resource.
- **Resource management strategies** — A set of integrated strategies, including landscape management, aquatic and riparian, and forest health strategies; strategies for specific species of concern; and additional strategies for specific resources.

**Public involvement** — The planning team started a comprehensive public involvement process in 1994, and continued it throughout planning. The process included public meetings, newsletters, field tours, and opportunities such as committees and public forums for interested people to get deeply involved. The eight-member planning forum represented a diverse set of public interests, and met periodically with the core team.

Two separate scientific reviews were conducted. In 1996, a limited review was done of the plan's fundamental concepts and initial set of integrated strategies. In 1998, Oregon State University coordinated a more comprehensive independent scientific review, involving twenty-six reviewers from a variety of disciplines and institutions.

The 2009 plan revision was based on the Board of Forestry's deliberation on the balance of economic, social, and environmental values provided through implementation of the Northwest Forest Management Plan (NW FMP) on the Tillamook and Clatsop State Forests. As this plan has been implemented on the three North Coast Districts

(Tillamook, Forest Grove, and Astoria), the Department has refined its information and learned from its management activities. With this updated knowledge, it had become apparent the expected economic output falls short of the predicted outputs, necessitating the adaptive management discussions with the Board. The process included meetings with stakeholders and the Forest Trust Land Advisory Committee, and numerous Board of Forestry meetings where public testimony was heard. Further details on the Board of Forestry work can be found in the meeting materials prepared for each meeting.

This plan requires the approval of both the Board of Forestry and the State Land Board.

**Resource descriptions** — The first step in management is to know what all the cogs and wheels are. That is a huge task. Soil, water, air, lupines, bark beetles, owls, steelhead, Douglas-fir, spruce, forest fires, floods — these are all parts of the forest. The resource descriptions are a modest attempt at understanding the pieces. They are the result of our curiosity to understand the land and a beginning to intelligent tinkering.

This section of Chapter 2 provides summary information about the following resources.

- Agriculture and grazing
- Air quality
- Biodiversity and disturbance history
- Cultural resources
- Energy and mineral resources
- Fish and wildlife
- Forest health
- Geology and soils
- Land base and access
- Plants
- Recreation
- Scenic resources
- Social and economic resources
- Special forest products
- Timber
- Water resources

Information is summarized very briefly here for some key resources.

**Biodiversity and disturbance history** — Natural disturbance is a normal process in ecosystems. Climate cycles, forest fires, windstorms, landslides, floods, and insect and disease outbreaks have always been normal events in the dynamic landscape of the Pacific Northwest. These disturbances have caused significant changes in northwest Oregon forests by disrupting ecosystems, communities, and population structure. Native species depend on the habitats created by these disturbances and on the changing pattern of habitats across the landscape. This section describes some of the important events in the disturbance history of northwest Oregon state forests.

Several large fires burned in northwest Oregon during the last 150 years, including a series of fires that burned over 800,000 acres between the Siuslaw and Siletz Rivers in the central Oregon Coast Range between 1846 and 1853. The two largest of these fires were the Yaquina Burn and the Nestucca Burn. The Cedar Butte Fire burned 40,000 acres in 1918 and the Salmonberry Fire burned 25,000 acres in 1931. The first Tillamook Burn occurred in 1933, and reburns occurred in 1939, 1945, and 1951, burning more than 355,000 acres.

Current patterns of forest ownership are closely related to fire history. The Tillamook Burn has become the Tillamook State Forest; parts of the Nestucca Burn and Yaquina Burn have become the Siuslaw National Forest; another part of the Yaquina Burn is state forest in West Oregon District; and parts of the Nestucca Burn and Siuslaw-Siletz Burn are now Bureau of Land Management forest (Salem District).

Northwest Oregon is hit by periodic severe windstorms. The Columbus Day storm on October 12, 1962 blew down an estimated 17 billion board feet of timber in western Oregon and Washington. Other major windstorms in the last century occurred in 1880, 1951, and 1996. As is typical of most disturbances, windstorms interact with other events in many ways. After the Columbus Day storm in 1962, Douglas-fir bark beetles killed an additional 2.6 billion board feet of timber by 1965.

Western Oregon, especially the Coast Range, has frequent, intense winter rainstorms. The most severe floods, such as the flood of February 1996, are usually rain-on-snow events, when heavy rain falls on snow, swelling the streams with melted snow and rain. Heavy rains also saturate soils, particularly where other disturbances such as fires have exposed the ground. The saturated soils can give way and start landslides and debris flows. Floods are more common in the cool, wet periods of climate cycles. Over the past 150 years, major floods occurred in western Oregon in 1861, 1890, 1948, 1964, and 1996.

Disease and insects combine with wind damage to create patchy stands. The interactions of wind, root disease, and bark beetles create canopy gaps, mix soils during tree uprooting, and increase structural and biological diversity in stands.

Today's forests have been greatly influenced by historic large fires, extensive logging of old growth forests, recent decades of fire suppression, and intensive forest management. Plantation forestry began as early as 1915 in the Coast Range. There are now many acres of uniform stands, mostly of the commercially valuable Douglas-fir. The forest's average age has decreased as old growth was replaced with younger trees. Many plantations were planted at a high density, which allows the efficient spread of pathogens such as root diseases and foliage diseases. Short rotations, clearcutting, and intensive site preparation (both mechanical and burning) reduced the number and size of snags and the amount of decayed wood in the forest, and also reduced the amount of hemlock dwarf mistletoe.

