Southwest Oregon

State Forests Management Plan

Revised Plan April 2010

Oregon Department of Forestry

Southwest Oregon State Forest Management Plan

January 2001 Plan
Habitat Conservation Plan references revised April 2010

Oregon Department of Forestry

FINAL PLAN

"STEWARDSHIP IN FORESTRY"

List of Acronyms and Abbreviations Used

ATV	All-terrain vehicle
BAT	Best Available Technology
BLM	Bureau of Land Management
BMP	Best Management Practices
BOFL	Board of Forestry Lands
BPA	Bonneville Power Administration
CEQ	Council on Environmental Quality
CMAI	Culmination of Mean Annual Increment
CMZ	Channel migration zone
CRS	Cultural, Recreation, and Scenic Inventory System
CSC	Closed single canopy (forest stand type)
CSFL	Common School Forest Lands
CSRI	Coastal Salmon Restoration Initiative
CWA	Clean Water Act
DBH	Diameter breast height
DEQ	Oregon Department of Environmental Quality
DFC	Desired future condition
DOGAMI	Oregon Department of Geology and Mineral Industries
DSL	Oregon Division of State Lands
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FC	Federal candidate species
FE	Federal endangered species
FMP	Forest management plan
FPA	Forest Practices Act
FPFO	Forestry Program for Oregon
FT	Federal threatened species
GIS	Geographic Information System
HCP	Habitat conservation plan
IHA	Interior habitat area
IP	Implementation plan
IMPLAN	Impact Analysis for Planning
IPM	Integrated Pest Management
ISR	Independent scientific review
ITP	Incidental take permit
LWD	Large woody debris
LYR	Layered (forest stand type)
MBF	Thousand board feet
MMBF	Million board feet
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NMFS	National Marine Fisheries Service
NWOA	Southwest Oregon Area
OAR	Oregon Administrative Rules
ODA	Oregon Dept. of Agriculture
ODF	Oregon Dept. of Forestry
ODFW	Oregon Dept. of Fish and Wildlife
OFS	Older forest structure (forest stand type)
OHV	Off-highway vehicles
ONHP	Oregon Natural Heritage Program
ORS	Oregon Revised Statutes
OSCUR	State forest inventory system
PM	Particulate matter
PSD	Prevention of Significant Deterioration
REG	Regeneration (forest stand type)
RMA	Riparian management area
ROS	Recreation Opportunity Spectrum
RV	Recreational vehicle
SBM	Structure-based management
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SDI	Stand Density Index
SE	Stem exclusion (stand development process) *or* State endangered species
SHPO	State Historic Preservation Office
SI	Stand initiation (stand development process)
SIP	State Implementation Plan
SSC	State sensitive species, critical status
SSV	State sensitive species, vulnerable status
ST	State threatened species
T&E	Threatened and endangered
TMDL	Total maximum daily load
TPA	Trees per acre
TSP	Total suspended particulate
UDS	Understory (forest stand type)
UR	Understory reinitiation (stand development process)
USC	United States Code
USDA	U.S. Dept. of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WRC	Oregon Water Resources Commission

Preface

This is a plan for special forests in Southwestern Oregon owned by the State. The plan achieves “greatest permanent value” to the citizens of the state, as defined in Oregon statute and administrative rule. Achieving “greatest permanent value” means providing a full range of social, economic, and ecological benefits, and achieving a balance between short-term and long-term economic returns.

This is a hopeful plan: It addresses people’s hopes for the future. Oregonians want their forest resources protected for future generations. At the same time, they expect a full range of economic, social, and environmental benefits today, as well as in the future. This plan achieves that balance in a public and scientifically credible way. This plan was developed with countless hours of public input, and several rigorous scientific and technical reviews. As a result, the plan is scientifically sound, and many people had a hand in shaping it.

This is a visionary plan: It envisions an idealized view of the future, without the constraints of the current forest condition. The forest produces sustainable and predictable forest products that generate jobs and revenues for the benefit of the state, counties, and local taxing districts. The diversity of forest structures is enhanced over time, providing for a broad range of social values important to Oregon citizens, including recreation. The diverse forest structures produced contribute to the range of fish and wildlife habitats necessary for all native species, and contribute to broad biodiversity.

This is a purposeful plan: It calls for active management across the landscape and over time to achieve its goals. It relies on integrated management of forest resources to produce a variety of values, and focuses on the compatibility of forest uses over time.

This is a flexible and adaptable plan: The plan calls for monitoring the response of the forest to strategies outlined in the plan. These responses are then evaluated against the goals of the plan, and the working hypotheses upon which the plan is built. The Board and Department of Forestry will then adapt the new information into the plan accordingly. The plan calls for major scientific, policy, and public reviews at least every ten years to provide regular periodic checkpoints to rigorously examine the scientific underpinnings, the policy environment, and the public’s view of the plan.

This is a sustainable plan: Because of the flexibility and adaptability described, this is a sustainable plan that Oregonians can embrace and support for decades. This plan will assure sustainable timber and revenue for the benefit of the Forest Trust Land Counties, and will also provide for the sustainable forest ecosystems and healthy watersheds that are important to Oregonians.

The planning document that follows is organized into five main chapters. Chapter 1 describes the state forests and planning process, and tells a little about the history of these lands to help the reader understand the forests today. Chapter 2 explains how the plan was developed using input from technical specialists and the public. This chapter contains information on forest resources, including forest products, watersheds, and wildlife. Chapter 3 describes the values, vision and goals that set the direction of the plan, and lists the working hypotheses that are the foundation for the strategic approach.

Chapter 4 is the heart of the plan, the concepts and strategies that will bring about the forest envisioned by the goals and values. Chapter 5 describes how the plan will be implemented in an adaptive management context. This chapter discusses district implementation planning, annual operations plans, asset management, monitoring and research, and continuing public involvement to shape the plan into the future.

The Department of Forestry is proud of the work and the vision that has created this new forest plan. As the plan strategies are implemented and monitored, with ongoing input from scientists and the public, thoughtful forest management will ensure predictable timber and revenues for schools and local economies, diverse habitats for wildlife and fish, and recreational opportunities. The Department encourages Oregonians to remain involved in the plan's implementation and development into the future.

Table of Contents

Chapter 3. Guiding Principles, Vision, and Goals

Chapter 4. Resource Management Concepts and Strategies

Chapter 5. Implementation

Appendices

Tables

Figures

Executive Summary

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

Chapter 1. Place, Purpose, and History: The Southwest Oregon State Forests

The *Southwest Oregon State Forest Management Plan* provides direction for state forest lands in the Southwest Oregon District. These lands are in Josephine, Douglas, Jackson and Curry Counties. Of the district's 18,073 acres, approximately 52% (9,372 acres) are owned by the Board of Forestry, and 48% (8,702 acres) are owned by the Oregon State Land Board. This plan supersedes the *Long Range Timber Management Plan for the Southern Oregon Region State Forests* (Oregon Department of Forestry 1987).

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 proper balance between the resources and achieve the greatest permanent value through a system of integrated management.

Chapter 1 sets the stage for the *Southwest Oregon State Forests Management Plan*, with a brief history of the forests, and a description of state forest planning.

Location — The Southwest Oregon District manages a total of 18,073 acres of state-owned forests. Of this total, 9,372 acres of land are consolidated in southern Douglas and northern Josephine Counties, and are known as the Glendale block. In the context of desired land exchanges, the Glendale block is referred to as the acquisition area. This block is located north of Glendale to Sunny Valley, west of Highway I-5. The remaining 8,702 acres of Common School forest lands are in small blocks in four counties, and are referred to as the scattered parcels. They are located in Curry, Douglas, Jackson, and Josephine counties.

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 "State Forest Ownerships" in Chapter 2, and also in Appendix D.

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.

Josephine, Douglas and Coos counties donated some of their forest lands to the state. However, southwest Oregon counties also sold forest lands to private timber companies or individuals to keep them on the tax rolls, or kept them to be managed as county forests. Later, parcels of private lands were purchased or donated to become state forests. In 1944, the Windy Creek property (Glendale) along with some other acreage for a total of about 3,600 acres, was deeded to the State of Oregon (Board of Forestry).

Management planning for state forests — Management planning for Oregon state forests involves 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 (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.

Budgets
Annually (fiscal year), and biennially

Annual District Operations Plans
Cover one district; project-specific; annual

District Implementation Plans
Cover one district; revised periodically

Long-Range Forest Management Plans
Provide overall direction; regional scale; reviewed every 10 years

Figure S-1. Planning for Oregon State Forests

Chapter 2. Understanding the Forest: Planning and Resources

This chapter describes the process used to develop this plan, and presents information about the forest resources.

Southwest 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 Southwest Oregon state forests.

The planning team included both field and program staff from the Oregon Department of Forestry and the Oregon Department of Fish and Wildlife. The planning team consulted many resource specialists. A steering committee provided policy direction to the core planning team.

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 began public involvement at the start of forest planning in 1997. The process included public meetings, written comment periods, and informal contacts with interest groups, county commissioners and individuals.

The 2010 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. These adaptive management discussions with the Board led to revisions to both the NW and Southwest FMP. 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 — This section of Chapter 2 provides summary information about the following resources.

- Agriculture and grazing
- Air quality
- Aquatic and riparian resources
- Cultural resources
- Energy and minerals
- Fish and wildlife
- Forest health and biodiversity
- Plants
- Recreation and scenic resources
- Roads and access
- Social and economic resources
- Soils
- Special forest products
- Timber
- Water quality
- Water supply
- Wetlands

Information is summarized very briefly here for some key resources.

Aquatic and riparian resources, water quality – Most Southwest Oregon state forests are located within the Rogue and Umpqua drainage basins. State forest lands represent only a small percentage of any one basin. Water quality is limited on many streams on or downstream from state lands by high summer water temperatures. This may be an historical condition for streams in this region. Water temperatures are an important limiting factor for salmonid fish species.

Fish and wildlife —The Southwest Oregon state forests provide habitats for hundreds of species of fish and wildlife. Of the many wildlife species potentially found on the Southwest Oregon state forests, 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 —** Federally and state listed as threatened in Oregon. Currently, there is one known nesting territory on Southwest Oregon state forests and one nesting territory located within 1/4 mile of Southwest Oregon state forests.
- **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. Currently, 5,500 acres of Southwest Oregon state lands are considered to be within the inland range of the marbled murrelet.
- **Spotted owl —** Federally listed as a threatened species. There are currently two active pair sites on state forest land, and one inactive site. In recent years, up to 34 owl activity centers have been reported on federal and private lands adjacent to state

forest lands. Approximately 95 percent of Southwest Oregon state forest land is within 1.3 miles of an owl activity center on adjacent lands.

- **Fish —** All native salmonid species except chum salmon are present in Southwest Oregon. The federal government has listed some populations of coho salmon, chinook salmon, chum salmon, steelhead trout, and Oregon chub as threatened or endangered species.

Forest health and biodiversity — Fire, windstorms, people, insects, and diseases constantly disrupt forests, injuring and killing trees and other living things. Disturbances are natural and necessary processes of the forest ecosystem and create key habitat features for wildlife and fish. Evaluations must determine what level of change indicates a significant forest health trend, within the context of normal and historical variability. This subsection lists forest health issues that may occur in Southwest forests.

Historically, fire return intervals ranged from ten to forty years in this region. Native Americans burned forested areas regularly to maintain big game habitat for hunting and for other purposes. Early European-American settlers continued the burning to develop homestead farms and ranches. In the early twentieth century, fire protection efforts increased, and most existing forests in the Southwest Oregon District date from that time.

As a result of the fire history, the district's forests have only limited amounts of large down woody debris, and very few older, decayed, down logs. Given the high fire danger that is typical for these forests during the summer, and the increasing risk of accidental fire starts from an increasing population, large amounts of wood on these forest floors may create a significant fire hazard.

In southwestern Oregon, bark beetles are always present in the forest, affecting mostly ponderosa pine and sugar pine. Important diseases include black stain root disease, white pine blister rust, and Port Orford cedar root disease. Dwarf mistletoe, noxious weeds (non-native), and animals may all interfere with tree growth. Non-biological stresses such as wind, drought and cold also damage trees, particularly when tree genotypes or species are planted which are poorly suited to their local environment.

Recreation and scenic resources — Southwest Oregon state forests have light recreational use, mostly hunting. Some lands in the district are within view of two scenic highways and the Rogue River, and are managed to protect scenic values.

Roads and access – State forest roads are a resource and represent long-term capital investments. They must be maintained in usable condition with minimal impacts on other resources such as water quality, soils, and wildlife. Approximately 90 miles of forest roads are located in the district. Roads through federally and privately owned land access a significant portion of state forest land. Approximately 15 parcels currently do not have reasonable access for management activities.

A road survey has recently been completed, and this information will be used to correct inadequate drainage, fish passage, and unstable sites resulting from old road construction. This information will also be used to develop access needs and to determine road closures.

Social and economic resources — Harvests from Southwest Oregon District forests represent only a small share of the region's timber harvests, which are dominated by harvests from federal and private forest lands. Revenue from state forests, almost all of which comes from timber harvest, provides funding for schools and other local governments. Total timber harvest income from Southwest Oregon state forests was over $3 million during the 1988-1998 period. Total volume harvested in the time period was 18 MMBF.

Chapter 3. Values, Vision, and Goals: Setting the Direction

Chapter 3 presents the guiding principles, forest vision, resource management goals, and monitoring assumptions.

Guiding principles — The plan's guiding principles are given in Chapter 3. These are the overall rules, goals and responsibilities that guide the process of planning.

1. The plan will recognize that the goal for management of Common School Forest Land is the maximization of income to the Common School Fund over the long term. 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.
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 Southwest 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 Southwest 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. Southwest 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 Oregon Department of Forestry will be guided by stewardship principles in developing and implementing forest management.
15. 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 represents an idealized view of the future, without the constraints of the current forest condition. The strategies in Chapter 4 and the implementation plan will describe how the 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, aquatic and riparian resources, cultural resources, energy and minerals, fish and wildlife, forest 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 – Scientific understanding about forest systems is substantial, but incomplete. At the center of this plan and fundamental to its adaptive management framework is a set of working hypotheses. These key working hypotheses are described in Chapter 3.

Chapter 4. Concepts and Strategies

Chapter 4 presents the concepts and strategies for a broad, integrated management approach to be implemented on Southwest 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 (structure-based management).
- Aquatic and riparian conservation.
- Forest health.

Landscape management concepts — This plan is based on an approach called structure-based management (SBM). 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 sustainable timber and revenue, diverse habitats for indigenous species, a landscape level contribution to properly functioning aquatic systems, and a forest that provides for 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.

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.

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

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

   Most forest stands in southern Oregon are complex and diverse, containing many tree species along with variations in size, age, and density of trees. These more complex structures are not easily identified as being one stand structure or another, and may often be a combination of different structures intermingled throughout. Patchy stand structures are common in older forest types.

   The stand type definitions in this chapter provide broad categories for the types of stands on the landscape. They will be used by field managers to categorize existing stands and to describe the desired future condition for the development of stands through time.

   The desired stand structure array presented later in this chapter (as part of Landscape Management Strategy 1) emulates the diversity of stand types historically associated with conifer forests in Southwestern Oregon.

   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 levels, the forest stand and the broader landscape. 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 large and old trees, wildlife trees, snags, down wood, 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, fragmentation, landscape composition and pattern, boundaries, corridors, and interior habitat areas.

- Interior habitat area principles — The plan places an initial focus on development of mature forest patches and interior habitat areas (IHAs), since the planning area has a limited acreage of mature forest and IHAs. All patch types are essential if habitats are to be provided for all species.

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 lower quality timber from young stands. Final harvests of these stands will result in the harvest of high quality wood. 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. Recreational and commercial fisheries will be enhanced by aquatic and riparian strategies that maintain and restore properly functioning habitats. The diverse array of stand types and arrangements will also provide many recreational opportunities.

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. 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: the effects of landscape ecology on riparian and aquatic habitats —** 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.
- **Watershed assessment and analysis —** Watershed assessment must be a critical process in implementation of this plan. 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 — Management actions must consider the effects of disturbance agents, which are a permanent part of the forest ecosystem. By integrating forest health strategies and forest management, we ensure the most options for the future. 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 short-term habitat needs of some species on state forest lands. When necessary to provide short-term habitat considerations for wildlife and fish species of concern, additional conservation tools may be used.

Landscape Management Strategies

1. **Actively manage the state forest landscape and forest stands to produce the desired future array of stand structure types and produce 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

Regeneration	5-20 percent (10% used for analysis)
Closed Single Canopy	35-55 percent (45% used for analysis)
Understory	5-15 percent (10% used for analysis)
Layered	10-20 percent (15% used for analysis)
Older Forest Structure	10-30 percent (20% 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 review of this strategy through adaptive management. 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.**

   The 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 the 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 the covered 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 an implementation plan for the district that provides more specific information on the application of Landscape Management Strategies 1 through 3, for a ten-year period.**
   A district implementation plan will be developed that contains more detailed information describing how the 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, watershed assessment and analysis is an overarching strategy designed to collect and synthesize key watershed information that will be used to further evaluate the 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 Appendix C of 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. **Alternative vegetation treatment in riparian areas —** 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. **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 C-3 and C of Appendix C-4.

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 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. **Manage the forest to minimize unwanted fire.**

3. **Detect and monitor pest populations, damage levels, and trends.**

4. **Use the Integrated Pest Management (IPM) process to implement suppression or prevention actions when pest populations or damage exceed acceptable levels.**

5. Assess and manage forest genetic resources.

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 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, additional conservation tools will be implemented where determined necessary for individual species. These species are referred to as "species of concern" and 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).

❑ 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 and Monitoring

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 total value of standing timber on the Southwest Oregon state forests is estimated at approximately $162 million, as of January 2001.
- Hunting and fishing have local and regional economic benefits.
- The streams and rivers that flow from the Southwest 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 90 miles of active forest roads on the Southwest Oregon state forests. These roads and their related infrastructure such as culverts and bridges contribute to the overall asset value.
- 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 concept and process 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.

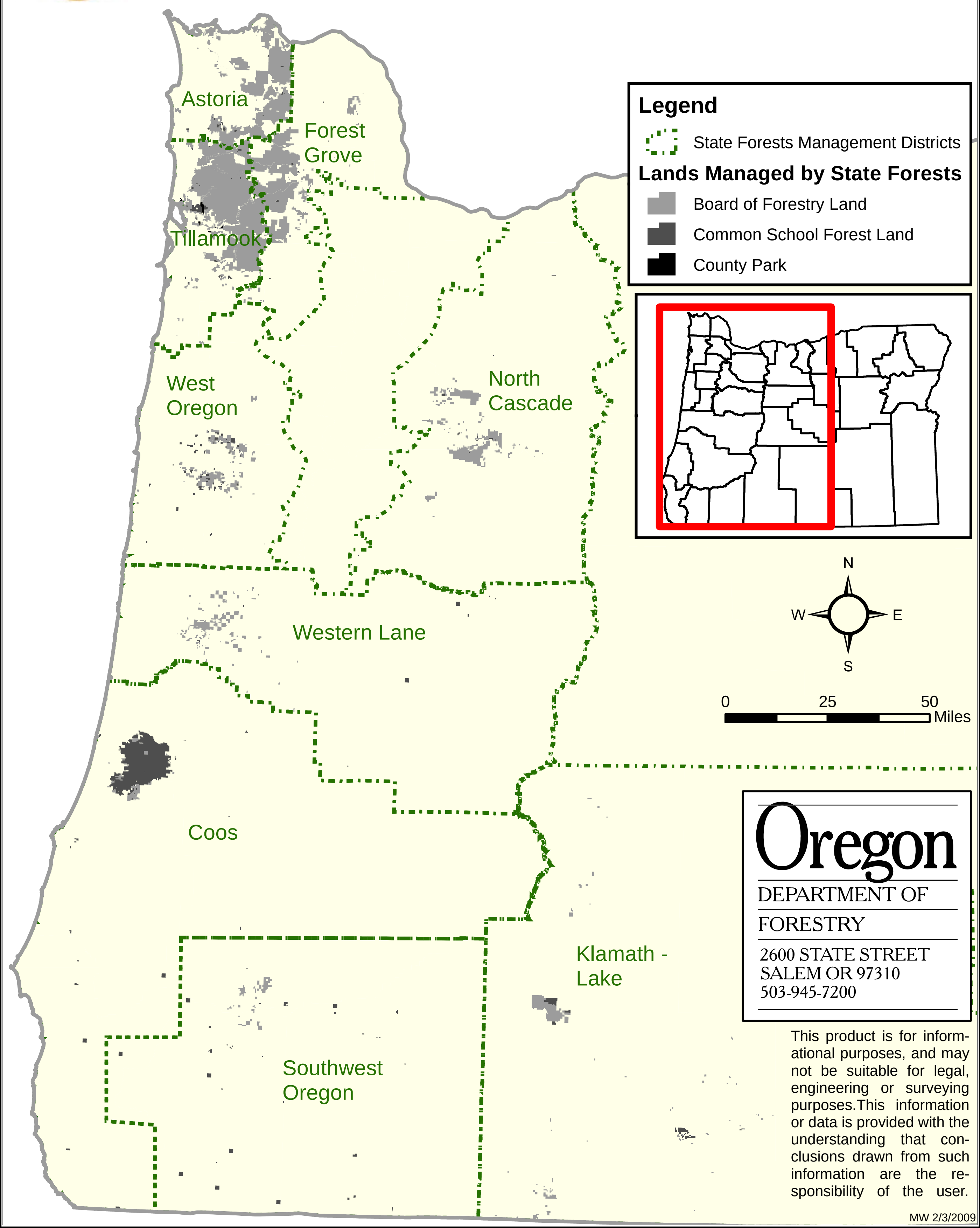
Monitoring — Monitoring is a key element in this plan. Information from monitoring and research will be used to assess resource conditions, ecological and cultural trends, success in carrying out the strategies, the effects of the strategies on resources, and the validity of the working hypotheses.

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?

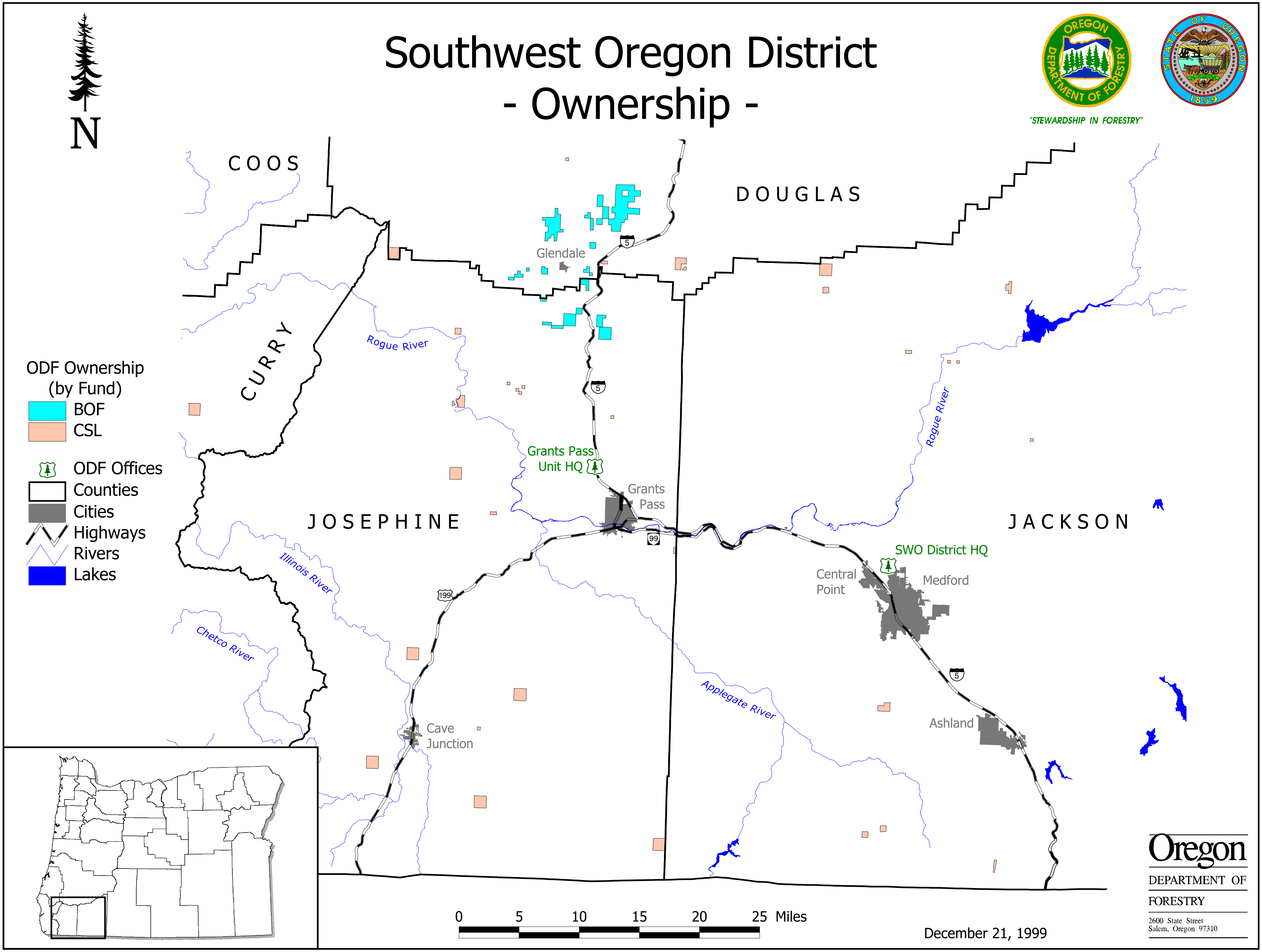
Effecting change — As new information becomes available, changes could be made in strategies, approaches, and prescriptions. This section includes guidelines on making changes at various levels.

Map Section

Department of Forestry
State Forests Districts



Southwest Oregon District
- Ownership -



"STEWARDSHIP IN FORESTRY"

December 21, 1999

Oregon
DEPARTMENT OF FORESTRY
2600 State Street
Salem, Oregon 97310

Chapter 1
Purpose, History, and Planning

Purpose and Scope of the Management Plan

The *Southwest Oregon State Forest Management Plan* provides direction for state forest lands in the Southwest Oregon District. These lands are in Josephine, Douglas, Jackson and Curry counties. Of the district's 18,073 acres, approximately 52% (9,372 acres) are owned by the Board of Forestry, and 48% (8,702 acres) are owned by the Oregon State Land Board. This plan supersedes the *Long Range Timber Management Plan for the Southern Oregon Region State Forests* (Oregon Department of Forestry 1987).

Like other recent plans for managing state forest land, the *Elliott State Forest Management Plan* (Oregon Department of Forestry 1993) and the *Eastern Region Long Range Forest Management Plan* (Oregon Department of Forestry 1995), as well as the *Northwest Oregon State Forests Management Plan* (Oregon Department of Forestry 2000e) currently being developed, this plan is far more extensive than past timber management plans. All resources have been considered, from agriculture and grazing to cultural resources, recreation, wildlife and fish habitat, and wetlands. Goals and strategies have been developed for each group of resources.

The strategies for this plan implement a new approach, called structure-based management, which will provide for diverse timber products and habitats across the landscape.

This chapter sets the stage with a brief history of the state forest and a description of state forest planning. The additional headings in this chapter are:

Location of Southwest Oregon State Forest

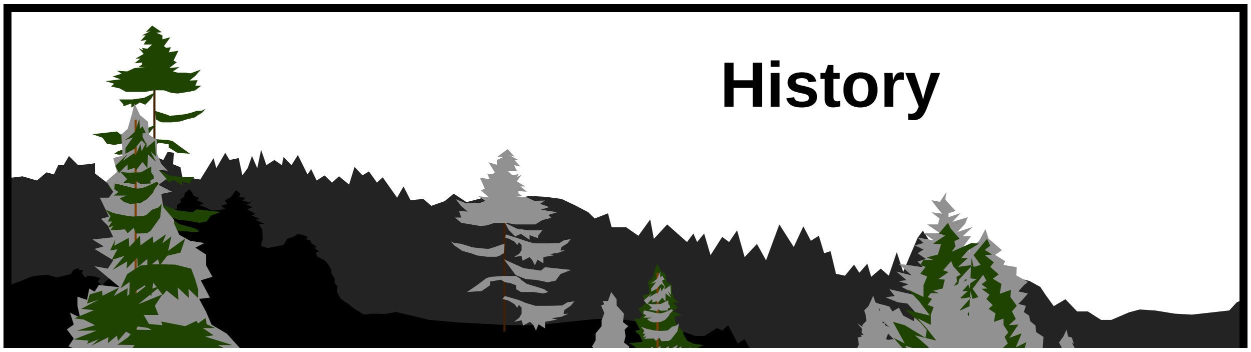
The state forest lands in southwest Oregon lie in a region with a complex geological history and unique biodiversity. The climate, mix of tree species, and silvicultural strategies are quite different from other state forest lands.

The Southwest Oregon District manages a total of 18,073 acres of state-owned forests. Of this total, 9,372 acres of land are consolidated in southern Douglas and northern Josephine counties, and are known as the Glendale block. In the context of desired land exchanges, the Glendale block is referred to as the acquisition area. This block is located north of Glendale to Sunny Valley, west of Highway I-5. Major streams are Cow Creek, which drains into the South Umpqua River, and Grave Creek, a tributary of the Rogue River. The remaining 8,702 acres of Common School forest lands are in small blocks in four counties, and are referred to as the scattered parcels. They are located in Curry, Douglas, Jackson, and Josephine counties.

Neighboring forests are a checkerboard of private and federal lands created by various public land transactions. Federal forests in the vicinity of state lands include the Siskiyou, Rogue River, Klamath, Six Rivers and Umpqua National Forests, and the Medford and Roseburg Districts of the Bureau of Land Management (BLM).

Three mountain ranges of different geological origins come together in southwest Oregon, the Oregon Coast Range, the Cascades, and the Siskiyou (Klamath) Mountains. The 3,500 to 4,000 feet high Umpqua Mountains form the Rogue and Umpqua River divide, and stretch from the Coast Range to the Cascades, breaking southwest Oregon into the two major river systems. As described in Chapter 2, under "Resource Description," the climate is both drier and harsher than northwest Oregon. Summer high temperatures are coupled with low humidity typical of a Mediterranean climate. Fire is the major natural disturbance. State forests are dominated by conifers, especially Douglas-fir, along with a variety of hardwoods.

History



A historical perspective helps us to understand the state forests today and provides a context for making decisions about the future. The next few pages describe some of the events that have affected state forests in southwestern Oregon. Landscapes, ecologies, land use and ownership patterns are outcomes of history as well as climate and geology.

- The uses of fire by Native Americans, as well as natural lightning fires, greatly influenced vegetation patterns in the planning area for thousands of years, until the mid-1800s. When European settlers first arrived in the area, recently burned-over lands were common, grasslands were much more prevalent than today, and trees clustered along streams, ridge tops, and protected valleys.
- Early settlers cleared forests for agriculture, introduced livestock, mined the streams, hunted for meat and hides, and also set fires, both deliberately and accidentally.
- Within a very few years, from 1840 to 1850, southwest Oregon land was taken from the Native Americans and put into private and public ownership. Some of this land, consisting of both private and federal parcels, later became state forests.
- After about 1940, new technologies facilitated logging, reforestation, and fire suppression. This has resulted in dramatic changes to forest and tree species distribution, and changed the fire regime from frequent, low intensity fires, to less frequent but more damaging fires.
- Cultural resource sites and objects may still be found on state forest lands today, and are a significant public resource.

Geologic History

The unique diversity of tree species and other vegetation in southwestern Oregon is the result of its geologic past (Atzet and Wheeler 1982). The Klamath province is old, being thrust above sea level before most of Oregon. The land was formed from complex folds, intrusions and islands of many different metamorphosed, sedimentary and volcanic rocks of different ages. Each parent rock produced a variety of soils, habitats and plant communities.

Climate fluctuations over the last several thousand years allowed migrations of plants from both warmer (California and the Sierras) and cooler climates (northern Oregon). There was little glaciation in this province, and it served as a refuge for migrant species during glacial periods (Atzet and Wheeler 1982). Approximately 9,000 years ago, after retreat of the glaciers, the climate was hotter and dryer than today, and the region was greatly affected by fire. Climate conditions similar to today have persisted for about 5,000 years, interrupted by a "Little Ice Age" from about 1300 to 1850 (Atzet and Wheeler 1982, Agee 1993).

First Inhabitants

Native Americans lived in southwest Oregon and helped shape the landscape for thousands of years before the arrival of visitors and settlers from other continents in the 18th and 19th centuries. Some of the Native Americans in the planning area were the Cow Creek Band of the Umpqua, the Upper Umpqua, Takelma, Coos, Coquille, Shasta Costa, and Dakubetede (LaLande 1991). At least three major language groups were represented. The Cow Creek Band lived along the South Umpqua and Cow Creek, and spoke a language related to those of tribes of the Willamette Valley, as did the Takelma in the Rogue Valley. Other language families included the coastal Pacific Northwest culture that extended north to Alaska, as well as languages related to Navajo and Apache (Beckham 1986).

Anthropologists believe the first Americans began to migrate from Asia during glacial periods as much as 25,000 years ago. Radiocarbon dates show human presence in Oregon by 10,000 years ago (Beckham 1986, LaLande 1991, O'Donnell 1996). These earliest inhabitants, the Paleo Native Americans, hunted big game, including mastodon, mammoths and saber-toothed tigers, using large, fluted, stone points. A fragment of a fluted projectile point has been found along the North Umpqua River (Beckham 1986).

The change of climate at the end of the glacial period meant extinction of some of the big game species, and probably required expanded subsistence techniques for the Native Americans. Tools found at sites of this Archaic Period include knives, scrapers, and chopping tools of people who were gatherers as well as hunters and fishers. One of these sites, on the North Umpqua, lies beneath a layer of ash formed 7,000 years ago by the explosive eruption of Mount Mazama, which created Crater Lake (Beckham 1986). During the next few thousand years, new styles of projectile points appeared. Small, narrow-necked points up to 2,000 years old may indicate the introduction of the bow and arrow. Probably the oldest and richest archaeological sites would have been along the coast, but the level of the Pacific Ocean has risen during the last 6,000 years, and these sites would now be underwater and several miles out to sea (Beckham 1986).

Records of early explorers and settlers indicate that the southwest Oregon tribes in the Umpqua and Rogue Valleys frequently set fire to meadows and hillsides to encourage food plants (such as tarweed, bracken fern and berries) and basketry materials (hazel and beargrass). They burned underbrush in the forests to make them more open for hunting (Beckham 1986, Boyd 1986, LaLande 1991, Zybach 1993). Fire was used as a tool to drive game, to collect insects for food, and against enemies. Oak trees were underburned to encourage acorn production and to clear the ground to make collection of acorns easier

(Boyd 1986, Agee 1993). In the dry climate, large fires could spread over a period of weeks or months (Agee 1993).

European-American Settlement and Impacts on Native Americans

A few European ships visited the coast of southwest Oregon in the 1700s to explore and trade for furs. After 1820, parties of fur traders and explorers traveled overland to the Umpqua Valley. The impacts of early trapping on the beaver population are unknown, but beaver activities generally have significant effects on hydrology and water supply, and in the creation of riparian and fish habitat. As everywhere in the Americas, the first encounters with people from other continents brought a series of epidemics. An estimated 90% of the Native Americans in Oregon died within a few decades (Beckham 1986, Boyd 1986).