**Fish and wildlife** — Forests are more than trees. The northwest Oregon state forests provide habitats for hundreds of species of fish and wildlife. Appendix E provides lists of vertebrate species known or suspected to be found on, adjacent to, or in some cases, downstream of, state forest lands in both aquatic and terrestrial environments. In total,

these lists include 270 species, of which 63 are mammals, 147 birds, 32 amphibians and reptiles, and 28 fishes.

Of the many wildlife species potentially found on the northwest Oregon state forests, ~~four~~ three bird species are listed as threatened or endangered under either (or both) the federal and state Endangered Species Acts. Populations of some fish species are also listed.

- **Bald eagle** — ~~S~~F~~ederally and~~ state listed as threatened in Oregon. Currently, there are ~~eight~~ 13 known nesting territories on northwest Oregon state forests, and ~~nine~~ 27 ~~more~~ additional nesting territories located within one mile of northwest Oregon state forests.
- ~~**Peregrine falcon** — State listed as endangered in Oregon. No active nest sites are currently known on state forest lands.~~
- **Marbled murrelet** — Federally listed as threatened in Oregon. The marbled murrelet is a seabird that nests in mature or old growth coniferous forests within 50 miles of the ocean. Marbled murrelets currently nest in some areas of northwest Oregon state forests in the Coast Range. Currently, ~~8,6136,352~~ acres are in designated MMMA (marbled murrelet management areas) in northwest Oregon state forests.
- **Spotted owl** — Federally listed as a threatened species. In 1999, there were 20 pairs and 8 resident single owls on northwest Oregon state forests, and 61 pairs and 8 resident single owls known to be adjacent to these state forests. These figures add up to a total of 97 owl sites on or adjacent to northwest Oregon state forests. In 2008, there were 119 owl sites on or adjacent to northwest Oregon state forests, including 20 pair and four resident single sites on State Forests. Increases in spotted owl numbers may be partially related to increased survey efforts, as populations have generally declined since the spotted owl was added to the federal endangered species list in the early 1990's.
- **Fish** — At least 28 fish species use habitats in the plan area for part or all of their life history, or use habitats downstream from state forests that may be influenced by state forest management. The federal government has listed some populations of coho salmon, chinook salmon, chum salmon, steelhead trout, and Oregon chub as threatened or endangered species. Not all populations of these species are listed. Only some ESUs (evolutionarily significant units) are listed or proposed.

**Forest health** — The most comprehensive definitions of a healthy forest are based on the premise that management objectives can be achieved only within the limits of an ecologically viable and sustainable system. The following concepts are common to most current definitions of forest health: 1) a healthy forest can vigorously renew itself across the landscape and recover from a wide range of disturbances; 2) a healthy forest provides for the human needs of values, uses, products, and services, and; 3) a healthy forest provides a diversity of stand structures that provide habitat for many native species and all essential ecosystem processes.

Key indicators of forest health include damage from insects, disease, and animals; and damage from abiotic stressors such as fire, weather extremes, and air pollutants. These disturbance agents kill trees or parts of trees, or reduce growth. Because they have a unique history, many of the northwest Oregon state forests are now at a critical point in

terms of forest health. Much of the Tillamook Burn was planted or seeded with Douglas-fir from non-local seed sources, with unknown long-term consequences. The recent dramatic upswing of Swiss needle cast damage is a warning that these forests may not be as healthy as once thought.

**Recreation** — Statewide demand for outdoor recreation is growing faster than the population. The SCORP study (1988) found that the North Coast region and the region surrounding the Portland metropolitan area have the greatest need in the state for additional recreation facilities. These two regions need trails of all kinds (hiking, jogging, riding, biking, and off-road vehicle), and campgrounds as well.

State forest lands comprise a significant percentage of public forest lands in parts of northwest Oregon. Most of these lands lie within a two-hour drive of a major city such as Portland or Salem, and recreational use is growing rapidly. Of all the northwest Oregon state forests, the Tillamook State Forest gets the most recreational use. The Tillamook offers large areas open to OHV (off-highway vehicle) use. Motorized recreation is the most popular activity on the Tillamook, has the largest group of users, and is growing rapidly. Hiking, horse riding, and mountain biking occur in lower numbers than OHV recreation, but are also growing on the Tillamook. The Tillamook is also a destination attraction for people fishing for salmon and steelhead.

The Tillamook State Forest recreation plan was updated in 2000, and recreation plans were completed for the Clatsop and Santiam State Forests. Public participation is a key part of this planning on each state forest.

On the other northwest Oregon state forests, recreational activities include hunting, fishing, OHV use, hiking, horseback riding, camping, and visiting waterfalls. Because these other state forests have few recreational developments such as trails or campgrounds, recreational use is limited.

**Social and economic resources** — Northwest Oregon state forests comprise only about two percent of Oregon's forest land. However, these forests are important to local communities economically dependent on the forests' resources and important to residents who recreate in these forests. Oregon's forests are as important as ever to the economic health of the state's residents but, in addition to producing timber, they are expected to also provide recreation, clean water, and healthy populations of fish and wildlife for residents of burgeoning metropolitan areas and tourists alike.

The Lettman report (1996) estimates that each one million board feet of timber harvest in northwest Oregon state forests generates 24 jobs. The most jobs are generated in the lumber and wood products industries, and in schools and other local and state government (which receive revenues from state forest harvests). The "ripple effect" leads to additional jobs created in other employment sectors. In terms of income, the Lettman report estimates that each one million board feet of timber harvest in northwest Oregon state forests generates \$1.2 million in Oregon personal income.