From 1818 until 1846, Oregon was occupied by both Americans and British. An 1846 treaty settled the boundary between the United States and Canada, and gave the Oregon region to the United States. During the 1840s most newcomers to Oregon settled in the Willamette Valley (O’Donnell 1996). In 1846, an emigrant wagon and supply road into southwest Oregon was opened, the Applegate Trail, and brought new settlers to the Umpqua Valley.

When early settlers began to arrive in southwest Oregon, much of the area now dominated by forest was in open meadows and prairies (Boyd 1986). Early travelers through the area had referred to the lack of forest, which was confined to the valleys and ridge tops, and the abundance of grasses "as high as a horse's back." This condition was furthered by settlers who used fire similarly to the Native Americans to enhance wild game hunting for hides and meat. Much forest land was later converted to agriculture and used for crops and grazing.

At first, after almost 30 years of fur trading, relations with the Native Americans were relatively peaceful. However, in 1850, gold was discovered in the Rogue River Valley, and in 1851 at Josephine Creek near the Illinois River. Jacksonville was founded, and hundreds of miners filed for claims in southwestern Oregon (Beckham 1986, O’Donnell 1996). Traditional food sources for the Native American families were heavily impacted. Mining damaged fish spawning grounds and ancient village sites along the streams and rivers. Wild game was hunted out for hides and meat for the mining camps. The settlers' hogs ate the acorns, and their cattle and horses grazed and trampled camas lilies. The Native Americans’ traditional fall burning now threatened log cabins and fences.

Although Native American land title was acknowledged in an 1848 act creating the official Oregon Territory, no land was ceded to Native Americans in southwest Oregon. Native American families were destitute and starving. In the winter of 1852-53, another fever attacked the Native American population, killing up to two-thirds of the population (Beckham 1986). After 1853, massacres and murders escalated into a cycle of indiscriminate retaliation from both whites and Native Americans. Groups of miners known as "volunteers" (vigilantes) formed, some dedicated to exterminating all Native Americans from the region.

During this time, there were several attempts by people on both sides to reach agreement, including treaties and land cessions. The Cow Creek Treaty and the Rogue River Treaty of 1854 were the first binding agreements with Native American tribes in the Pacific Northwest. However these efforts could not prevent all-out conflict between the Native Americans and the whites, known as the Rogue River Indian War.

By 1856, most of the Native American bands that had chosen to fight surrendered to the Army (Beckham 1986). The government removed over 2,000 Native Americans, including bands who had remained peaceful, from southwestern Oregon to the Siletz and Grand Ronde reservations (Beckham 1986). Scattered individuals and families remained in the area, although embittered settlers sought to kill them, and the Bureau of Indian Affairs contracted with bounty hunters to capture them. Some of these Native Americans, perhaps about 100 in Douglas County, survived to become a remnant Native American population (Beckham 1986). Later, others returned to their homeland and presently there are again several hundred Native Americans in Douglas and Josephine counties.

In 1956, the federal government terminated the Oregon tribes, hoping to encourage assimilation (O'Donnell 1996). Even so, the Cow Creek Band and the Confederated Coos, Lower Umpqua, and Siuslaw Tribes continued to meet and act as tribes. By the 1970s, the tribes were working closely with archaeologists and historians to recover and preserve their history, and they participated in the cultural resource programs of the Umpqua National Forest and Bureau of Land Management, Roseburg District. In the late 1970s and early 1980s, eight Oregon tribes were "restored" by Congressional legislation, and in 1984 the Cow Creek Band and the U.S. agreed to a negotiated settlement for payment for loss of their lands (Beckham 1986).

Statehood and Land Transfers

By the Organic Act of 1848, the federal government had reserved sections 16 and 36 in every township in Oregon, a total of 3.5 million acres, for the use of schools. When Oregon became a state in 1859, these Common School lands were transferred to the state. More than 60% of this land, particularly the most valuable agricultural or timber land, was eventually sold or lost to land fraud. The majority of the remaining sections are in eastern Oregon. About 132,000 acres of Common School forest lands, mostly in western Oregon, are managed by the Oregon Department of Forestry. Most Common School forest land was consolidated as the Elliott State Forest in Coos and Douglas counties, with the rest scattered throughout the state.

After statehood, southwest Oregon's population expanded rapidly. Douglas County had over 3,000 people in 1860. By 1880 there were almost 10,000 (Beckham 1986). Euro-American settlement in Oregon was greatly encouraged by the Donation Land Law of 1850, which legitimized the land claims of those already settled in the Oregon Territory. The act gave free land to newcomers and induced more people to move to Oregon, especially to the agricultural lands in the Willamette, Umpqua and Rogue River Valleys (O'Donnell 1996). In 1862 the Homestead Act was passed, further encouraging settlement.

In 1869, Congress granted to the Oregon and California (O & C) Railroad 20 odd-numbered sections for every mile of track laid, to expedite further settlement and development of Oregon. This act reserved nearly 3.7 million acres of land to the railroad. However, in 1916, after accusations of fraud and extensive litigation, Congress forfeited the agreement and returned 2.3 million acres, containing 50 billion feet of lumber, to the federal government. For similar reasons, Coos Bay Wagon Road lands also reverted to the federal government. Since becoming federal land, a share of timber sale revenues from the “O & C lands” have been distributed to the counties by a formula in the act, subsequently amended. Currently most O & C lands are administered by the Bureau of Land Management, with some being managed by the U.S. Forest Service.

Toward the end of the 19th century, first the federal government and, later, the state of Oregon began to see a need to conserve some public land rather than transferring it to private landowners. In 1886 the federal government set aside land to protect Crater Lake. In 1891 Congress passed a Forest Reserve Act, which set the stage for the creation of the national forests. President Grover Cleveland set aside the Cascade Forest Reserve two years later (now in the Rogue River and Winema National Forests), and 13 new forest reserves in 1897.

Early Logging

Native Americans in northwestern and coastal Oregon cut western red cedar for use in building shelters and canoes, and for other uses, even weaving the bark fibers into cloth. However, Euro-American settlers cut many more trees, mostly to clear the land for agriculture. The settlers tended to regard forests with "hostility and dismay that trees covered so much of the land needed for agriculture" (Schroeder 1974). Some wood was needed for local use, but that was insignificant compared to the overwhelming abundance of Oregon's forests.

The California Gold Rush of the late 1840s provided the first market for lumber from the Pacific Northwest (O’Donnell 1996). In 1872, the building of the O & C Railroad into Douglas County gave a boost to logging in southwest Oregon. Early loggers also used streams and rivers to transport logs. Oxen were used to drag logs into nearly dry streambeds during the summer to be washed down by the fall rains. Dry log flumes also carried logs to streams, one near Glendale being 4 miles long (Beckham 1986). A water flume along Jump-off Joe Creek was built of earth and wood trestles. It ran about 8 miles to Three Pines Planning Mill on the railroad near Hugo. Near the coast, timber companies sometimes constructed splash dams, so they could store the logs in reservoirs until they could be released after the fall rains in a flood of logs and water. Fortunately for fish habitat, this technique was not much used in Josephine and Douglas counties.

In 1881 the steam donkey engine was introduced, capable of hauling logs over rough terrain, and railroads were constructed into the woods to bring the logs to the sawmills. Remnants of railroad grades and trestles are still common in the Oregon forests (Schroeder 1974).

Fires were now a significant threat to the developing industry. Fire has always been a part of the forest ecosystem, but before European-American settlement, these were frequent and usually low intensity fires that often spared mature trees. Small fires were interspersed with hotter fires, creating a mosaic of diverse stands across the landscape.

There is evidence that the frequency of large fires in Oregon increased in the 1840s, with the influx of settlers (Pyne 1982). In the mid-1800s, miners and trappers were responsible for extensive fires in southwestern Oregon (Atzet and Wheeler 1982).

The first Oregon forestry law, passed in 1864, outlawed malicious setting of fires or allowing them to escape. After severe forest fires in 1902 in almost every Washington and Oregon county west of the Cascades, organizations to suppress wildfires began to be formed (Agee 1993). During this century, fire suppression and prevention has become so effective that it has transformed the forests. Fires are much less frequent, fuels have built up, and shade tolerant and less fire resistant tree species have proliferated. There is more timber now (acres and volume) in southwest Oregon than in the early 19th century. However, fires when they do occur are much more likely to be extensive and stand replacing. During the fall of 1987, dry lightning ignited 39 fires, burning over 70,000 acres in southern Oregon (including approximately 1,000 acres of state forest land). Many were not controlled until November rains finally extinguished them (Agee 1993).

Development of the State Forests

The Oregon Department of Forestry was created in 1911, with its major purpose being the control of forest fires. A 1925 law allowed the Board of Forestry to accept gifts or donations of forest land. In 1939, the State Forests Acquisition Act was passed, which enabled the Board of Forestry to acquire tax-foreclosed forest lands from the counties. At that time, trees were regarded as a resource, but forest land without marketable timber was viewed as almost worthless. Therefore, many landowners failed to pay taxes and allowed logged or burned forest lands to revert to the counties. Others lost timberland that they were unable to harvest due to lack of capital and loss of markets during depressions. This left the counties with thousands of acres of lands they could not afford to protect from fire. Under the provisions of the Acquisition Act, counties could donate forest lands to the Board of Forestry. These donated lands are now managed by the Department of Forestry to provide revenue to the counties and local taxing districts (Schroeder 1974).

Josephine, Douglas and Coos counties did donate some of their forest lands to the state. However, southwest Oregon counties also sold forest lands to private timber companies or individuals to keep them on the tax rolls, or kept them to be managed as county forests. Later, parcels of private lands were purchased or donated to become state forests. In 1944, the Windy Creek property along with some other acreage for a total of about 3,600 acres, was deeded to the State of Oregon (Board of Forestry).

Common School forest lands owned by the Oregon State Land Board are also managed by the Department of Forestry. Land exchanges have helped to consolidate some of these lands, which were originally distributed throughout Oregon. For example, the Elliott State Forest is mostly made up of exchanged Common School forest lands. The Department of Forestry has an ongoing land exchange program to continue to block up state forest lands for efficient management. In southwest Oregon, the goal is to consolidate state forests in the acquisition area (the Glendale block).

Long-Range Planning for State Forests

Management planning for Oregon state forests involves four main elements that include 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 level of ODF administrative districts and is documented through District Implementation Plans. Annual operations plans and budgets (biennial and fiscal) are designed to achieve the objectives of the District Implementation Plan for short-term periods of time (1 or 2 years).

Budgets
Annually (fiscal year), and biennially

Annual District Operations Plans
Cover one district; project-specific; annual

District Implementation Plans
Cover one district; revised periodically

Long-Range Forest Management Plans
Provide overall direction; regional scale; reviewed every 10 years

Figure 1-1. Planning for Oregon State Forests

The Long-Range Forest Management Plan

The long-range forest management plan provides overall direction for managing the state forests in the planning area. It takes a broad, integrated resource management approach to planning. This plan presents goals and strategies for managing resources found on state forest lands. Further, it advances a specific set of strategies designed to integrate the management of several key resources (timber, fish and wildlife, and forest health). It is based on the premise that these are not mutually exclusive resources that must be traded off against each other; these are interrelated resources that can be managed in an integrated manner to achieve multiple benefits.

The following legal and policy mandates and information sources guide the development of the goals and strategies in long-range forest management plans for state forests:

- Statutory and administrative rules for management of Board of Forestry Lands.
- Oregon Constitution mandates for management of Common School Forest Lands.
- Oregon Supreme Court rulings
- Advice from Oregon's Attorney General
- Policies of the State Land Board, the Board of Forestry, and the State Forester.
- Agency obligations under the state and federal Endangered Species Acts.
- Guiding principles for the *Southwest Oregon State Forest Management Plan*.
- Resource assessments and available resource data.
- The most current scientific information available, supplemented by input from a comprehensive independent scientific review.
- Consultation with the Forest Trust Lands Advisory Committee (required by statute).
- Advice and recommendation from other state and federal natural resource agencies.
- Input from comprehensive public involvement in the planning process.

The statutory mandate for forest planning is found in ORS 526.255. This law requires the State Forester to report to the Governor and legislative committees on "long-range management plans based on current resource descriptions and technical assumptions, including sustained yield calculations for the purpose of maintaining economic stability in each management region." In 1998, the Board of Forestry adopted a set of administrative rules that provide further direction to the State Forester in planning for the management of these lands. OAR 629-035-0030 states:

> "In managing forest lands as provided in OAR 629-035-0020, the State Forester shall develop Forest Management Plans, based on the best available science, that establish the general management framework for the planning area of forest land. The Board may review, modify, or terminate a plan at any time; however the Board shall review the plans no less than every ten years. The State Forester shall develop implementation and operations plans for forest management plans that describe smaller-scale, more specific management activities within the planning area."

The rules also require the following key elements to be included in the management plan.

- **Guiding principles —** These include legal mandates and Board of Forestry policies. Taken together, these principles shall guide development of the management plan.
- **Resource descriptions —** Resources on state forest lands are assessed. Resources on surrounding land are considered, to provide a landscape context.
- **Forest resource management goals —** The goals are statements of what the State Forester intends to achieve for each forest resource within the planning area, consistent with OAR 629-035-0020.
- **Management strategies —** The strategies describe how the State Forester will manage the forest resources to achieve the plan's goals. The strategies shall identify management techniques the State Forester may use to achieve the plan's goals.
- **Asset management —** This chapter states general guidelines for asset management, which provide overall direction on investments, marketing, and expenses.

- **Implementation, monitoring, research, and adaptive management —** These chapters provide general guidelines for these items.

The administrative rules specify that the State Forester shall be guided by the following stewardship principles in developing and implementing forest management plans:

- The plans shall include strategies that provide for actively managing forest land in the planning area.
- The plans shall include strategies that:
  - — Contribute to biological diversity of forest stand types and structures at the landscape level and over time: a) through application of silvicultural techniques that provide a variety of forest conditions and resources; and b) through conserving and maintaining genetic diversity of forest tree species.
  - — Manage forest conditions to result in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life; and protecting, maintaining, and enhancing native wildlife habitats, recognizing that forests are dynamic and that the quantity and quality of habitats for species will change geographically and over time.
  - — Provide for healthy forests by: a) managing forest insects and diseases through an integrated pest management approach; and b) utilizing appropriate genetic sources of forest tree seed and tree species in regeneration programs.
  - — Maintain or enhance long-term forest soil productivity.
  - — Comply with all applicable provisions of ORS 496.171 to 496.192 and 16 USC § 1531 to 1543 (1982 & supp 1997) concerning state and federally listed threatened and endangered species.
- The plans shall include strategies that maintain and enhance forest productivity by:
  - — Producing sustainable levels of timber consistent with protecting, maintaining, and enhancing other forest resources.
  - — Applying management practices to enhance timber yield and value, while contributing to the development of a diversity of habitats for maintaining salmonids and other native fish and wildlife species.
- The plans shall include strategies that utilize the best scientific information available to guide forest resource management actions and decisions by:
  - — Using monitoring and research to generate and use new information as it becomes available.
  - — Employing an adaptive management approach to ensure that the best available knowledge is acquired and used efficiently and effectively in forest resource management programs.

District Implementation Planning

The long-range plan provides overall management direction and establishes specific strategic approaches for meeting the resource management goals of the plan. Each district in the planning area develops an implementation plan, which describes in more detail how the management strategies will be applied on that district. These plans are designed to describe forest management activities for a ten-year period, however it is anticipated that new technical information or changing conditions may call for updates to individual district IPs within a shorter time frame than ten years. A more specific description of the type of information that will be included in district IPs under the *Southwest Oregon State Forest Management Plan* is provided in Chapter 5.

Annual Operations Planning

The third level of planning is annual operations planning. Each district prepares annual operations plans, which show the exact location and nature of management activities that are proposed for a given fiscal year. These documents are the most detailed level of planning conducted by the Oregon Department of Forestry.

Initial operations plans are developed by district staff. These initial plans are then reviewed by resource specialists from the program staff and the area staff to ensure consistency with the relevant district implementation plan and also with the goals and strategies of the forest management plan. Resource specialists involved in plan review include the geotechnical specialist, silviculturist, forest engineer, wildlife and fisheries biologists, recreation coordinator, and others on a case by case basis.

Final plans are submitted to the program staff in Salem for review and comment, and ultimately approved by the District Forester.

Budgeting

Budgeting is accomplished at two levels: fiscal year and biennial (two-year). Biennial budgets are prepared every two years and submitted to the Legislature, through the Governor’s Office, for legislative approval. Biennial budgets are designed to provide sufficient spending authorization to implement the forest management plan, which is done through the more specific programs in the district implementation plans. However, since the state lands program operates entirely on a fixed percentage of the revenue received from management of the lands, actual expenditures year to year are managed through preparation of fiscal year budgets.

Fiscal year budgets are prepared annually, and are a detailed assessment of the actual resources needed to accomplish the annual operations plans. Periodic revenue estimates are used to project the level of expenditure that can be supported for a given fiscal year, within the overall biennial authorization. If revenues are lower than what was anticipated during the biennial budgeting process, then an individual fiscal budget may reflect lower expenditure levels.

Chapter 2

Understanding the Forest: Planning and Resources

The planning process for the Southwest Oregon State Forest involved many people, including the local communities, agency specialists, and scientists. This inclusive process was based on the belief that public awareness and involvement would lead to the best management plan. The next few pages describe the steps of the planning process for the Southwest Oregon District.

Forest management begins with an understanding of the parts of the forest, from Douglas-fir trees to salamanders. The resource descriptions in this chapter briefly describe what we know currently about the forest. They will be supplemented over time by continuing research, monitoring and on-the-ground experience.

This chapter's main headings are listed on the next page.

The main headings in this chapter are:

Southwest Oregon State Forest Planning Process

The previous long-range forest management plan for the Southwest Oregon District was adopted in 1987 (Oregon Department of Forestry 1987). This was primarily a timber management plans, with other resource values considered mainly as constraints on timber management and revenue production for the counties and local taxing districts. Environmental influences, while well considered, were not transparent to the public.

During the late 1980s, there was growing concern about the status of several wildlife species. The northern spotted owl was listed as a federal threatened species in 1990. In response, the Department of Forestry began to survey for the presence of owls in and near existing and planned timber harvest units. Many owl sites were located, and many sold timber sale contracts were affected. Following federal guidelines for take avoidance (since rescinded), the Department of Forestry established circles with a 1.5 mile radius around each owl site, and severely limited management activities within the circles. The result was a net reduction in the acres available for sustainable timber production and a corresponding reduction in the harvest objectives for each district with owl sites.

The marbled murrelet was also listed as a federal threatened species in 1992, affecting many state forest lands in western Oregon. Salmon conservation became a major issue in the 1990s, and many other wildlife species also appear to be in trouble, although less information is available about several of these.

Due to these new concerns, the Department of Forestry saw in the 1990s that there was a need to develop comprehensive, integrated forest management plans for state forests. The planning process for Southwest Oregon District is described in this section.

Planning Team, Resource Specialists, and Consultants

The core planning team consisted of both field and program staff of the Department of Forestry, as well as representatives of the Oregon Department of Fish and Wildlife. The core team was responsible for managing all aspects of the planning process. The core team included foresters, fish and wildlife biologists, and other specialists. Additional specialists were consulted in fields such as geotechnical engineering, geology, hydrology, air quality, soils science, forest pathology, forest economics, special forest products, botany, and cultural resources.

Planning Elements

The planning process was guided by a set of guiding principles. The draft plan contains an integrated set of goals and strategies for managing the forest resources, and specific processes and procedures for implementation of the strategies in an adaptive management context.

Guiding Principles

The guiding principles are listed in Chapter 3. The principles were derived from the following sources:

- **State and federal laws and administrative rules —** Statutes and mandates governing state forest management include the direction to manage the lands "so as to secure the greatest permanent value of such lands to the state" (ORS 530.050). Other laws recognize the special interests of the counties, local governments, and Common School Fund, and address the importance of salmon and other native species.
- **Board and state agency policies —** These include policies of the Board of Forestry, State Land Board, and State Forester.
- **Other sources —** Other sources include recommendations from planning team members, resource specialists, and the public, consistent with good stewardship of the forests.

Resource Descriptions

Technical specialists developed initial assessments for each resource. After these assessments were evaluated and additional information gathered, final resource descriptions were written. This chapter provides summaries of the resource descriptions.

Development of Goals

The resource goals in Chapter 3 describe broadly what we would like to achieve through the management of each resource. The goals are intended to be qualitative, not quantitative in nature. They derive from the following sources:

- **State and federal laws and administrative rules**
- **Board and state agency policies**
- **Other sources —** These include recommendations from planning team members, resource specialists, and the public. These goals are not mandated in law or policy, but are believed to be consistent with good stewardship of the forests.

Development of Strategies

Strategies are found in Chapter 4. During concurrent development of the *Northwest Oregon State Forests Management Plan*, the Department of Forestry developed a set of integrated strategies termed "structure-based management" (SBM). This set of strategies was reviewed in two separate peer review processes by scientists of diverse fields, and also received intensive public review and comment. The structure-based management approach has been adapted to the different forest conditions in southwest Oregon.

The goals for one resource may compete to some degree with the goals for one or more other resources. The strategies attempt to achieve a reasonable balance between the goals for the various resources. The highest priority was placed on meeting goals related to specific laws or administrative rules. The next priority was on goals based on current policy direction. The lowest priority was placed on meeting goals that are not mandated in law or policy, but which are consistent with good stewardship of the forest resources.

This forest plan does not present a range of alternative strategies. The integrated strategies are designed to achieve high levels of outputs for key resources, including forest products, revenues, and habitat for native fish and wildlife. This is a departure from more traditional approaches to forest planning, which tend to focus on trade-offs among competing resources. In connection with planning for the northwest Oregon state forests, the Department did contract with Dr. John Sessions of Oregon State University to examine habitat and economic outputs for a variety of forest management approaches. This information is summarized in the *Final Report for Decadal Analysis of Alternatives* (Oregon Department of Forestry 2000c).

Adaptive Forest Management

Monitoring and adaptive management are key elements of this forest plan. A properly constructed monitoring program combined with effective adaptive management will provide the necessary flexibility to modify the strategies as new information becomes available. In fact, the integrated strategies and their associated standards need to be viewed as a reasonable starting point. They will be changed over time as we learn more. Over the long term, the strategies could result in a variety of possible outcomes as adaptive management is achieved.

Public Involvement

Public involvement provides the planning team with a wider range of information and ideas, and is critical to gaining public understanding, acceptance, and support for planned actions. The planning team began public involvement at the same time they started forest planning in 1997. The public involvement process had three important objectives:

- Seek appropriate insight, opinion, and data on planned management actions.
- Foster understanding, acceptance, and support for the forest management planning process and the forest management plan.
- Promote opportunities to inform the public about forest systems, forest stewardship, and management of state forests.

The public involvement process included public meetings, written comment periods, press releases, and informal contacts with interest groups, county commissioners, and individuals. Public meetings were held in Glendale and Grants Pass on April 14 and 15, 1997, and November 3 and 4, 1997.

Plan Approval

The provisions of this plan are intended to satisfy the legal and policy framework for managing Board of Forestry and Common School Forest Lands. The Department of Forestry also has a contractual obligation with the Oregon State Land Board to prepare management plans for Common School Forest Lands. Accordingly, this plan requires the approval of both the Board of Forestry and the State Land Board.

Resource Descriptions

This section describes the forest resources in the Southwest Oregon state forest planning area. An overview gives the regional and landscape perspective, followed by descriptions of forest resources, in alphabetical order. Appendix D describes legal and policy mandates for specific resources.

Overview of Southwest Oregon State Forest

State Forest Ownerships

Oregon state forests consist of two different ownerships, Board of Forestry and Common School forest lands. The two types of land were acquired in different ways, and they are owned differently within state government. Board of Forestry forest lands are also known as County Forest Trust Lands, and are owned by the Board of Forestry. Common School forest lands are owned by the Oregon State Land Board. Legal and policy mandates for the two ownerships are described in Appendix D.

The state forest lands in Southwest Oregon District are generally small parcels and widely scattered. The two largest parcels are a tract of about 3,500 acres in Windy Creek, and a tract of 1,900 acres in McCullough Creek, near Glendale.

Board of Forestry Lands (BOFL) – These lands were acquired by the Board of Forestry through direct purchase or transfer of ownership of the lands from counties in exchange for a portion of the future revenue produced by the lands. Much of the land base was tax-delinquent land transferred by the counties to the state for management in the 1930s and

1940s. In 1944, the Windy Creek property and some other acreage, a total of about 3,600 acres, were deeded by the landowner directly to the Board of Forestry.

In the Southwest Oregon planning area, 9,372 acres are Board of Forestry lands. These lands consist of parcels that range in size from 40 acres to 3,400 acres, located in southern Douglas and northern Josephine Counties. This area is referred to as the "acquisition area" in Southwest Oregon's forest management plan and land exchange plans.

Background Information

The Governor appoints the seven members of the Board of Forestry, and the Oregon State Senate confirms the appointments. No more than three members may receive any significant portion of their income from the forest products industry, and at least one member must reside in each of the three major forest regions of the state. Members serve no more than two consecutive four-year terms. The Board supervises forest policy for all of Oregon's 27.8 million-acre forest, as well as state forest management.

Common School Forest Lands (CSFL) – Most Common School lands were acquired when Oregon became a state in 1859. At that time the federal government granted sections 16 and 36 of every township to the new state for the use of schools. Oregon's grant was originally 3.5 million acres of grazing and forestland. Eventually, much of the land was either sold for the benefit of schools, or lost through fraudulent land deals. More recently, the state acquired some lands due to foreclosures on unpaid loans that were used to purchase unimproved forestlands. Common School forest lands are owned by the Oregon State Land Board, which consists of the Governor, the Secretary of State, and the Treasurer, and are managed for the benefit of schools.

About 48% of the Southwest Oregon planning area, 8,702 acres, is made up of Common School forest lands, arranged as scattered tracts in four counties. These parcels range in size from 40 acres to 640 acres. Most Common School forest lands are located in Josephine County, followed by Jackson, Douglas, and Curry Counties. Table 2-1 below summarizes the land base acres within the Southwest Oregon planning area by county.

Table 2-1. Summary of Land Ownership

County	BOFL acres	CSFL acres	TOTAL acres
Curry	0	589	589
Douglas	6,864	1,229	8,093
Jackson	0	2,048	2,048
Josephine	2,508	4,835	7,342
Total acres	**9,372**	**8,702**	**18,073**

Compiled from OSCUR 1998 Inventory data

Land Base Designation and Land Management Classification

The 1998 Oregon Administrative Rules on State Forest Management Policy and Planning (Chapter 629 Division 35) require that all forest land shall be designated either as "silviculturally capable of growing forest tree species" or "not capable of such growth (non-silviculturally capable)." The purpose of this designation is limited to portraying the physical potential of the land to grow trees. The designation is merely descriptive, and does not propose any land use strategy.

The rules also require the State Forester to classify all forest lands within planning areas according to the types of management that will be applied, the appropriate range of management activities, and the forest resources addressed. Land management classification describes the management emphasis for parcels of state forest lands, as determined by forest management plans. The system identifies when a particular forest resource may need a more focused approach in its management or, in some cases, exclusive priority in management. State forest lands will be classified into one of three classifications: General Stewardship, Focused Stewardship, or Special Stewardship.

General Stewardship lands include all those where forest resources are managed using integrated management practices, and for which resource management goals are compatible over time and across the landscape. All resources addressed in forest management plans will be managed. Resources may not be treated equally on every acre, but across the landscape, management will meet the goals identified in the plans.

Focused Stewardship lands are also managed using integrated management practices, but for a specific resource or resources on these lands; a forest management plan or legal requirement identifies the need for supplemental planning, modified management practices, or compliance with specific requirements. Management of specific forest resources may have minor impacts on the management of other resources, but will not preclude integrated management. Focused Stewardship lands will be further classified into one (or more) of the following subclasses: Agriculture, Grazing or Wildlife Forage; Aquatic and Riparian Habitat; Cultural Resources; Deeds; Domestic Water Use; Easements; Energy and Minerals; Plants; Recreation; Research/Monitoring; Transmission; Visual; and Wildlife Habitat. An example of Focused Stewardship might be an area with scenic values, where visual qualities must be protected during and after forest management activities. This consideration could affect harvesting systems, the size and location of harvest units, and road locations.

Special Stewardship lands are those where one or more forest resources require protection that precludes integrated management of all resources; where a legal or contractual constraint dominates resource management; or where lands are committed to a specific use and management activities must be compatible with that use. Special Stewardship lands are classified into the following subclasses: Administrative Sites; Agriculture, Grazing or Wildlife Forage; Aquatic and Riparian Habitat; County or Local Comprehensive Plans; Cultural Resources; Deeds; Domestic Water Use; Easements; Energy and Minerals; Operationally Limited; Plants; Recreation; Research/Monitoring;

Transmission; Visual; and Wildlife Habitat. An example of Special Stewardship might be the area surrounding a nest tree of a threatened or endangered species.

The goals and strategies of forest management plans drive the management of key resources, rather than the land management classification system. The identification and mapping of streams, wetlands and associated aquatic and riparian habitat will be based upon criteria in forest management plans, using existing information or map-based estimates. Information will be updated through watershed assessments and site-specific monitoring conducted over time. Land management classifications are not prescriptions. Prescriptions are based upon a forest management plan, statutory or contractual requirements, and site-specific conditions.

Public involvement is an important component of the land management classification process. A minimum 90-day public comment period is required prior to the State Forester approving the initial land management classifications. A 30-day comment period is mandated before any major changes are made to the classifications, and there may be an optional 30-day comment period before minor changes are made.

Table 2-2 shows a preliminary classification of the state forest lands in this plan. Public comment will take place in 2000-2001. (Note: Total acres in this table are greater than actual ownership because of overlapping subclasses.)

Table 2-2. Draft Land Management Classification System Southwest Oregon (November 1999)

Stewardship	Subclass	BOF	CSL	Total Acres
General		5,014	4,128	9,142
Focused	Aquatic and Riparian Habitat	3,264	2,931	6,195
	Transmission	16	0	16
	Visual	504	218	722
	Wildlife Habitat	0	496	496
Focused Total		3,784	3,645	7,429
Special	Aquatic and Riparian Habitat	709	599	1,308
	Operationally Limited	0	202	202
	Plants	0	644	644
	Transmission	109	0	109
	Visual	0	302	302
	Wildlife Habitat	88	0	88
Special Total		906	1,747	2,653
Grand Total		9,704	9,520	19,224

Forest Ecosystems of Southwestern Oregon

Climate and Landforms

Climate and landforms are the major factors that shape regional forest ecosystems. Southwest Oregon is an interesting and complex region, influenced by the Pacific Ocean and the coming together of three mountain ranges: the Siskiyou Mountains (the northernmost range of the Klamath Mountains group), the Coast Range, and the Cascades. The land was formed by vast geological events that resulted in depositions, folded and faulted mountains, rocks metamorphosed by great heat and pressure, and peaks and outcroppings from volcanic action. Rocks here are among the oldest in Oregon. The topography is rugged and eroded, and soils are extremely varied. The area has experienced a long history of disturbance, especially by fire.

The Southwest Oregon District is mountainous, with little land located on the valley floors. State forest lands in the region vary from 1,120 to 6,400 feet elevation, and are found from 18 to 89 miles from the coast, and from southern Douglas County to the California border. Most of the lands (more than 16,000 acres) are located at elevations ranging from 2,000 feet to 4,500 feet, and are in the Klamath Mountains, the west slopes of the Cascades, or the Coast Range. The lands are divided almost equally between the Rogue River basin (including the Illinois and Applegate Rivers sub-basins) and the Cow Creek sub-basin of the Umpqua River basin.

The underlying bedrock is metamorphic on most of the lands, and includes some of the oldest rock formations in Oregon. The soils are generally very stable, even on steeper slopes. The district has only small amounts of highly erosive soil types. Some of the poorer soils may develop a deep surface ravel if they are subjected to heavy disturbance.

The region has a Mediterranean climate that is typified by hot, dry summers and moderate rainfall occurring abundantly in the winter months, making it unique from the rest of western Oregon. Snow occurs mostly above the 3,000-foot elevation and is generally short-lived. Average annual precipitation varies from 25 inches per year (near Rogue River and Shady Cove) to 118 inches per year (near the Cave Junction). Nearly 80% of the precipitation occurs in the winter months. Temperatures range from 9 degrees to 116 degrees F.

Diverse Tree and Shrub Species of Southwest Oregon

Plant communities in southwest Oregon combine elements of northern California, the coast, and eastern Oregon regions, and include a number of species indigenous only to the Klamath Mountains (Franklin and Dyrness 1988). In the western Siskiyou Mountains, forests consist of a mixture of evergreen conifers dominated by Douglas-fir (*Pseudotsuga menziesii*) mixed with drought-resistant hardwoods such as Pacific madrone (*Arbutus menziesii*) and golden chinquapin (*Castanopsis chrysophylla*). Soils are diverse and include serpentine outcrops, which have a distinctive array of trees and plants.

Douglas-fir and madrone are usually the dominant tree species, but ponderosa pine (*Pinus ponderosa*) may be more dominant on some drier, southern exposure aspects. Most Douglas-fir dominated sites also contain significant conifer populations of ponderosa pine, sugar pine (*Pinus lambertiana*), incense cedar (*Libocedrus decurrens*), and grand fir (*Abies grandis*) as well as hardwood populations of madrone, chinquapin, tanoak (*Lithocarpus densiflorus*), and canyon live-oak (*Quercus chrysolepis*). Jeffrey pine (*Pinus jeffreyi*) is found primarily on serpentine sites. In upper elevations, on sites with lower productivity, knobcone pine (*Pinus attenuata*) pioneers after fire. This tree is totally dependent on fire to open the cones and release seed.

A variety of other trees may also be present on Southwest Oregon state-owned forest land under special circumstances: on moister serpentine sites, Port-Orford cedar (*Chamaecyparis lawsoniana*) may be found; at higher elevations, white fir (*Abies concolor*) and Shasta red fir (*Abies magnifica var. shastensis*); on north slopes in the more northern tracts of southwestern Oregon, western hemlock (*Tsuga heterophylla*); in a very small, high elevation area south of Grants Pass, Brewer's weeping spruce (*Picea Brewerana*); along stream courses and wet areas, red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifloia*), willows (*Salix sp*.) and Pacific yew (*Taxus brevifolia*) are common; white alder (*Alnus rhombifolia*) is found in isolated more moist areas; and on the most western parcel, Oregon myrtle (*Umbellularia californica*) may be found.

Brush fields of evergreen chaparral are abundant in the mixed-evergreen zone. Typical shrubs are manzanita (*Arctostaphylos spp.*), canyon live oak, ceanothus (*Ceanothus spp.*) and poison oak (*Rhus diversiloba*). Many of the hardwood trees in this zone may also exist as shrubs, depending on site. Shrubs tend to dominate after fire and on dryer sites with shallow soils.

Mid to high elevation areas with shallow and/or rocky soils occasionally contain rock gardens or natural, open meadows with few, if any trees. These areas are unique and may contain threatened, endangered or rare plants. They are usually protected through the Land Management Classification System (LMCS) or County Comprehensive Land Use Planning (LUP) designations or both.

Watersheds

A watershed is an area within which precipitation that falls as rain or snow drains to the same stream or river. There are different levels of watershed, from the watershed of a small stream to the watershed of the Willamette or Columbia Rivers. The Oregon Water Resources Department has defined 18 major drainage basins in Oregon. The Southwest Oregon state forests are in the Rogue and Umpqua drainage basins.