Revenue from state forests, almost all of which comes from timber harvest, provides large dollar sums to schools and other local governments. Total income from northwest Oregon state forests averaged \$50 million per year in the 1994-1995 two-year period; in that same time period, Clatsop and Tillamook Counties received an average \$30 million per year income (total for the two counties) from state forests.

**Timber** — Conifer forest covers most land in the northwest Oregon state forests. Hardwoods, grass, and brush cover a small percentage of the land. Before these lands became state forests, large fires and logging killed or removed most older conifer forests. In the northwest Oregon state forests today, most conifer forests are less than 85 years old. Average annual timber harvests were approximately 95 MMBF (million board feet) from 1994 to 1996.

**Water resources** — Water affects virtually every other resource — trees, plants, fish, wildlife, soils, recreation, and others. On the northwest Oregon state forests, water resources include surface water (streams, lakes, and wetlands), groundwater and aquifers, water supply (for instream and out-of-stream uses), riparian areas, and water quality. Roughly 400 rivers and streams flow across or near the northwest Oregon state forests. Some of the major rivers are the Nehalem, Kilchis, Wilson, Trask, Salmonberry, Klaskanine, Big Elk, and Alsea Rivers. The state forests have a few small lakes, such as Rhody Lake and the Butte Lakes on the Santiam State Forest.

## Chapter 3. Guiding Principles, Vision, and Goals

Chapter 3 presents the guiding principles, forest vision, management goals, and monitoring assumptions. These values and goals set the direction for the management plan — the compass that guides our navigation.

**Guiding principles** — The plan’s guiding principles are given in Chapter 3, along with explanations. Here, the principles are listed without the accompanying discussion.

1. The plan will recognize that the goal for management of Board of Forestry Lands is to secure the greatest permanent value to the citizens of Oregon by providing healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits to the people of Oregon. The goal for management of Common School Forest Land is the maximization of income to the Common School Fund over the long term.
2. The plan will recognize that ecosystem restoration and watershed health are among the key goals that this plan must achieve, in a manner that is aligned with the policy direction for Board of Forestry and Common School Forest Lands.
3. The plan will be a comprehensive, integrated forest management plan taking into account a wide range of forest values.
4. The plan will be developed within the context of Northwest Oregon State Forests as managed forests.
5. The plan will acknowledge the protected and recognizable interest of the counties from which most of the Board of Forestry Lands were originally derived.
6. The plan will recognize that the forest is intended to be an important contributor to timber supply for present and future generations.
7. Lands will be identified and managed to provide for a sustained contribution, biological capability, and economic and social values. The plan will recognize that there will be trade-offs between revenue-producing activities and non-revenue-producing activities.
8. The plan will examine opportunities to achieve goals through cooperative efforts with other agencies, user groups, or organizations.
9. Diverse input from a variety of interested parties, including user groups, business interests, adjacent landowners, and the general public will be a high priority throughout the planning process.
10. The plan will be goal-driven.
11. The plan will view northwest Oregon state forest lands in both a local and regional context.
12. The plan will consider the overall biological diversity of state forest lands, including the variety of life and accompanying ecological process.

13. Northwest Oregon state forest lands will be managed to meet state and federal Endangered Species Acts while fulfilling the Board of Forestry's other statutory responsibilities. Management plans for threatened or endangered species will seek to complement or supplement habitat provided by other landowners to the extent that such provision of habitat is compatible with administrative rules defining greatest permanent value.
14. The plan will commit the Oregon Department of Forestry to using monitoring and research to generate and utilize new information as it becomes available, and employ an adaptive management approach to ensure that the best available knowledge is acquired and used efficiently and effectively in forest resource management programs.

**Forest vision** — The forest vision is a picture of northwest Oregon state forests in the future. It represents an idealized view of the future, without the constraints of the current forest condition. The strategies in Chapter 4 and the implementation plans will describe how each district can move from the current forest condition toward this future forest. The future forest will provide a diversity of forest structures, the range of fish and wildlife habitats necessary for all native species, recreation and other social values, and a sustainable and predictable level of forest products.

**Resource management goals** — Goals were developed for individual resources, in the context of legal and policy mandates for the management of state forests. The goals are general, non-quantifiable statements of direction. The management strategies in Chapter 4 describe how the Department of Forestry will achieve the goals.

Goals were developed for the following resources: agriculture and grazing, air quality, cultural resources, energy and minerals, fish and wildlife, forest condition (health and biodiversity), land base and access, plants, recreation and scenic resources, social and economic resources, soils, special forest products, timber, water quality, water supply, and wetlands. See Chapter 3 for the complete text of the management goals.

**Working hypotheses** — Our understanding about forest systems is substantial, but incomplete. We continue to learn more through monitoring and research. At the center of this plan, and fundamental to the strong adaptive management framework included in this plan, is a set of working hypotheses. These key working hypotheses are related to broader assumptions and beliefs, and are described in Chapter 3.

# Chapter 4. Resource Management Concepts and Strategies

Chapter 4 presents the concepts and strategies for a broad, integrated management approach to be implemented on northwest Oregon state forests. This integrated management approach is designed to generate a range of economic, environmental, and social values from these state forests. This chapter presents an active management approach, and stresses the compatibility of uses.