The Rogue and Umpqua drainage basins are significant watersheds which are directly influenced by state forest lands in Southwest Oregon. In the Rogue drainage basin: Althouse Creek tributary to East Fork Illinois, and Illinois Rivers; Coleman Creek, tributary to Bear Creek; Hog Creek; Quartz Creek tributary to Jump-off Joe Creek; the Rogue River; Salmon Creek tributary to Grave Creek; Slick Rock Creek, tributary to Steve's Fork, Carberry Creek, and Applegate River; and Yale Creek, tributary to Little

Applegate and Applegate Rivers. In the Umpqua drainage basin: Cow Creek tributary to South Umpqua River; McCullough Creek, Perkins Creek, and Windy Creek, tributaries to Cow Creek; Little Bull Run, tributary to Bull Run and Cow Creek; Bear Creek, tributary to Windy Creek; and Lawson Creek, tributary to Bear Creek.

For more information on watersheds, see particular resources, including fish and wildlife, water quality, water supply, and wetlands.

Regional Ownership Patterns

The Glendale block, along with some of the scattered tracts, consisting of about two dozen parcels and 12,000 acres, are part of a checkerboard array of BLM and private forest lands (mostly industrial). Conditions on adjacent ownerships range from late successional conifer forests on BLM lands to regeneration and young forest types on most privately owned lands.

Some adjacent land is owned by private industrial forest landowners, including Rough and Ready, Sun Studs, Superior Lumber, C&D Lumber, and Roseburg Forest Resources. The private industry lands have a mix of medium-aged forest and younger plantations. The private landowners continue to use both regeneration harvest and commercial thinning. Industrial forest ownerships tend to be well stocked to conifer species and intensively managed. Many small privately owned lands are a result of early harvesting with little reforestation effort, which has resulted in mixed conifer/hardwood forest types.

More extensive blocks of federal lands, either BLM or national forests, surround another dozen parcels of state lands, totaling about 6,000 acres. Much of the federal land is in protected land use classification, but some partial cutting is currently being done on BLM lands. Much of the BLM ownership adjacent to state-owned lands is made up of matrix lands, which are included in harvest calculations. The national forest lands have more restrictions, but are often within federal allowable harvest areas.

Most of the scattered, more remote lands are good candidates for land exchanges, especially with the federal agencies. Although significant effort has been made to exchange scattered lands and consolidate state forest lands into larger blocks, only a few small exchanges have occurred. Much of the effort has been directed at exchanging lands with both BLM and the Forest Service, since land managed by these federal agencies surrounds the scattered state forest lands. In exchange, the state would acquire parcels of federal lands within the acquisition area identified in the Southwest Oregon Land Exchange Plan.

Specific Resources

Additional details on mandates and policies for specific resources may be found in Appendix D.

Agriculture and Grazing

Farming and grazing took place historically on some Southwest Oregon state forest lands, and some land under a power line right-of-way has been leased for Christmas tree growing. Generally, the terrain and soil types are not suitable for growing agricultural crops. Currently there is no authorized agricultural or grazing use on Southwest Oregon state forest lands, and none is anticipated.

Air Quality

Two activities on Southwest Oregon state forests can affect air quality: prescribed fire and wildfire. Slash disposal by burning is carried out on a small portion of state forest operations. Prescribed burning is used on state forest lands when it will result in a significant increase in reforestation success. Prescribed fire might be used where there is lack of sufficient planting spots due to slash, or where fire would inhibit competing vegetation. Good planning for a prescribed burn is a must in order that the complex issues (including air quality) are addressed. Past burning on state forest land has had minimal impacts on air quality in southwest Oregon.

There have only been three significant wildfires in the Southwest Oregon District from 1963 through 1999. All three fires occurred in 1987-1988. Collectively, the fires burned 1,000 acres of state-owned forest land. Air quality impacts from wildfire are unpredictable and not controllable except through fire prevention efforts.

National standards regulate both total suspended particles in smoke, and particulate matter small enough (10 microns and less in size) to be carried deep into the lungs where it can cause serious health problems. Because of improvements in air quality, Grants Pass was recently removed from the list of non-attainment areas for particulate matter. Particulate matter in the Grants Pass airshed is largely produced by wood stoves. Wildfires and prescribed burning also produce particulate matter.

A second set of standards, the Prevention of Significant Deterioration (PSD) standards, determine the maximum amount that pollutants may exceed 1977/1978 baseline levels. This program classifies areas into three classes, depending on air quality. Class I areas within the region include Crater Lake National Park and some federal lands classified as wilderness, and have the strictest regulations. Most land within the region is Class II. There are no Class III areas in the vicinity of state forest lands in southwestern Oregon.

Aquatic and Riparian Resources

As described above under “Watersheds” (page 2-12), the Southwest Oregon state forests are located within the Rogue and Umpqua drainage basins. State forest lands represent only a small percentage of any one basin.

Aquatic and riparian resources are intimately influenced by forest management activities. Forest management activities on state forest lands have been conducted to meet or exceed the requirements of the Forest Practices Act and its various revisions since 1971 (see Appendix D for a summary of Forest Practices Act changes). Therefore, activities on state forest lands have been increasingly sensitive to effects on aquatic and riparian resources and their importance to aquatic and terrestrial wildlife.

Riparian zones on most state forest lands are in fairly good condition as far as water quality, vegetative cover, and stream banks are concerned. Other elements, such as large woody debris, stream structure, snags, and large conifer trees within the aquatic and riparian zones may be in need of improvement. In part this is being accomplished through time, as existing trees become larger and areas of excessive hardwood stands are replaced with more conifer.

Cultural Resources

Cultural resources are objects, structures or sites used by people in the past, whether thousands of years ago or during recent history. They are fragile, irreplaceable and nonrenewable resources. Objects that remain undisturbed in their original locations provide the most significant record of past lifeways and cultures in Oregon, including past ecological conditions.

Most cultural sites found so far on Southwest Oregon state forests are related to early logging, farming, railroading, trapping, or mining. Sites that are obviously intact are protected when timber sales and other management activities are planned. Individual artifacts of logging or railroading origin are noted, but may not be protected.

Ditches, presumably to transport water for hydraulic mining, were found on property in T38S, R2W. A Native American camp site is known to exist on or near state-owned land near the Rogue River and within the federal and state Scenic Waterways in T34S, R8W. Amateur collectors heavily used this area for many years before BLM began managing the site under the Scenic Waterways Act. An old, split-rail cedar fence was known to exist on land in Section 6, T34S, R1W, but mostly disappeared in the 1970s. There were known to be two small log cabins, apparently used for temporary shelter by trappers, miners or others on or near state-owned land in T32S, R3W and in T40S, R5W. Their current condition and status is unknown. There have also been reports of incidental pieces of equipment from logging operations in the early part of the twentieth century. The current location or status of these is unknown. No cultural resource surveys have been conducted on state-owned lands in this district. Surveys have been conducted on nearby federal lands.

Energy and Minerals

The geology of southwestern Oregon is complex and difficult to read. The mineral, oil, and gas potential of the state forest lands is largely unknown. Except for limited areas and certain commodities, the forests remain unexplored for mineral resources. Field studies would be needed throughout the planning area to do a meaningful assessment of these resources. Mineral resources that have been located, especially in the Siskiyou Mountains and Rogue River Valley, include gold, quicksilver (mercury), copper, chrome and nickel.

Several state laws regulate energy and mineral resources on state forests. The Division of State Lands (DSL) has jurisdiction for the leasing of oil, gas, and minerals on state-owned lands. Before a lease is issued, the law directs DSL to consult with the State Department of Geology and Mineral Industries (DOGAMI) and to get concurrence of the state agency responsible for the surface rights of the land involved. Leases are auctioned when more than forty acres are involved. On less than forty acres, leases are handled through negotiations. DSL also administers a prospecting permit system that could eventually lead to applications for leases.

The Department of Forestry does have the right to use gravel, sand, stone, and soil from state forest lands to repair or construct roads or other state facilities without going through DSL. Department of Forestry policies provide guidance on the sale of rock to other forest landowners or contractors for road surfacing, while recognizing the primary need to meet state forest management goals.

DOGAMI collects and publishes mineral resource information, produces geologic maps and archives, and distributes information from other state and federal natural resource agencies. DSL maintains records of mineral leases and mineral prospecting permits, as well as correspondence files that indicate areas of past exploration interest. The Department of Forestry and Department of Transportation have test data on the rock resources in various locations.

Fish and Wildlife

The following briefly summarizes the known current condition of the fish and wildlife resource.

Northern Spotted Owl

Survey work for northern spotted owls began on state lands in 1991. In 1994, state survey teams began working cooperatively with BLM surveyors to more efficiently cover planned operational areas as well as existing owl sites. Spotted owl detections have increased over the last several years, due to better or more extensive surveys, or to an increase in the number of birds present. There are currently three active pair sites on state land. In the years leading up to the 2001 plan approval, up to 34 owl activity centers were reported on federal and private lands adjacent to state forest lands; today, the number is approximately 60 owl activity centers. Approximately 95 percent of Southwest Oregon state forest land is within 1.3 miles of an owl activity center on adjacent lands.

Marbled Murrelet

The forest lands in this plan are in Marbled Murrelet Recovery Zone 4 (USDI Fish and Wildlife Service 1997). Typically the inland range of the marbled murrelet is considered to be within 50 miles of the ocean. In southwest Oregon, the inland range of the marbled murrelet is less than 50 miles from the ocean, and is restricted to the hemlock/tanoak vegetation zone (plus a 10 km buffer around that zone).

Approximately 625 acres of state forest lands are within the southwest Oregon murrelet survey zone. Surveys for murrelets have been conducted in suitable habitat since 2002; however, no murrelets have been detected.

Bald Eagle

There are about thirty-five known bald eagle territories in southwestern Oregon. There is one bald eagle nest on state forest lands near the Rogue River. This nest is one of two used by a pair of bald eagles. The other nest is located about ¼ mile away on BLM land. Two additional bald eagle territories are within one mile of state forest lands.

Peregrine Falcon

Peregrine falcons are not known to nest on Southwest Oregon state lands. There is a known falcon nest site within 0.5 miles of and across the Rogue River from state land near the mouth of Grave Creek. Two other parcels, Kerby Peak and Slick Rock Creek, have rocky outcrops and cliffs that have potential as nest sites. The more likely of these sites, Kerby Peak, has been monitored periodically by BLM and ODFW biologists, but no activity has been observed.

Northern Goshawk

Goshawks are not known to nest on state forest lands in Southwest Oregon, although systematic surveys have not been conducted. Goshawks do nest on federal lands adjacent to state forest land.

Fish

All native salmonid species except chum salmon are present in Southwest Oregon. State-owned lands have a direct influence on eight Type F streams (Cow Creek, Little Bull Run, Windy Creek, McCullough Creek, and Perkins Creek in the Umpqua Basin; Salmon Creek and Coleman Creek in the Rogue Basin; and Yale Creek in the Applegate Basin). The species present in these streams are primarily steelhead and cutthroat trout, with coho likely to be found in Windy Creek. In Southwest Oregon, especially in the Rogue

Basin, larger seasonal streams commonly have fish use for spawning and occasionally for rearing, if pools remain in the stream after summer flows cease. Otherwise juvenile fish move downstream to perennial waters during the summer months.

Fisher

Fishers are not known to inhabit any state lands in Southwest Oregon. However, no systematic surveys have been done for this species on these lands. The fisher's range would indicate that it could be found on most state lands within Southwest Oregon. It is likely that the lack of older forest and more complex forest types on these lands limit prey base, as well as other habitat requirements such as large tree cavities, large down logs, and mistletoe brooms.

Bats

The Townsend's Big-Eared Bat is a species of concern that may be present on Southwest Oregon sate forests. Likely habitat for hibernacula, summer roosting, and maternity/ nursery sites (caves and cave-like structures) are not known to occur on state lands. There are a few man-made mine adits near state land, but their suitability for possible bat use is unknown. Bat boxes were constructed and placed under bridges in two locations on state lands in 1997, but have not been occupied to date.

Amphibians

There are several amphibian species of concern that have ranges within lands under Southwest Oregon District management. No systematic surveys have been done for these species. The foothill yellow-legged and the tailed frog, prefer streams that are perennial and cold. The red-legged frogs prefer ponds or slow moving streams.

The Del Norte and Siskiyou salamanders prefer rock talus slopes within a forested canopy. Small streams comprise the habitat for the southern seep salamander. The clouded salamander prefers loose bark and downed wood. The western toad requires woody debris and slow moving streams.

Western Pond Turtle

Western pond turtles occur over much of Southwest Oregon and are likely on many state lands. They have been observed on a beaver pond in the upper reaches of Windy Creek (washed out during flood events of 1996 and 1997). They are likely to be found on state lands in other beaver pond areas downstream, and in beaver ponds in the Little Bull Run Creek. Western pond turtles are present on state lands associated with the Rogue River.

Forest Health and Biodiversity

Fire, windstorms, people, insects, and diseases constantly disrupt forests, injuring and killing trees and other living things. These disturbances are natural and necessary processes of the forest ecosystem. However, when disturbance causes effects that are more severe and widespread than people consider normal or acceptable, the forest is often described as unhealthy (Campbell and Liegel 1996).

Forest health can be evaluated by measuring key ecosystem processes. It is essential to recognize that ecological conditions are always changing due to normal system variability, such as responses to natural events and human use. Evaluations must determine what level of change indicates a significant forest health trend, within the context of normal and historical variability. Listed below are forest health issues that may occur in Southwest forests.

Fire History

Historically, fire return intervals ranged from ten to forty years in this region. Native Americans burned forested areas regularly to maintain big game habitat for hunting and for other purposes. Early European-American settlers continued the burning to develop homestead farms and ranches. In the early twentieth century, fire protection efforts increased, and most existing forests in the Southwest Oregon District date from that time. Because of the fire history, few if any stands are as old as 200 years. The district's oldest known forest stands are 130 to 160 years old.

As a result of the fire history, the district's forests have only limited amounts of large down woody debris, and very few older, decayed, down logs. Given the high fire danger that is typical for these forests during the summer, and the increasing risk of accidental fire starts from an increasing population, large amounts of wood on these forest floors may create a significant fire hazard.

Insects and Disease

- **Bark beetles —** In southwestern Oregon, bark beetles such as Western pine beetle, Mountain pine beetle, Turpentine beetle, Douglas-fir bark beetle and the pine engraver beetle are always present in the forest. Most trees that are killed are ponderosa pine and sugar pine. The Douglas-fir bark beetle usually infests windthrown or diseased Douglas-fir trees. When a major windstorm or fire event occurs, the large supply of high quality Douglas-fir breeding logs allows beetle populations to increase tremendously. Unless the large (more than twelve inches in diameter) windthrown Douglas-firs are salvaged rapidly, a bark beetle outbreak can occur when the emerging brood attacks nearby standing green trees. Pine engraver beetles will attack dead or dying trees but can also move to healthy standing trees if populations are high enough.
- **Black Stain Root Disease** Black stain root disease, caused by the fungus *Leptographium wageneri*, was largely unrecognized in the Pacific Northwest before 1969. Since then the disease has been detected in many areas. It occasionally causes

severe damage to Douglas-fir. Black stain is transmitted over long distances by spore-carrying bark beetles and weevils. The disease typically appears in small patches. These disease patches are encountered most frequently in areas with severe soil disturbance, in dense stands that have been precommercially thinned, along roads, and in stands with a history of tractor logging (Hansen 1978, Goheen and Hansen 1978). The high frequency of black stain root disease centers in disturbed areas probably reflects insect preference for stressed or injured host trees. Thinning in midsummer, avoiding site and tree damage, and favoring species other than Douglas-fir, can reduce impacts of this disease.

- **White pine blister rust —** White pine blister rust is caused by the fungus *Cronartium ribicola*, which was introduced from Europe into British Columbia in 1910. This disease also affects sugar pine. Special measures such as hazard rating, pruning, and planting resistant seedlings are necessary to ensure the continued presence of sugar pine in the forest.
- **Stem decay —** In old growth stands, decay organisms cause tree death or breakage, creating gaps in the canopy and providing rotten wood and hollow logs for wildlife. In areas with extensive young stands, the main concern may be the lack of decay and defect, and its probable effect on wildlife and ecosystem processes.
- **Dwarf mistletoe —** Different species of dwarf mistletoe may infect the Douglas-fir, western hemlock, sugar pine and ponderosa pine in this area. Height and diameter growth reductions can be large. Tree form is often affected. Bark beetles may attack trees weakened by mistletoe infections.
- **Port Orford cedar root disease —** This disease is caused by a root colonizing fungus *Phytophthora lateralis.* The fungus is spread by spores in water. Trees affected by this disease will die.
- **Noxious weeds —** Noxious weeds are an emerging problem on forest lands. Invading non-native plants compete with native vegetation, and can significantly alter ecosystems. Spotted knapweed, star thistle and gorse are present in some western Oregon forests (Campbell et al. 1997).
- **Animal damage —** Animals that can damage forest trees include black bears, mountain beavers, deer, elk, porcupines, gophers, and river beavers. With many of these animals, damage can be locally severe.

Drought, Freezes, Windthrow, and Other Non-Biological Factors

Severe windstorms, droughts, fires, and freezes can kill many trees. At least several of these events should be expected over the life of a stand. Isolated fragments of conifer stands, which may be set aside for threatened and endangered species, will be particularly susceptible to windthrow. Windfall is minimized when sound trees, free of root disease, are left along cutting lines.

Periodic cold snaps may caused extensive browning of many conifers, but the long-term effects have been generally minor. Low temperatures can also cause top-kill of conifers.

Damage from abiotic stresses tend to be greatest when tree genotypes or species are planted which are poorly suited to their local environment.

Plants

The Oregon Natural Heritage Program has provided a list of threatened, endangered, candidate, and rare plant species which have potential to exist on state forest lands. However, this list includes a 50-mile buffer around the lands, and many species listed are likely to occur only within the buffer area, e.g., those that occur within 100 feet of the ocean beach. The list of likely occupants of district lands is expected to be much shorter. Since Southwest Oregon includes such a diversity of micro-climatic, geologic, and vegetative types, it would be desirable for some regionalization of the list within the plan area.