## Basic Concepts for Integrated Forest Management

The strategic approaches described in this chapter are based on scientific research in silviculture and wildlife biology. The basic concepts for integrated forest management focus on:

- Landscape management.
- Aquatic and riparian conservation.
- Forest health.

**Landscape management concepts** — This plan is based on an approach called structure-based management. SBM is designed to produce and maintain an array of forest stand structures across the landscape in a functional arrangement that provides for the social, economic, and environmental benefits called for from these state forest lands. These include a high level of sustainable timber and revenue, diverse habitats for indigenous species, a landscape level contribution to properly functioning aquatic systems, and a forest that provides for diverse recreational opportunities.

Structure-based management is designed to emulate many aspects of natural stand development patterns and to produce structural components found in natural stands, but in fewer years. By anticipating future patterns of forest development, foresters predict the potential for individual stands to produce specific characteristics such as a multi-layered canopy. Foresters can then develop appropriate silvicultural prescriptions and influence the rates of stand development and the types of structures, products, and habitats that forest stands actually produce.

Four key concepts are the foundation for landscape management under SBM.

### 1. Active management for a diverse array of forest stand types.

A diversity of stand structures will provide for a broad range of ecosystems and biodiversity — including a wide range of wildlife habitats. The structural components associated with the range of stand structures will benefit long-term forest productivity by maintaining the key structural linkages for nutrient cycling and soil structure. The high level of biodiversity should result in a more resilient forest that will be less prone to large-scale damage from environmental or human stresses.

The desired stand structure array presented later in this chapter emulates the diversity of stand types historically associated with conifer forests in the Coast Range and Cascades. Studies have been done on the historical distributions of older stand types (old growth) in the Oregon Coast Range. Research suggests that the percentage of older stand types ranged from 30 to 70 percent of the landscape at any point in time. At smaller scales the variability was even greater, ranging from 15 to 85 percent of the landscape.

Once a desired future condition of stand types is achieved, individual stands on the landscape will continue to change. However, the relative abundance of the different types is expected to remain reasonably stable. At some point decades in the future, a dynamic balance will be achieved of the stand types in a desired array, and individual stands will move in and out of the various types at a relatively even rate.

## **2. Landscape design to provide for a functional arrangement of the stand types in terms of habitat values.**

SBM does not consist only of achieving a specific array of stand types. Landscape planning is necessary to provide for a functional arrangement of the stands, and the forests must also have key structural components. In order to meet these needs, stands will vary in size and exist in a variety of arrangements. Landscape design includes:

- **Managing biodiversity** — Forest management for biodiversity is implemented at two scales, the broader landscape and the forest stand. At the landscape level, manage for a variety of stands across the landscape, emulating natural patterns. Maintain habitats of species at risk of extinction, and unique ecosystems. Provide adequate interior forest habitats. At the stand level, maintain structural features such as snags, wildlife trees, down wood, large and old trees, vertical and horizontal structure, and herb and shrub communities. Coarse-filter planning provides the foundation for protecting biodiversity. Fine filter habitat requirements are superimposed to ensure that overall biodiversity goals are reached.
- **Landscape design principles** — Landscape design must consider the following elements: habitat patches at different scales, the matrix or dominant landscape element, fragmentation, landscape composition and pattern, boundaries, corridors, and interior habitat areas.
- **Interior habitat area principles** — The plan places an initial focus on the development of mature forest patches and interior habitat areas (IHAs). All patch types are essential if habitats are to be provided for all species. However, the planning area has a limited amount of mature forest. IHAs are associated only with mature forest patches, and wildlife associated with IHAs are important in reaching wildlife diversity goals in forested landscapes. Forest stands will progress through the other patch types on their way to becoming older forests.

**3. Active management to provide for key structural components within stands and on the landscape (snags, down wood, legacy trees, etc.).**

The key structural components within managed forests are:

- Remnant old growth trees
- Residual live trees
- Snags
- Down wood
- Multi-layered forest canopies
- Multiple native tree species (conifers and hardwoods)
- Herbs and shrubs
- Gaps

**4. Active management for social and economic benefits.**

Structure-based management will require extensive thinning and partial cutting. These activities will produce significant volumes of lower quality timber from young stands. Final harvests of these stands will result in the harvest of high volumes of high quality wood. Maintaining a variety of stand structures provides consistent employment in silvicultural operations and in the processing of forest products. Diversified treatments can produce a range of qualities, sizes, and species of logs to match market conditions, as well as special forest products such as mushrooms, berries, or greenery.

With the development of a variety of stand structures across the landscape, local and regional economies will benefit from opportunities for recreational hunting as well as wildlife viewing. Recreational and commercial fisheries will also be enhanced by aquatic and riparian strategies that maintain and restore properly functioning habitats. The diverse array of stand types and arrangements will provide many recreational opportunities. Activities such as hunting and off-road vehicle use will continue to be provided for at high levels, and additional opportunities will be realized for uses that are becoming increasingly popular (hiking, mountain biking, interpretive and educational programs).

**Aquatic and riparian conservation concepts** — Riparian and aquatic habitats will be managed to maintain or restore key functions and processes of aquatic systems. Since streams are tightly linked to the landscapes they flow through, riparian and aquatic conditions depend upon the interrelated components of the entire landscape. This plan uses a blended approach to manage riparian and aquatic habitats at both the landscape level and through site-specific prescription. Landscapes are dynamic: both structure and function change across time and space. Even with change, stability is ensured as long as ecosystem structure and function are maintained within certain bounds and all required components remain within the landscape.

The key concepts for aquatic and riparian conservation are:

- **Management for proper functioning of aquatic systems** — The overall approach in this plan is based on the following key concepts:
  - Native aquatic species have co-evolved with the forest ecosystems in western Oregon.

- High quality aquatic habitats result from the interaction of many processes, some of which have been greatly influenced by human activity.
  - Aquatic habitats are dynamic and variable, through time and across the landscape.
  - No single habitat condition constitutes a “properly functioning” condition. Rather, providing diverse aquatic and riparian conditions over time and space more closely emulates natural disturbance regimes.
- **The blended approach: a combination of landscape-level and site-specific strategies** — Aquatic ecosystems interact closely with the surrounding terrestrial systems. Therefore, the health of the aquatic system depends upon forest management practices that recognize, maintain, and enhance the functions and processes that compose these terrestrial-aquatic interactions. This plan uses a blended approach that applies the concepts of landscape ecology to manage riparian and aquatic habitats at both the landscape level and through site-specific prescriptions. This approach seeks to emulate natural disturbance patterns in upslope and riparian areas.
  - **Use of watershed assessment and analysis to refine strategies and plan management activities during plan implementation** — Watershed analysis will characterize the riparian, aquatic, terrestrial, and cultural conditions, processes, and interactions that affect the overall watershed character, and response to management activities. Watershed analysis is a tool to guide management and policy decisions to the best possible sustainable use of a watershed’s resources, and to restore and/or maintain watershed health and properly functioning aquatic systems.

**Forest health concepts** — The key concepts for forest health are:

- **Active management for a diverse and healthy forest ecosystem resilient to biotic and abiotic influences** — High biodiversity provides stability and resiliency to the forest, especially with regard to pests. Strategies to reduce the undesirable impacts of insects, diseases, and other agents must be based in the ecology of these ecosystems and also must be tailored to individual stands, situations, management objectives, and the landscape or regional context. Under this plan, forest health strategies are integrated with forest management.
- **Integrated pest management** — Any pest suppression activities on state forest lands must adhere to the principles of integrated pest management (IPM). IPM is a coordinated decision-making process that uses the most appropriate of all reasonably available means, tactics, or strategies, blended together to minimize the impact of forest pests in an environmentally sound manner to meet site-specific management objectives.

## **Resource Management Strategies**

The resource management strategies are the heart of this plan. This chapter also describes adaptive management measures for the strategies, including key working hypotheses and key assumptions/questions to be addressed through monitoring. The strategies are presented under the following headings:

- ❑ Integrated forest management strategies
  - Landscape management strategies
  - Aquatic and riparian strategies
  - Forest health strategies
- ❑ Strategies for specific species of concern
- ❑ Strategies for specific resources

❑ **Integrated Forest Management Strategies**

The integrated strategies are the basis for managing the forest landscape as a whole. These begin with four landscape management strategies, which are the core of structure-based management. The landscape management strategies are supplemented by riparian and aquatic strategies, and forest health strategies. Together, this set of integrated strategies will apply across the landscape. They will contribute to a range of habitats that is likely to accommodate most wildlife species, and encourage broad forest biodiversity.

It will take many decades to produce the desired forest, riparian, and instream conditions. Over the short term, the integrated strategies may not provide the habitat necessary for some species of concern ~~contribution on~~ state forest lands, ~~to the maintenance or recovery of threatened, endangered, or sensitive species.~~ To assure habitat for wildlife and fish species of concern, development of a habitat conservation plan (HCP) under the federal Endangered Species Act is also underway. This proposed *Western Oregon State Forests Habitat Conservation Plan* would cover all northwest and southwest Oregon state forests except for the Elliott State Forest (which has a separate HCP). For species of concern, additional strategies focus on ~~When necessary to provide short-term habitat considerations for wildlife and fish species of concern, additional conservation tools may be used, including anchor habitats or site protection.~~ protection of anchor habitats, summarized in this plan and described in greater detail in the HCP. If the HCP is not adopted, this forest management plan will be expanded to include further detail on managing habitat for specific species or populations.

The integrated strategies must be viewed in an adaptive management context. As monitoring provides feedback, the plan will be fine-tuned and improved. District implementation plans (IPs) will describe the activities that will move each forest towards the vision and desired future condition.

**Landscape Management Strategies**

- 1. Actively manage the state forest landscape and individual forest stands to produce the desired future array of stand structure types across the landscape in each Department of Forestry district and produce high levels of sustainable timber and revenue.**

The percentages in the table below are intended to describe the direction to move the forest. They describe a long-range desired future condition, described with upper and lower limits as well as a mid-range percentage that is used for technical analysis. There is no specific timeframe for achieving the array described.

**Table S-1. Stand Structure Types: Percent of the Landscape in Each District**

Regeneration	<del>15-25 percent</del> — <del>5-15 percent</del> (10% used for analysis)
Closed Single Canopy	<del>5-15 percent</del> <del>10-20 percent</del> (15% used for analysis)
Understory	<del>30-40 percent</del> <del>15-35 percent</del> (25% used for analysis)
Layered	<del>15-25 percent</del> <del>20-30 percent</del> (25% used for analysis)
Older Forest Structure	<del>15-25 percent</del> <del>20-30 percent</del> (25% used for analysis)

The percentages in Table S-1 assume that such an array of stand types, properly arranged on the landscape, will contribute to the habitat needs of all native species. The Department of Forestry will conduct an ~~ongoing comprehensive~~ review of this strategy through adaptive management ~~and the specific array described when 30% in aggregate of layered and older forest structure stands is achieved on lands in the planning area.~~ This review will evaluate the extent to which stand conditions meet the habitat needs of native species, and whether additional layered and older forest structure stands are needed to meet that goal.