Recreation and Scenic Resources

State forest lands in the district have light recreational use, mostly hunting during the late summer and fall. There is little fishing on state forest lands since the streams are generally small. The Windy Creek and McCullough Creek blocks receive greater recreational use than the other Southwest Oregon state lands because of the ease of access and proximity to a population center (Glendale). Windy Creek has had a day use park for about 30 years, jointly developed and maintained by Douglas County Parks and the department. This area is located about one-half mile from the end of the paved, county-maintained Windy Creek Road, and was jointly developed and maintained by Douglas County Parks and the district. In recent years the county has operated the park under a special use permit with the Department of Forestry. The county has indicated their intent to discontinue the permit and has let it expire. Much of the use of the park area in the last several years has come from youth parties and there is often associated vandalism, littering and other undesirable activities.

There is a small arboretum combined with a fitness trail located at the Grants Pass unit office. This trail system is currently under development, and has the potential to offer forest interpretation and outdoor education benefits to the local schools and community.

Unregulated shooting and target practice is also closely associated with littering and some vandalism. In 1997 meetings were held with Glendale area residents about development of a shooting range and archery target trails on state forest land. It was hoped that a public organization would develop to lead, monitor and maintain any facilities developed from this effort in cooperation with the department, but that hasn't occurred yet.

Scenic Resources

State forest lands in Southwest Oregon are within view of two Scenic Highways (Interstate 5 and the Redwood Highway) as well as the Wild and Scenic Rogue River. The draft land management classification process has placed the parcels that are affected by the Scenic Rules of the FPA or the Federal or State Scenic Waterways Act or Rules into Special Stewardship Classification. Lands that are outside the areas covered by these rules or acts, but which are subject to prolonged view from the highways or the river are classified Focused Stewardship.

Roads and Access

Access to state forest lands is provided by state highways, county roads, private and state forest roads, and recreational trails. State forest roads are a resource and represent long-term capital investments. They must be maintained in usable condition with minimum impacts on other resources such as water quality, soils, and wildlife.

Recreation trails exist in two locations, London Peak and Kerby Peak. Both trails were constructed or reconstructed and are maintained by BLM under Special Use Permits issued from the Department of Forestry.

Approximately 90 miles of single lane forest roads are located on state-owned forest lands in the Southwest Oregon District. Lands in the Glendale block, which comprise about one-third of the state-owned forest land in the district, are well roaded. Collector spurs and temporary spurs will be needed for future management in this block.

The remainder of the state-owned land is in scattered parcels and is intermixed with private and federal forest lands. There are approximately 15 parcels that do not have reasonable access for management activities. About 6 of these may not need access due to no or limited planned activity. Three or four parcels have access that is in need of reconstruction due to washouts from recent flood events. One or two of these may be addressed by federal agencies.

One deeded county road easement, which is no longer used by the public or maintained by the county, in Section 3, T33S, R6W, is being examined by the county for vacation back to the original landowners (including BOF). This would enhance the ability of the landowners to control, use and maintain this road.

Most roads are built or improved as projects on timber sales. Main access roads are surfaced with rock to provide for all-weather use and to minimize impacts from rainfall and runoff. Secondary spur roads may either be surfaced with rock to reduce erosion potential, or blocked after a timber sale or other forest management activity is completed to minimize disturbance to elk, deer, other wildlife or for other management reasons. The roads are still subject to road maintenance requirements unless they are legally closed or "put to bed" by removing culverts and providing necessary long-term drainage.

Roads that go through federally and privately owned forest land access a significant portion of state forest land. Legal easements or permits are necessary in order to use these roads to haul logs from timber sales. Other non-commercial forest management activities are usually exempted from a permit requirement. Easements may be temporary or permanent, and may allow public use or only the department's employees and contractors.

A survey of all roads on state land has recently been completed. This information is being used to correct inadequate drainage and fish passage situations as well as to identify and correct unstable sites resulting from old road construction. This information will also be used to develop access needs and to determine road closures and which roads should be abandoned and rehabilitated.

Social and Economic Resources

Intensive forest management activities provide sustainable timber to the marketplace and revenues to schools, counties and local taxing districts, as well as jobs related to various harvesting and processing activities. Special forest products, fish, wildlife, recreation, and scenic values promote regional economic viability.

Harvests from Southwest Oregon District forests represent only a small share of the region's timber harvests, which are dominated by harvests from federal and private forest lands. Similarly, state forests contribute other resources, such as recreation, but overall other ownerships are more significant.

Historically, Southwest Oregon management plans were developed around the timber harvest and revenue production for county taxing districts and the Common School Fund. The flow of timber volume and revenues has fluctuated but has been generally positive since active management began in 1963. There was a major dip in the early 1980's followed by an almost complete halt in 1990 due to concerns about northern spotted owl habitat.

During the past 38 years, the timber harvest has focused on cutting older timber stands. The objective was the harvest of stands over 90 years old within 30 years. This objective was about 50 percent accomplished by 1990. In that year, the Department of Forestry implemented a spotted owl policy that postponed any regeneration harvest within 1.3 miles of owl activity centers. Southwest Oregon District did not sell any regular timber sales from 1990 through 1994. The Department of Forestry modified its spotted owl policy in December 1994, allowing timber harvest in compliance with the 1990 USFWS guidelines for harvest.

Since 1995, commercial thinning of young forest stands has provided limited timber volume and revenues. It is anticipated that operations under this plan will increase timber volume and revenues from state forest lands while concurrently increasing the amount and diversity of habitats available to sustain owls and other species of wildlife, fish and plants.

Soils

All forest resources are dependent upon soil. Besides supporting the growth of plants, soils store and deliver water to streams and lakes. The characteristics of a given soil are influenced by parent materials (rock), time, climate, living organisms, and topography. Forest site productivity depends upon soil depth, porosity, biology, and the availability of plant nutrients. BLM (1975) and the Soil Conservation Service (1979) have mapped most soils in the planning area. Soils are grouped into associations defined as distinctive patterns of soils, topography and drainage that make up a unique natural landscape.

Upland soils in the western half of the Klamath province are moderately deep reddish-brown silt loam or silty clay loam underlain by silty clay (Franklin and Dyrness 1988). These soils are interspersed with scattered areas of peridotite or serpentine which are shallow and stony, and underproductive for tree growth. There are a variety of valley soils, mostly dark-colored, well-drained silt loam underlain by a silty clay loam subsoil. Poorly drained streamside soils also occur.

In the eastern part of the province, principal upland soils are dry for a long period of the year, and are generally reddish-brown soils with bedrock within 1 meter of the surface (Franklin and Dyrness 1988). The texture tends to be loam underlain by clay loam subsoils. Shallow, gravelly soils of low fertility occur but are less widespread. Soils on flood plains and alluvial fans in the eastern half of the Klamath Mountains province are principally well-drained prairie soils.

Site quality on state forest lands in the planning area varies from 60 to 130 based on 50 year site index. The average for the planning area is believed to be about 95. Areas with Site Indexes lower than 60 are classed as incapable of forest production. Forest stands range from being relatively windfirm to being highly susceptible to windthrow, depending on steepness of slope and soil depth. On dry sites or steep and precipitous slopes, reforestation may be difficult. Harvesting and silvicultural systems must be thoughtfully designed and implemented to ensure the long-term productivity of these sites. Organic material and duff are particularly important to the stability and productivity of forest soils. Controlling wildfires and carefully managing prescribed fires as well as carefully planning harvest systems are critical for preserving these organic materials.

Background Information

Site class is a measure of an area's relative capacity for producing timber or other vegetation. It is measured through the site index. The site index is expressed as the height of the tallest trees in a stand at an index age (King 1966). In this document, the age of 50 years is used. The 5 site classes are defined below.

Site class I – 135 feet and up	Site class IV – 75-94 feet
Site class II – 115-134 feet	Site class V – below 75 feet
Site class III – 95-114 feet	

Erosion

Landslides are the dominant erosional processes in the steep terrain of the Klamath Mountains. Debris slides are the most common type of slide, and can originate in headwalls or elsewhere on over-steep mountain slopes. A significant portion of these forest lands has an inherent, relatively high risk of slope movement. The most significant slides related to forest management occur because of road maintenance problems and legacy roads. Legacy conditions result from historical logging practices, especially old (sometimes abandoned) hauling and skid roads that were built before the current rules were adopted, and before there was a good understanding of the causes of slope failure.

Landslide monitoring occurs through the Forest Practices Landslide Reporting process. This information can be effectively used to identify problems and investigate causes. This program does not monitor background levels of slope movement that occur in the absence of management activities.

A study conducted by the Department of Forestry on landslides from the 1996 storm events have found that landslides have a higher occurrence in the 9 or 10 years following clear-cut harvesting as compared to mature forest stands. Stands of 10 to 100 years in age have a lower occurrence than mature forests. This same study showed that slides from recent road construction was relatively low, and those slides that did occur from roads were smaller.

General observation of Southwest Oregon state lands would indicate that slide occurrence is much lower than would be expected for this region. This might be due to more careful control of road construction and harvesting activities on state lands and/or the relatively low amount of “high risk sites” that is present on these lands. Over the last 25 years there have been very few landslides associated with state lands, and most were small. Two larger debris flows that were associated with state land occurred in the 1996 storm events, originated from other ownership, and came onto state ownership.

A survey of all roads on state land has recently been completed, and will be used to identify and correct unstable sites resulting from old road construction. (See information in the “Roads and Access” subsection above.)

Special Forest Products

The special forest products program in the Southwest Oregon District is very small. Most permits that have been issued are for firewood and beargrass, but occasional permits have been issued for pit-run rock, cedar boughs, various brush and fern species, mushrooms, and burls.

Firewood cutting falls into two categories: commercial and personal use. Generally, standing hardwood (madrone and chinquapin) and decks of high quality hardwood logs are made available to commercial operators. They are generally better able to handle the scope and difficulty of the project. This is also a more cost-effective way to market this material. Personal use cutters usually do not have the equipment needed to extract material which is not close to road access, and are not able to move large amounts of material in the time frame available. Personal use permits are normally issued on an “as available” and “first come” basis for landing piles which are close to access and do not fit the needs of the commercial wood cutter. Additionally, since personal use wood cutters do not have the equipment to be a “fire safe” operation, these permits are not available during high fire danger periods (fire season). This creates a timing problem when many landing piles are not on all weather roads and often get too wet to allow access after the fire danger passes.

Timber

Harvesting and associated management activities have been occurring on Southwest Oregon state forest lands since 1960. Many of the Board of Forestry stands that were received by the state were either poorly or moderately stocked to conifer, and had abundant stocking of hardwood species (due to previous cutting and minimal reforestation). Most young stands (less than 40 years old) today are either adequately or over-stocked with conifer, and have minor components of hardwood species.

Common School forest lands in 1960 were unharvested and had limited or no access. These lands were often remote and/or of low site quality. Currently, approximately 44% of the Common School lands are in well-stocked young stands, and much of it has developed access.

Table 2-3. Timber Volume and Value from Board of Forestry Lands and Common School Forest Lands FY 1988-1998

BOFL MBF	BOFL Value	CSFL MBF	CSFL Value
2,861	$490,794	15,356	$2,891,336

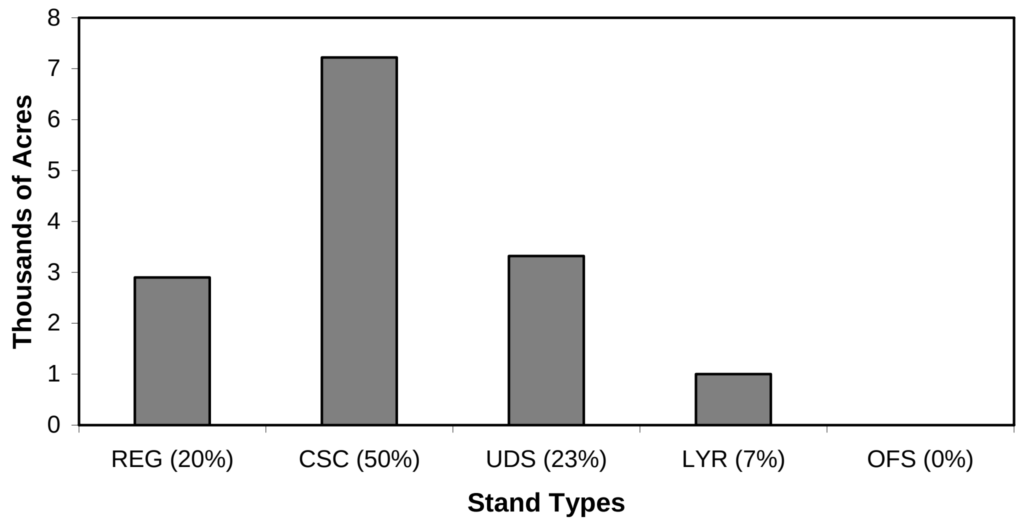
Forest Stand Types: Current Condition

The current stand condition for Southwest Oregon District is displayed below, showing the current age distribution (Table 2-4), and stand structure, acreage, and percentage (Figure 2-1), using the structure-based management definitions for structure types. Table 2-5 gives the standing volume summary.

Table 2-4. Average Stand Age Distribution

Age Ranges	0-35	36-75	76-125	126+
Acres	2,619	4,822	2,929	3,534

Figure 2-1. Current Stand Structure, by Acres and Percent



Common School lands contain more regeneration stand types, older-age stands, lower site productivity, and species diversity than do Board of Forestry lands.

Table 2-5. Size Class and MMBF Summary of Southwest Oregon Stands

Size Class	Acres*	MMBF 6"-12" dbh	MMBF 12"-16" dbh	MMBF 16"+ dbh	Net MMBF
0"-.5" reprod	23	0	0	0	0
.5" – 5" saplings	1,352	.56	0	0	.56
5"-8" premerch poles	2,660	2.87	0	0	2.77
8"-16" thinning size	7,079	85.59	13.78	0	99.37
16"-23" medium sawtimber	5,047	47.67	60.47	33.03	141.16
23"-75" large sawtimber	1,350	6.10	10.93	47.31	64.33
Totals	17,511	142.79	85.18	80.34	308.19

*Silviculturally capable lands
Data from 1998 Inventory (Forest Biometrics FPS 5.3b)

Water Quality

Water quality in the Southwest Oregon planning area is managed for industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water-contact recreation, and aesthetic quality.

The following rivers and streams that flow through or downstream from state forest lands are currently designated as water quality limited under the federal Clean Water Act (see Appendix D for more information on this Act): Windy Creek, Cow Creek, Coyote Creek, Salt Creek, Quartz Creek, Hog Creek, Elk Creek, Rogue River, and Coleman Creek. It is likely that high summer water temperatures are the limiting quality on all these streams. This may be an historical condition for streams in Southwestern Oregon and unrelated to current forest management practices.

Water temperatures are an important limiting factor for fish species. A rolling seven-day mean maximum temperature of 64º F is the standard limit for streams that do not have bull trout populations.

Water Supply

Many streams associated with Southwest Oregon state lands have permitted downstream water users. Most of these are considerable distance downstream from state land. There are less than a half dozen permitted water users that take water from or near state lands. All of these users are documented and an inventory will be maintained so that state forest operations can be tailored to protect the permitted water user. Efforts to get unpermitted uses either in compliance or removed from state forest land should continue as they are discovered.

Wetlands

There are no known “significant wetlands” (8+ acres) on Southwest Oregon state lands as defined in the Forest Practices Act. Smaller wetlands are not now inventoried.

Chapter 3

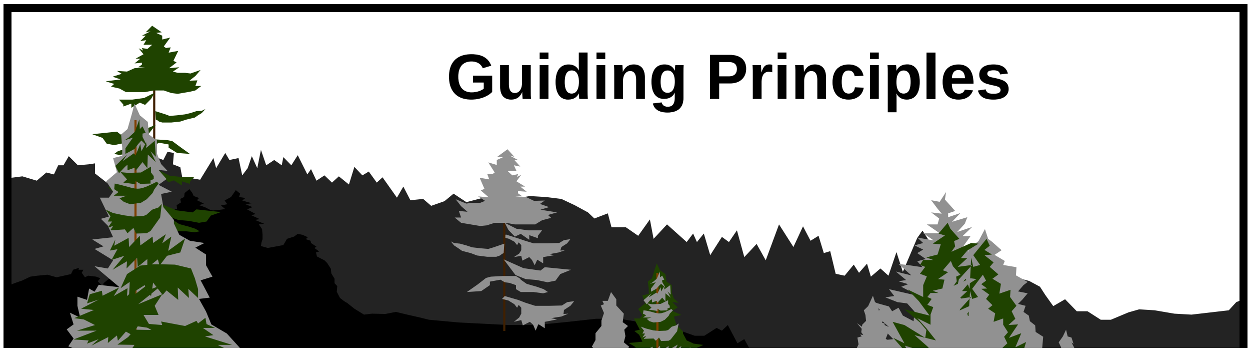
Guiding Principles, Vision, and Goals

Chapter 3 presents the values, vision, and goals that set the direction for the management plan.

On the next two pages are the guiding principles which guide the process of planning for the Southwest Oregon state forest. Following the guiding principles is a description of a vision of the forest in the future.

The resource management goals, which start on page 3-6 are general, non-quantifiable statements of direction. The forest management strategies in Chapter 4 will describe how these goals will be achieved.

Guiding Principles



Guiding principles are the overall rules, goals and responsibilities that guide the process of planning for Oregon state forests. They arise from state and federal laws and administrative rules; policies of the Board of Forestry, State Land Board, and State Forester; and input from advisory committees, scientists, interest groups, and the public. The guiding principles for this plan were originally drafted and reviewed with the public at the beginning of the southwest Oregon planning process. The guiding principles have been amended since 1997, after adoption of a new administrative rule for state forest management, and due to increasing scientific knowledge.