**2. Develop a landscape design that arranges the forest stand types to create a variety of patch types, patch sizes, and patch placement on the state forest landscape over time.**

Each district, through its district implementation plan, will develop a landscape design consistent with the landscape design guidelines described under this strategy in Chapter 4. The application of these principles and guidelines will be discussed in the landscape design section and desired future condition display contained within each district implementation plan. The design will describe or display how stand types will be arranged on the district landscape, in a regional context, to achieve the variety of patch types, sizes, and arrangements necessary to provide functional habitat for native species.

**3. Actively manage the state forest landscape to incorporate structural habitat components into the forest at a landscape level.**

This strategy presents approaches for managing the habitat components listed below. These standards are meant to be general guidelines for forest managers. It is understood that individual stands may exceed or may fall below these standards, but it is expected that on a landscape-wide basis, stands will average the habitat conditions

outlined by these standards. Chapter 4 gives numerical standards and/or qualitative guidelines for these components.

- Remnant old growth trees
- Residual live trees
- Snags
- Down wood
- Multi-layered forest canopies
- Multiple native tree species (conifers and hardwoods)
- Herbs and shrubs
- Gaps

**4. Develop implementation plans for each district that provide more specific information on the application of Landscape Management Strategies 1 through 3, for a ten-year period.**

Implementation plans will be developed for each district that contain more detailed information describing how each district is moving towards achievement of the desired future condition, implementing the landscape design guidelines, and providing for the structural habitat components at the landscape level.

**Aquatic and Riparian Strategies**

The landscape-level component of the blended approach is comprised of the landscape management strategies just described. Over time, the application of these strategies is intended to create forest conditions on the landscape that will more closely emulate historic conditions and processes relative to aquatic systems.

The second component of this blended approach is a set of more site-specific or prescriptive strategies designed to protect key resource elements or provide for specific functional elements not necessarily addressed by the landscape strategies.

Finally, the third component is watershed assessment and analysis. Watershed analysis is critical to the evaluation and refinement of both the landscape-level and site-specific approaches. The process is designed to collect and synthesize key watershed information that will be used to further evaluate the first two components of this blended approach.

In addition to the landscape management strategies, there are seven strategies for aquatic and riparian areas.

**1. Implement watershed assessment and analysis** — Watershed assessment and analysis will be used to collect needed information at both watershed and site-specific levels, and to synthesize that information into recommendations for appropriate changes to goals and strategies. Information from watershed assessments and other inventory and assessment projects will be used in an adaptive management framework to accomplish plan objectives.

This strategy involves development of a comprehensive watershed assessment and analysis process for state forest lands; completion of assessments and analyses on priority watersheds on state forest lands within ten years following plan adoption; cooperation with local watershed councils and adjacent landowners; and effective

application of results at the appropriate planning level through the adaptive management process.

- 2. Apply management standards for aquatic and riparian management areas —** Establish and maintain riparian management areas adjacent to all streams, in accordance with the standards described in ~~the proposed Western Oregon State Forests Habitat Conservation Plan~~, and Appendix J of the forest management plan (this plan), and species of concern strategies where they apply.

Riparian management areas will contain four zones: the aquatic zone, stream bank zone, inner RMA zone, and outer RMA zone. Determination of the applicable management standards is based on a stream classification system. Streams are grouped based on the presence or absence of certain fish species (Type F or Type N), and by size (estimated annual average flow). Small non-fish-bearing streams (Type N) are further classified according to flow pattern in normal water years, as perennial or seasonal. Some seasonal Type N streams are seasonal high energy streams or potential debris flow track reaches.

- 3. Restore aquatic habitats —** Complete assessments to identify potential factors that could be contributing to undesirable aquatic habitat conditions, or that could be limiting the recovery of aquatic habitats. Road inventories and risk assessments, and aquatic habitat inventories, will contribute to this strategy.

Identify, design, and implement projects to remedy identified problems in a timely manner. Criteria and guidelines are specified for this strategy in Chapter 4.

- 4. Apply alternative vegetation treatment to achieve habitat objectives —** The term “alternative vegetation treatment” refers to the application of silvicultural tools and management techniques in riparian management areas, using standards that differ from general riparian management standards, for the purpose of changing the vegetative community to better achieve the plan’s aquatic and riparian habitat objectives.

Potential projects include silvicultural treatments such as the conversion of hardwood stands to conifer species, selective removal of hardwoods from mixed-species stands and the establishment of shade-tolerant conifer seedlings, the creation of gaps in hardwood stands to establish conifer seedlings (shade-intolerant and shade-tolerant), or other similar practices not specifically described in the management standards for riparian areas. These projects will be implemented in a way that maintains diverse riparian plant communities (heterogeneity) at the landscape and basin scales, and that minimizes the potential for adverse effects to aquatic resources, including depressed salmonid populations.

- 5. Apply specific strategies to other aquatic habitats: wetlands, lakes, ponds, estuaries, bogs, seeps, and springs —** The management objectives for these waters are generally similar to the objectives for streams, but the specific prescriptions are sometimes different. The strategies for other aquatic habitats will maintain the productivity of these habitats, maintain hydrologic functions, and contribute to

conditions needed for maintaining other native wildlife species of concern. The prescriptions for other aquatic habitats are presented in Tables J-3 and J-4, in Appendix J.

- 6.6. Slope stability management — The Department of Forestry will use a three-level approach to manage slope stability concerns in forest planning and operations on state forest lands in the planning area. This approach is described in more detail in the proposed *Western Oregon State Forests Habitat Conservation Plan*.**

This strategy involves utilizing watershed assessment to assess landslide hazards; evaluation of alternatives to minimize, mitigate for, or avoid risk in high and moderate hazard areas; and design of operations to minimize, mitigate for, or avoid identified risks.

- 7. Forest road management —** The road system will be managed to keep as much forest land in a natural, productive condition as possible; prevent water quality problems and associated impacts on aquatic resources; minimize disruption of natural drainage patterns; provide for adequate fish passage where roads cross fish-bearing streams; and minimize exacerbation of natural mass-wasting processes.

This strategy will be accomplished by completion of a comprehensive inventory of existing roads on state forest lands; development and updating of district implementation plans and transportation planning; forest road design, construction, improvement and maintenance in accordance with processes and standards in the *Forest Roads Manual*; and identifying and prioritizing roads for closure and/or abandonment.

### **Forest Health Strategies**

There are seven forest health strategies. The components of these strategies and guidelines are given in Chapter 4.

- 1. Actively manage the forest to maintain or improve forest health.**
- 2. Detect and monitor pest populations, damage levels, and trends.**
- 3. Use the Integrated Pest Management (IPM) process to implement suppression or prevention actions when pest populations or damage exceed acceptable levels.**
- 4. Assess and manage forest genetic resources.**
- 5. Implement the State Forest Program's Swiss Needle Cast Strategic Plan (Oregon Department of Forestry 2000).**
- 6. Participate in research and cooperative programs that align with our management objectives, to improve our knowledge and actively enhance forest health and biodiversity.**
- 7. Cooperate with other agencies and associations to prevent the introduction of non-native pests.**

## □ Strategies for Specific Species of Concern

The integrated management strategies described in this chapter are intended over time to result in habitat conditions on the landscape and in aquatic and riparian areas that will provide functional habitat conditions for native species. As described, these more diverse and potentially functional habitats will take many decades to create. While moving the landscape toward a more diverse habitat condition, there are expected to be individual species, referred to as “species of concern,” or habitats that require special consideration. Additional conservation tools will be considered where determined necessary for species of concern, including the use of anchor habitats and site protection. Species of concern are fish and wildlife species that have been identified as being at risk due to declining populations or other factors (e.g., having a limited range).

~~For individual species of concern, additional strategies focus on short-term protection of anchor habitats. These strategies will provide a higher short-term level of protection to existing key habitat areas for these species, and will fulfill state and federal Endangered Species Act obligations for northwest Oregon state forests. This plan and the proposed *Western Oregon State Forests Habitat Conservation Plan* contain strategies intended to protect existing key habitat areas and/or sites considered critical to the short-term survival of individuals or populations.~~

The strategy is to develop or maintain habitat areas across the landscape for species of concern that can be readily colonized as species abundance increases or distribution expands. Anchor habitat areas are intended to provide locales where populations will receive a higher level of protection in the short-term until additional suitable habitat is created across the landscape. Anchor habitat areas are not intended to be permanent reserves; however, they will be maintained until it can be demonstrated through adaptive management that the species concerned

~~The anchor habitat areas are intended to allow species with low mobility, limited dispersal ability, or high site fidelity to recolonize new habitat that is being created over the landscape over time. The concept of stationary central blocks of habitat, or “anchors,” is a way to ensure that new habitat may be more readily colonized. While anchor habitat areas are not intended to be permanent reserves, they will be maintained until it can be demonstrated through adaptive management that the species concerned is colonizing new areas of habitat and persisting in those areas.~~

The proposed HCP has several key anchor habitat strategies, including:

~~Northern spotted owl habitat clusters — These areas encompass the majority of existing viable owl sites within the Astoria, Tillamook, and Forest Grove Districts, a total of approximately 38,000 acres.~~

~~**Marbled murrelet nest site and buffer areas** — These areas encompass all known murrelet nesting sites on state lands in the planning area, a total of approximately 5,000 acres.~~

~~**Salmonid emphasis areas** — A set of sub-watersheds will be identified in the planning area, based on an analysis of existing habitat and fish abundance information. In these areas, management standards will focus on accelerated restoration and enhancement~~

~~actions, and management guidelines will lower the risk of adverse effects from forest management activities.~~

~~In addition to anchor habitats, some species of concern will be protected through site-specific management approaches. Species receiving site-specific protection will be those with habitat needs that otherwise might not be met with the provisions of this management plan, or with the anchor habitat approach. Site-specific management approaches will address both habitat protection and protection from disturbance, if applicable.~~

~~In addition to these anchor habitat strategies, the HCP describes protection measures for additional northern spotted owl sites not included within the cluster strategy, but considered important sites to maintain population viability in the short term.~~

~~The HCP also details specific strategies for other species of concern, including bald eagle, peregrine falcon, northern goshawk, fisher, Townsend's big-eared bat, Cascades frog, and western pond turtle.~~

#### **□ Strategies for Specific Resources**

Chapter 4 also includes strategies for specific resources, listed below.