1. **The plan will recognize that the goal for management of Common School Forest Land is the maximization of income to the Common School Fund over the long term. 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.**

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 Southwest 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 tradeoffs 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 southwest 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. **Southwest 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.**

The Vision: Images of the Southwest Oregon State Forests

(*Note to the reader: The forest vision is written in the present tense, as if we were already in the future and actually looking at this idealized forest.*)

A broad range of forest structures and native tree species are present in the forest. The forest stands are predominately conifer, although a few hardwoods are intermixed in most stands. Some stands and drainages are dominated by hardwoods.

Typical stand structures in the Southwest Oregon state forests in the future are listed below, and described more fully later in this document, under the heading "Stand Types."

- Regeneration stands, containing newly established trees, grasses, herbs, and shrubs. Trees can be conifers and/or hardwoods. Varying levels of grasses, herbs, shrubs or trees will remain from the previous stand, as well as such old stand components as snags, down wood and varying sizes of larger green trees. (Regeneration stand type)
- Closed stands with little light reaching the forest floor. Trees fully occupy the site and form a single, main canopy layer. There is little or no understory development. (Closed Single Canopy stand type)
- Open stands that contain more diverse herb and shrub layers than closed stands. Tree canopies may be a single species, single-layered main canopy with associated dominant, codominant and suppressed trees, or multiple species. However, significant layering of tree crowns has not yet developed. (Understory stand type)
- Open stands that have significant understory development. Vigorous herb and shrub communities combine with tree crowns to create multiple canopy layers. Tree crowns or shrubs exist at almost all levels from the forest floor to the tops of the tallest trees. (Layered stand type)
- Stands with large trees; multiple, deep canopy layers; substantial amounts of coarse woody debris; large snags; and other structures typically associated with older forests. (Older Forest Structure stand type)

Well-stocked, healthy and vigorous forest stands are the rule. Insect and disease agents are present at low levels and are considered part of a healthy forest. Insects, disease, minor windthrow, other natural events, and active management create gaps throughout the forest. Stands vary in size from a few acres to hundreds of acres, and generally have irregular shapes. Hard and soft snags and down woody debris are present in sufficient amounts to provide for soil productivity and habitat needs. Snags and down logs are located in all stand types, but occur in significantly different amounts in individual stands.

While the forest maintains a general balance of structures, each individual stand is continuously changing throughout time. This shifting mosaic of forest structures maintains vigorous timber-producing stands, contributes to the diversity of plant communities and wildlife habitats, and enhances overall biodiversity throughout the forest. The diverse mix of habitats includes habitat for species associated with older forest structures.

The forest contributes to the range of habitats needed by indigenous fish and wildlife species in southwestern Oregon. A mosaic of habitats helps to reduce the risk that species will become threatened or endangered due to lack of forest habitat conditions on state forest lands.

A comprehensive land exchange and acquisition program has effectively consolidated most Southwest Oregon state forests into ownership blocks that facilitate efficient management and public access.

The long-term productivity of soils is protected by using road construction, timber harvest, and site preparation techniques that minimize soil disturbance and compaction. Natural tree litter, decayed wood, duff, and organic matter are left in place to maintain nutrient cycling mechanisms and minimize erosion. Tree limbs and tops are retained in the forest to return nutrients to the soil. Fuel levels are managed to minimize or control soil degradation due to wildfire.

Thinnings, partial cuts, and regeneration harvests produce a supply of timber and revenue. Smaller diameter wood is produced from thinnings in the early stages of stand development. High quality timber is produced through silvicultural techniques and harvested through later thinnings, partial cuts, and regeneration harvests. Timber harvest and silvicultural activities contribute to regional employment and maintain the desired balance of forest structures.

Riparian management areas are dominated by conifers, but have a hardwood component. Healthy herb and shrub communities are part of the riparian environment. Snags and down logs are found in and around streams. Riparian areas support a diversity of tree, plant, and animal species. While the specific locations of channels, deep pools, and other habitats shift over time, the mosaic of stream habitats has an overall stability. High quality fish habitat exists in most areas. Stream enhancement projects are carried out in places where it is biologically and economically feasible to actively improve fish habitat.

The forest includes various wetlands. Management activities in and around wetlands protect wetland functions for fish and wildlife habitat, water storage, and water quality.

Resource Management Goals

This section describes the management goals for each resource on the Southwest Oregon state forests. Goals are general, non-quantifiable statements of direction. The management strategies in Chapter 4 describe how the Department of Forestry will achieve the goals. Resources are listed in alphabetical order in this chapter.

The management goals were developed in the context of legal and policy mandates for the management of state forests. Oregon Revised Statutes direct that Board of Forestry lands shall be managed by the State Forester to "secure the greatest permanent value of such lands to the state." The Oregon Constitution directs that Common School forest lands shall be managed "with the object of obtaining the greatest benefit for the people of this state, consistent with the conservation of this resource under sound techniques of land management."

Oregon Administrative Rules state that the goal for management of Board of Forestry lands is to provide "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."

Southwest Oregon District manages 18,073 acres of state forest lands. 9,372 acres of Board of Forestry land are consolidated in southern Douglas and northern Josephine Counties. This is an area known as the "acquisition area" in the Southwest Oregon Land Exchange Plan. Another 8,702 acres of Common School forest lands, located in four counties, are referred to as the "scattered parcels." One of the district's long-range goals is to actively pursue a land ownership pattern that can be efficiently managed. As detailed in Chapter 4, land exchanges and declassification (removing lands from the list of Common School forest lands) are possible strategies to achieve this goal.

Management goals for the acquisition area and scattered parcels may differ. The department will manage the scattered Common School lands, but management actions will emphasis forest health and maintaining asset value. While silvicultural prescriptions may be the same as or similar to those used for structure-based management on Board of Forestry lands, target percentages for the different structure types will be applied across all the scattered parcels, and not on individual tracts. Since these parcels are small and have little impact on the landscape, and there is no opportunity or desire to consolidate the lands in these scattered locations, the benefit would be minimal. Opportunities for revenue production and the maintenance or enhancement of forest health and asset value through thinnings, partial cuts, salvage, or regeneration harvest will be considered on a case by case basis.

The management goals in this section were used to guide the development of the strategies in Chapter 4, which describe how the department will attempt to achieve the goals. Resources are listed in alphabetical order.

Agriculture and Grazing

Permit agriculture and grazing to the extent that they are compatible with other resource goals. While these practices are unlikely to occur, there have been cases where incidental grazing from federal grazing permits has occurred without the consent of the state or any compensation. This situation has been addressed with the Division of State Lands, but further coordinating effort is needed.

Air Quality

1. Comply with the Oregon Smoke Management Plan and all applicable rules.
2. Maintain compatibility with Oregon’s Statewide Planning Goal 6 (Air, Water, and Land Resources Quality) direction to sustain and improve the air resource of the state.

Aquatic and Riparian Resources

1. Maintain and/or restore streamside vegetation that provides a number of interrelated functions important to properly functioning habitats for native fish and wildlife, including: contribute to floodplain and channel development; provide nutrients; contribute root mass for bank stability; provide shade for temperature control; help dissipate energy associated with high flows; provide cover, large woody debris and other aquatic habitat components; and affect sediment movement.
2. Develop or enhance instream structures to provide salmonid habitat or protect water quality where natural functions may be insufficient.
3. Meet the requirements of the Oregon Forest Practices Act water protection rules.
4. Work cooperatively with other landowners and resource management organizations (such as watershed councils) to monitor and improve water quality conditions in all streams, especially those that are listed as water quality limited.

Cultural Resources

1. Preserve and protect archaeological sites or archaeological objects in accordance with state law.
2. Conserve historic artifacts and real property of historic significance in accordance with state law, in consultation with the Secretary of State and the State Historic Preservation Office.
3. Protect additional cultural resource sites that are determined by the Department of Forestry to have special educational or interpretive value.
4. Maintain compatibility with Oregon's Statewide Planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources).

Energy and Minerals

1. In partnership with the Division of State Lands, manage gas, oil, and mineral resources on state forest lands to provide revenues to counties and local taxing districts or maximize long-term revenues to the Common School Fund.
2. Manage rock sources for long-term management needs of state forest lands.
3. Maintain compatibility with Oregon's Statewide Planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources).

Fish and Wildlife

1. In a regional context, provide habitats that contribute to maintaining or enhancing indigenous fish and wildlife populations at self-sustaining levels.
2. Meet the requirements of federal and state Endangered Species Acts.
3. Contribute to maintaining fish and wildlife populations at levels that allow recreational and commercial opportunities, including fishing, hunting, and wildlife viewing.
4. Maintain compatibility with Oregon's Statewide Planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources).

Forest Health and Biodiversity

1. Maintain or restore healthy forest conditions, thereby promoting sustainable, productive, and resilient ecosystems.
2. Contribute to biological diversity across the landscape.

3. Provide for structural complexity and age diversity within and among stands.
4. Maintain long-term forest soil productivity.
5. Protect forest resources from unwanted fire and damaging pests.

Land Base and Access

Land Base

1. Actively pursue a land ownership pattern that can be efficiently managed.
2. Maintain compatibility with all Oregon Statewide Planning Goals and the Oregon Coastal Management Program.

Access

1. Develop and maintain an access system adequate for fire protection and management activities.
2. Minimize potential adverse environmental and biological impacts of roads and other components of the access system.
3. Allow appropriate public access to state forest lands.

Plants

1. In a regional context, provide habitats that contribute to maintaining or enhancing native plant populations at self-sustaining levels.
2. Meet the requirements of federal and state Endangered Species Acts.

Recreation and Scenic Resources

Recreation

1. Provide diverse forest recreation opportunities that supplement, rather than duplicate, opportunities available in the region.
2. Provide opportunities for interpretation and outdoor education on state forest lands.
3. Maintain compatibility with Oregon's Statewide Planning Goal 8 (Recreational Needs).

Scenic Resources

1. Meet the scenic protection requirements of the Oregon Forest Practices Act for visually sensitive corridors associated with designated scenic highways.
2. Meet the requirements of the Oregon Scenic Waterways Act for certain lands adjacent to the Rogue River.
3. Manage the forest to minimize visual effects in areas designated by the Department of Forestry as visually sensitive.
4. Maintain compatibility with Oregon's Statewide Planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources).

Social and Economic Resources

1. On Board of Forestry lands, provide revenues to counties and local taxing districts.
2. On Common School lands, maximize the long-term revenues to the Common School Fund.
3. Select sound forest management practices that promote sustainable state and local economies.
4. Contribute to a mix of resource outputs and amenity values that promote the long-term social health and economic viability of the state and local communities.
5. Enhance public understanding of forest resources and forest resource management.
6. Maintain compatibility with Oregon's Statewide Planning Goal 9 (Economic Development) and Planning Goal 4 (Forest Lands).

Soils

1. Maintain long-term forest soil productivity.
2. Manage the forest and road system to minimize soil erosion.
3. Maintain compatibility with Oregon's Statewide Planning Goal 6 (Air, Water, and Land Resources Quality).

Special Forest Products

1. Manage the special forest products resource to provide revenues to counties and local taxing districts, maximize long-term revenues to the Common School Fund, and provide useful products.
2. Manage special forest products for sustainability over time, and to minimize any potential adverse environmental and biological impacts.

Timber

1. Manage the timber resource to provide revenues to counties and local taxing districts from Board of Forestry land, and from Common School forest land maximize long-term revenues to the Common School Fund.
2. Contribute to Oregon's timber supply.
3. Produce a sustained yield of timber from state forest lands.
4. Promote the maintenance, growth, and development of forest trees and stands through the use of appropriate silvicultural techniques.
5. Maintain compatibility with Oregon's Statewide Planning Goal 4 (Forest Lands).

Water Quality

1. Maintain a level of water quality sufficient to support beneficial use of the waters of the state, including propagation of fish and aquatic life, wildlife, domestic, agricultural, industrial, municipal, recreational and other legitimate uses.
2. Maintain water quality that meets the standards established by Oregon under the mandates of the federal Clean Water Act (33 USC et seq.).
3. Maintain compatibility with Oregon's Statewide Planning Goal 6 (Air, Water, and Land Resources Quality).

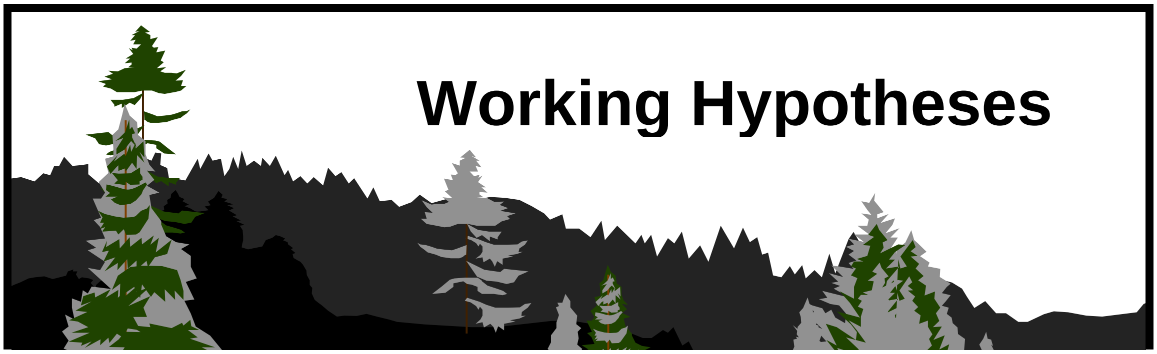
Water Supply

1. Maintain healthy watershed conditions to support the beneficial uses of the waters of the state.
2. Maintain natural watershed storage capacity processes.
3. Protect water-related functions of riparian lands.

Wetlands

1. Maintain the natural functions and attributes of wetlands over time.
2. Ensure that no net loss of wetlands occurs as a result of forest management activities.
3. Maintain compatibility with Oregon's Statewide Planning Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources).

Working Hypotheses



The forest vision described earlier in this chapter provides an idealized view of the future. It describes a type of forest and an approach to forest management that the Department of Forestry believes will achieve the resource management goals and thus provide for “greatest permanent value.” However, it is reasonable to ask why we believe such a future can come to pass, and what assumptions we have based this belief upon.

Forest management is ecologically, socially, and economically complex. Our understanding about forest systems is substantial, but incomplete. We continue to learn more through monitoring and research, and a strong adaptive management framework is essential to successful implementation of this plan. At the very heart of this plan, and fundamental to the adaptive management program outlined in a later chapter, is a set of working hypotheses. These working hypotheses relate to broader assumptions or beliefs that, if validated over time, lead us to believe that we can indeed achieve the future vision and thus the benefits that accrue from that future forest.

These key working hypotheses are:

- The citizens of Oregon will continue to support integrated and active management of state forests in southwest Oregon to provide for multiple outputs and benefits.
- An active and integrated forest management approach will provide for high levels of sustainable and predictable timber and revenue while concurrently providing habitat for native fish and wildlife species.
- Identification and protection of key habitat areas for specific species will maintain existing populations as a source to colonize new habitat.
- Species will colonize new habitat as it develops over the longer term.
- A diverse array of stand types will, at various times, provide for achievement of all the resource goals outlined in the previous section of this plan.

- Providing for biodiversity at the landscape level requires providing for an array of forest conditions through time and space that emulates conditions created by historic disturbance regimes.

- Providing for a diverse array of forest conditions through time can be accomplished in a managed context through the application of silvicultural principles.

- A diverse array of forest conditions will enhance overall forest health and reduce the risks of catastrophic loss from insects and disease.

- Active management through a combination of landscape-level strategies and site-specific standards will result in maintaining and restoring properly functioning aquatic and riparian habitats.

- Timber markets will exist over time for the range of timber types and qualities that will be produced from state forests. The diverse "portfolio" of products available from a diverse array of stand structures will strengthen the ability of state forests to capitalize on changing markets.

- A diverse array of forest conditions will provide diverse recreational opportunities on these state forest lands.

- Long-term management of natural resources can only succeed within a framework that provides for change.

Collectively, these working hypotheses form the basis for the set of integrated forest management strategies described in the next chapter. They also provide the foundation for the key questions that must be explored through time, as this plan is implemented, to assure that change occurs in an appropriate and timely manner.

Chapter 4

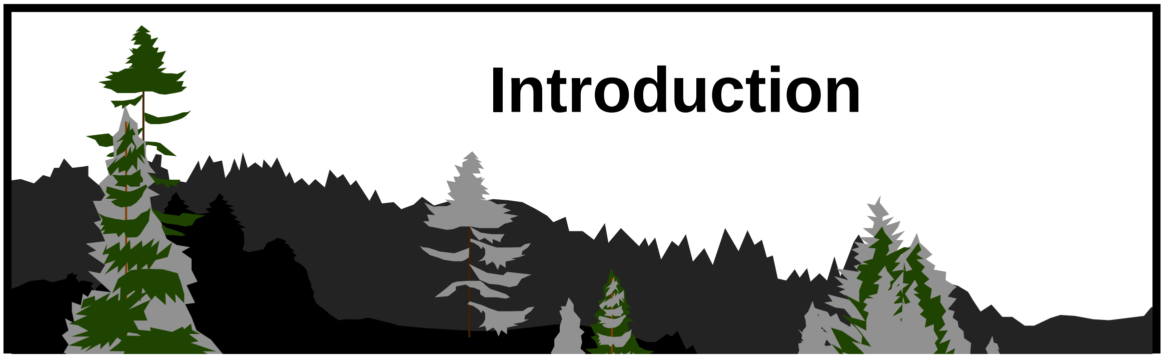
Resource Management Concepts and Strategies

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

This chapter explains the resource management concepts in the plan briefly, with citations of relevant scientific publications. The full references are given in Appendix B. The strategic approaches described next are based on the concepts, as determined by scientific research in silviculture and wildlife biology. The strategies are the heart of the FMP.

The main headings in this chapter are listed below.