- Agricultural and grazing resources
- Air quality
- Cultural resources
- Energy and minerals
- Land base and access
- Plants
- Recreation
- Scenic resources
- Soils
- Special forest products

## Chapter 5. Implementation

Chapter 5 describes guidance and standards for processes and activities that will be undertaken to implement the strategies.

**Implementation guidelines** — This section describes who is responsible for implementing the plan, and how implementation will be carried out. It discusses responsibilities, plan scope, plan duration, implementation levels based on funding, implementation plans, annual operations plans, and the team concept in implementation.

**Asset management** — Assets are defined as the tangible resources and infrastructure on state forest lands.

- The estimated total bare land value of the northwest Oregon state forests is currently \$235 million.
- The total value of standing timber on the northwest Oregon state forests is currently estimated at over \$5 billion.
- Populations of deer, elk, and bear support a recreational hunting industry. Populations of trout, salmon, and steelhead support a large recreational fishing industry. Both hunting and fishing have significant local and regional economic benefits.
- The northwest Oregon state forests support many recreational activities, including off-highway vehicle (OHV) use, camping, horseback riding, mountain biking, and hiking. These activities generate significant revenue for local and regional businesses. Investments in infrastructure such as interpretive centers, campgrounds, trails, and other facilities, add to the forest's net asset value.
- The streams and rivers that flow from the northwest Oregon state forests are water sources for municipal water systems, domestic water systems, agricultural uses, and fish hatcheries. In addition, these waterways support fish and recreation.
- Currently, there are approximately 3,290 miles of active forest roads on the northwest Oregon state forests. These roads and their related infrastructure such as bridges have an estimated value of \$209 million.

In addition to generating annual revenues, this forest management plan is expected to increase the asset value of the land and timber. Based on the analysis conducted by Oregon State University, it is estimated that standing timber inventory will increase from approximately 17.4 billion board feet today, to 28.4 billion board feet when the desired future condition is achieved, a 63 percent increase. Values are also expected to increase for the bare land, facilities, and infrastructure.

The value of these state forests is also expected to increase, in terms of their increasing ability to provide diverse wildlife habitats, properly functioning aquatic systems, high water quality, and outdoor recreation.

**Adaptive forest resource management** — Adaptive management is an approach to resource assessment and management that explicitly acknowledges uncertainty about the outcomes of management policies, and deals with this uncertainty by treating management activities as opportunities for learning how to manage better. This section describes the concepts, process, and strategies of adaptive management, the importance of research and monitoring for obtaining information necessary for decision-making, the role of stakeholders in adaptive management, and the process for dealing with changes in policies and practices when needed.

**Adaptive management concepts** — In state forest management, adaptive management is defined as a scientifically based, systematically structured approach that tests and monitors management plan assumptions, predictions, and actions, and then uses the resulting information to improve management plans or practices. Through the application of adaptive management techniques, the Department of Forestry will continually improve management policies and practices by learning from the outcomes of operational programs. Adaptive management requires managers and decision-makers who are willing to learn by doing, and who acknowledge that making mistakes is part of learning.

Adaptive management will include public participation, in order to identify and incorporate public concerns and values into the process.

The key concepts for adaptive management are:

- Adaptive management is a systematic, rigorous approach for learning from our actions, improving management, and accommodating change.
- Adaptive management is not a replacement for decision making at any level, but a system for making better decisions.
- Successful adaptive management requires a well-designed process, including a strong monitoring program. There are six steps in adaptive management.
  - Problem assessment.
  - Design experiments and related monitoring plans.
  - Implement experiments and monitoring as designed.
  - Monitor over an extended period of time.
  - Evaluate.
  - Verify or update the hypotheses used, and adjust management as necessary.
- Adaptive management requires a well-defined framework for effecting change.

#### **Strategies for Implementing Adaptive Management**

The following actions will be taken. Chapter 5 provides details.

- 1. Implement an adaptive management process and framework that provides for change at the appropriate planning level and in a timely manner.**
- 2. Develop and implement a monitoring program designed to evaluate the working hypotheses over time. Review and update a monitoring implementation plan at least every ten years.**

Monitoring is a key element in this plan. Information from monitoring and research will be used to assess resource conditions, ecological and cultural trends, success in carrying out the strategies, the effects of the strategies on resources, and the validity of the working hypotheses.

At first, the Department of Forestry will emphasize implementation and effectiveness monitoring — are we doing what we said we would do, and is it working? Over time, the department will also do validation monitoring — are the underlying assumptions of the management strategies correct?

3. **Conduct a comprehensive review of the goals and strategies of this FMP every ten years following adoption.**
4. **Conduct a comprehensive review of the landscape management strategies, when 30% in aggregate of LYR and OFS stand types is achieved on lands in the planning area.**

This review will evaluate the extent to which the array of stand conditions at that point in time meets the habitat needs of native species, and whether additional layered and older forest structure stands are required to meet that goal.

**Public involvement in implementation** — The Oregon Department of Forestry is committed to public participation in land management decisions. The public involvement program should be appropriate for the scale and complexity of the project. Chapter 5 describes details of public involvement in district implementation plans and annual operations plans.

## Appendices

The plan includes the following appendices.

- A. Glossary
- B. References
- C. Concepts for the Integrated Strategies
- D. Legal and Policy Mandates
- E. Wildlife: Species Lists, Status, and Habitat
- F. Public Involvement
- G. State Lands Research Policy
- H. History of the Northwest Oregon State Forests
- I. Decadal Analysis of Alternatives
- J. Management Standards for Aquatic and Riparian Areas