Introduction



Forest planning begins with overall policy (legal framework), guiding principles, vision, resource management goals, and landscape management strategies, and proceeds through several steps to site-specific projects. Figure 4-1 on the next page shows the hierarchy of three planning levels, from strategic to operational.

The *Southwest Oregon State Forests Management Plan* (FMP) builds an encompassing strategic framework. The strategies in this chapter are the heart of the FMP. Using the strategic framework in the FMP, district implementation plans are developed to achieve the FMP's management goals for a ten-year period, and move toward the forest vision. Finally, annual operations plans describe site-specific projects and outcomes for a one-year period.

The three planning levels provide a flexible system of adaptive management. Agency staff, through identified review and approval processes, can make changes as needed at the various levels, ranging from strategic, landscape-wide changes to the FMP, to specific, tactical changes at the district and project level.

STRATEGIC → **OPERATIONAL**

FOREST MANAGEMENT PLANS (*Planning Area)*

Greatest Permanent Value
(full range of benefits)

Resource Goals

Integrated Forest Management Strategies

Resource Management Strategies

Key Working Hypotheses

Land Base Designation

Land Management Classification System

Monitoring/Research Goals

10 YEAR IMPLEMENTATION PLANS (*District)*

Current Condition

Desired Future Condition

Watershed/Basin Descriptions

Management Opportunities

Harvest Objectives

Young Stand Management Objectives

Lane Management Classification Maps

Recreation Plans

Road Plans

Monitoring/Research Plan

ANNUAL OPERATIONS PLANS (*District)*

Timber Sale Plan

Habitat Improvement Projects

Young Stand Management Projects

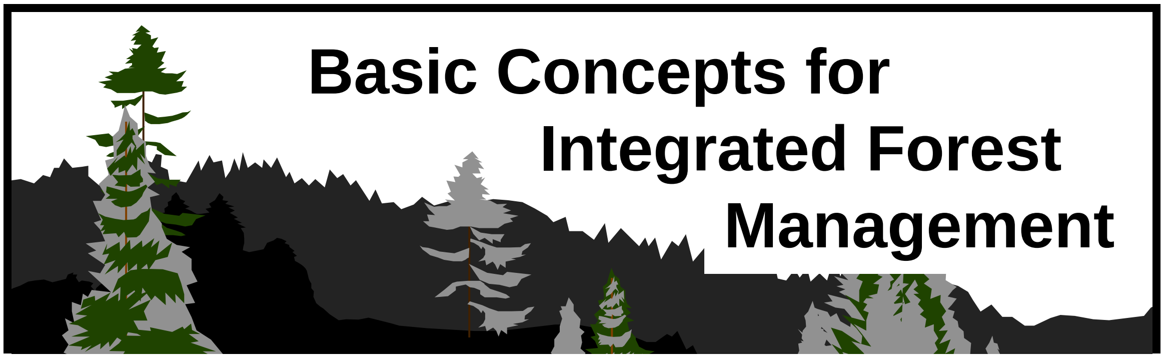
Recreation Projects

Road Management Projects

Monitoring/Research Projects

Figure 4-1. State Forest Plans And Policies: Planning Hierarchy And Key Products

Basic Concepts for Integrated Forest Management



Integrated management, as the term is used in this plan, means bringing together knowledge of various disciplines (forestry, fisheries, wildlife, water) to understand and promote land management actions that consider effects and benefits to all. It is an approach to forest management that seeks to achieve a broad range of resource goals and provide a balance of social, economic, and environmental benefits from the forest over time.

The basic concepts for integrated forest management in this plan focus on:

- Landscape management (structure-based management).
- Aquatic and riparian conservation.
- Forest health.

Landscape management (structure-based management) — The landscape management concepts and strategies presented in this chapter are based on an approach called structure-based management (SBM). SBM is the application of silvicultural tools in a manner that is designed to attain a desired landscape condition, which in turn will meet the land management objectives of the FMP. Specifically, it 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 in the management direction for these lands. This includes sustainable timber and revenue, diverse habitats for indigenous species, a landscape level contribution to properly functioning aquatic systems, and a forest that provides for recreational opportunities.

The following four key concepts are the foundation for landscape management under SBM:

1. Active management for a diverse array of forest stand types.
2. Landscape design to provide for a functional arrangement of the stand types in terms of habitat values.
3. Active management to provide for key structural components within stands and on the landscape (snags, down wood, legacy trees, etc.).
4. Active management for social and economic benefits.

These landscape management concepts are discussed in the following pages.

Aquatic and riparian conservation — Three aquatic and riparian concepts key to integrated management are discussed beginning on page 4-30:

1. Management for proper functioning of aquatic systems.
2. The blended approach — landscape-level approach combined with site-specific strategies.
3. Use of watershed assessment and analysis to refine strategies and plan management activities during plan implementation.

Forest health — Finally, two forest health concepts are the basis for the forest health strategies described in the strategy section of this chapter:

1. Active management for a diverse and healthy forest ecosystem that is resilient to biotic and abiotic influences.
2. Adherence to the principles of integrated pest management.

This plan also describes two important processes for assuring that these concepts and the related strategies are applied in a manner that results in the intended outcomes. These two processes are:

1. Implementation planning that relies on the knowledge and expertise of local natural resource professionals to determine specific stand pathways and prescriptions.
2. A monitoring and adaptive management system that operates at the temporal and spatial scales necessary to assure that course corrections occur in a timely manner.

Implementation planning is included as a key strategy later in this chapter and is discussed in more detail in Chapter 5. The concepts, framework, and processes for monitoring and adaptive management are described in Chapter 5.

Basic Concepts for Landscape Management

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.

Individual stand management will vary greatly under SBM. Some stands will be managed along pathways that focus on timber production, with habitat structures such as snags and down wood incorporated. Others will be managed to produce stands that emulate habitat conditions normally associated with older forests. These stands are also expected to produce high volumes of timber.

Stand density will be actively managed to accelerate stand development; this will be done through periodic thinning and partial cutting. These techniques can be used to produce a variety of results. Some prescriptions will result in fast-growing, well-stocked stands with minimal understories. Other prescriptions will develop more complex stand structures, with rapid tree diameter growth, enough sunlight on the forest floor to maintain understory plants, and a complex forest canopy. Thinning and partial cutting can also be used to create or maintain other important structural components, such as snags, down wood, gaps in the canopy, and multiple canopy layers.

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.

Oliver (1992) states:

> "Biodiversity (biological diversity) describes the variations in life forms, genetic makeup, biological processes and ecological niches that occur in any specific area. Regional and global biodiversity has been declining: attempting to reverse the trend is of both moral and practical concern. Maintaining stable populations of all species by managing for each species individually is an impossible task. However, biodiversity can be promoted by maintaining the habitats — forest structures — in which the species are found."
>
> "Much recent environmental attention has been misdirected at stand level forestry operations, as if an ideal stand structure would solve all environmental concerns. The solution actually lies at the landscape level — where the appropriate dynamic balance of stands in diverse structures and patterns can maintain habitats for a diversity of plants and animals."

Many other researchers agree that there is no single, ideal stand structure that serves as a panacea to the wildlife and biodiversity issues we face today. A diversity of stand structures across the landscape in varying amounts and arrangements is probably the most reasonable way to provide habitats for the broad spectrum of birds, small mammals, or wildlife in general. (For entire paragraph: Hunter 1990, Hansen et al. 1991, Carey et al. 1996, Carey and Johnson 1995.)

Landscape Management Concept 1: Active Management for a Diverse Array of Stand Types

The first concept of structure-based landscape management is "active management to produce a more diverse array of forest stand types."

Pacific Northwest forests follow a typical progression of stand structures over time following a major stand-replacement disturbance. Historically, these large scale disturbances resulted from major windstorm events, large scale insect and disease outbreaks, and from both natural and Native American caused wildfires. One model of this progression following disturbance has been clearly defined by Oliver and Larson (1996). While the descriptions of stand initiation, stem exclusion, understory reinitiation, and old growth structure have been borrowed from the Oliver and Larson model, the descriptions have been altered to reflect some differences found in a more Mediterranean climate representative of the area covered by this plan. The stand types identified later in this section are all characterized by these three phases of stand development.

Two major differences between northern temperate and Mediterranean climates affect natural progression of the forests (Atzet et al. 1992). First, fire occurrence and intensity differ between the two regions. Compared to the northern forests described by Oliver and Larson, which are characterized by moist, mild conditions, Mediterranean climates such as those in southwestern Oregon have greater seasonal temperature extremes and prolonged dry seasons, with most precipitation falling in the winter months. Lightning and human-caused fires are easily ignited during the hot, dry weather of summer and early fall. Second, limiting factors to forest growth are different. Northern forests are light-limited, with numerous cloudy days and more diffused light than direct sunlight. In Mediterranean climates, water is the crucial factor for forest growth.

In Mediterranean areas and without fire suppression programs, fires occur frequently (at 15 to 20 year intervals) (Agee 1991, 1993; Atzet and Martin 1991; Atzet and Wheeler 1982; Walstad et al. 1990). The fires burn at lower intensities than in northern forests, since the forests do not create as much fiber for fuel, and the frequent fires prevent fuel accumulation. Natural fires in this region typically cause complete mortality in only about 25% of the fire area. Fires in the northern temperate zone are infrequent and, because of abundant fuel accumulations, they are intense. Often these intense natural fires cause mortality in 75% or more of the forest area involved.

In the dry Mediterranean zones, water is the most important factor for forest growth, and the availability of water and light is closely linked. Consequently, forest trees not only grow at slower rates, they also do not form and maintain as dense a canopy as the northern forests. According to Oliver and Larson 1996, when some other factor such as drought limits tree growth, the root systems expand to fill the growing space rather than the crowns expanding. Full occupancy of root growing space may occur before crowns actually touch, therefore stands on droughty site may reach maximum stand density without crown closure (Oliver and Larson 1996). Because water and not light is the limiting factor, forest canopies tend to be more open (than northern forests) before additional canopy layers become begin to develop. By comparison, in northern forests, the amount and type of growth on the forest floor is most strongly influenced by the density of the canopy, and therefore the amount of light reaching it. More water availability will not usually make large differences in the lower layers of northwest forests.

Most forest stands in southern Oregon are more complex and diverse than stands of similar structure to the north (Atzet and Wheeler 1984). There are more tree species, and more variation in size, age, and density than in the typical northern temperate stand types. Additionally, the more complex structures are not so easily identified as being one stand structure or another, and may often be a combination of different structures in groups intermingled throughout. Patchy stand structures are common in older forest types.

Forest stands develop along continuums. The stand type definitions on the next page represent snapshots of stand conditions taken along the various continuums. On the next several pages, figures show what these stand types look like, and describe the stand types in more detail.

The definitions provide some broad categories for the types of stands currently on the landscape. The stand type definitions will be used by field managers to categorize existing stands and to describe the desired future condition for the development of stands through time. Because the definitions describe points along continuums, it will not always be apparent how a particular stand should be classified. If a stand does not appear to fit any given type, then it should be placed into the type with the closest fit. Future inventories will be designed to better assist the field manager in determining the stand types.

The sidebars on the next few pages describe both the stand condition, and the stand development process that occurs in that stand type. The terms for both stand types and development processes are used throughout this document. When the discussion refers to stand condition, the stand type names are used. The process names are used when the discussion refers to stand development processes. The table on the next page shows the relationship of stand types to stand development processes.

Structural components will be carried over or recruited from the regeneration harvests or other stand management activities conducted under this plan. The most common structural components will be snags, residual trees, and down wood. Snag and residual tree standards are more stringent for older forest structure stands. See Landscape Management Strategy 3 for these standards.

Stand Type Definitions

The forest stand types are defined briefly here, and explained in more detail in the next several pages.

Regeneration (REG) — This stand type occurs when a disturbance such as timber harvest, fire, or wind has killed or removed most or all of the larger trees, or when brush fields are cleared for planting.

Closed single canopy (CSC) — This stand type occurs when new trees, shrubs, and herbs no longer appear in the stand, and some existing ones begin to die from shading and competition, in a process called stem exclusion.

Understory (UDS) — This stand type occurs after the stem exclusion process has created small openings in the canopy, when enough light and nutrients become available to allow herbs, shrubs, and new trees to grow again in the understory.

Layered (LYR) — This stand type occurs as the process of understory reinitiation progresses where openings in the canopy persist. Shrub and herb communities are more diverse and vigorous, and two or more distinct layers of tree canopy appear.

Older forest structure (OFS) — This stand type occurs when forest stands attain structural characteristics such as numerous large trees, multi-layered canopy, substantial number of large, down logs, and large snags. It is not the same as old growth, although some of its structures are similar to old growth.

Old growth — Typical characteristics of old growth include: a moderate to high canopy closure; a patchy, multilayered, multispecies canopy with trees of several age classes, but dominated by large overstory trees with a high incidence of large living trees, some with broken tops and other indications of old and decaying wood; numerous large, standing dead trees (snags); heavy accumulations of down woody debris; and the presence of species and functional processes that are representative of the potential natural community. In western Oregon, old-growth characteristics begin to appear in unmanaged forests at 175 to 250 years of age.

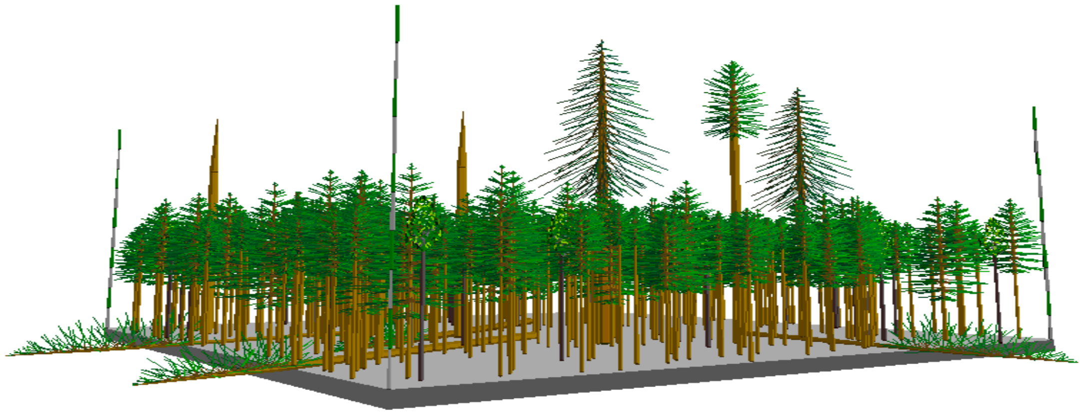
Table 4-1. Relationships between Stand Type Definitions and Stand Development Processes

Stand Type	Stand Development Process
Regeneration (REG)	Stand Initiation (SI)
Closed Single Canopy (CSC)	Stem Exclusion (SE)
Understory (UDS) Layered (LYR) Older Forest Structure (OFS)	Understory Reinitiation (UR)

Stand Type 1 — Regeneration (REG)
Stand Development Process — Stand Initiation (SI)

The site is occupied primarily by tree seedlings or saplings, and herbs or shrubs. The trees can be conifers or hardwoods. Herbs, shrubs, and/or grasses are widespread and vigorous, covering 20 to 80 percent of the ground. This type includes first-year regenerated stands, and continues to the stage when the trees approach crown closure up to 25 years.

A REG stand develops through the stand initiation process, which begins when a disturbance such as timber harvest, fire, or wind has killed or removed most or all of the larger trees, or when undesirable vegetation is cleared for planting. Herbs, shrubs, and some live trees will remain from the previous stand, as well as snags and down wood. New plants (trees, shrubs, and herbs) begin growing from seed, sprouts, artificial regeneration, or other means in the early years of this stage. In the later years of this stage, increasing crown closure shades the ground, and herbs, shrubs, and grasses begin to die out or lose vigor.

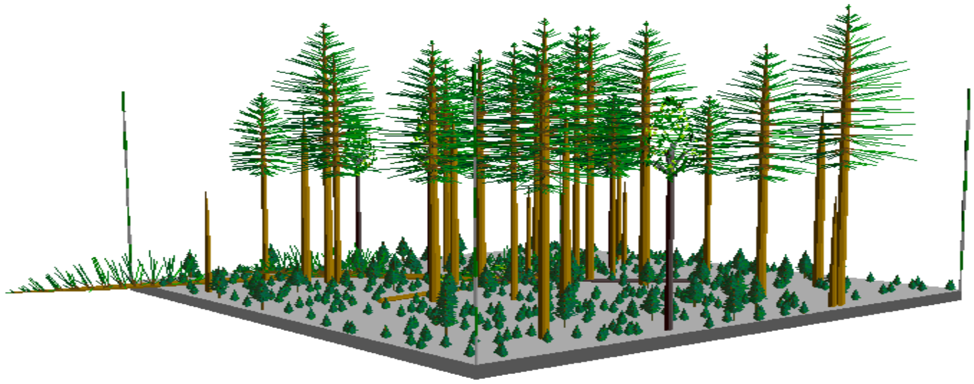


Stand Type 2 — Closed Single Canopy (CSC)

Stand Development Process — Stem Exclusion (SE)

Trees fully occupy the site and form a single, main canopy layer. There is little or no understory development. Where understory vegetation exists, there is low shrub and herb diversity. The shrub and herb layers may be completely absent or may be short and dominated by one or two shade-tolerant species. CSC stands may include sapling stands, unthinned stands, or thinned stands where the overstory still occupies most of the stand.

A CSC stand develops when the trees in a REG stand grow larger and begin to compete for moisture, light, and nutrients. The stem exclusion process begins when new trees, shrubs, and herbs no longer appear and existing ones begin to die, due to competition. Later in the stage, shrubs and herbs may essentially die out of the stand altogether. The trees begin to show decreasing limb sizes, diameter growth rate, and crown length. Later, less competitive trees die. Root diseases may kill additional trees. As some trees die, snags and down wood begin to appear in the stand. The surviving trees grow bigger and have more variation in height and diameter. Stand may remain in this stage for decades. Near the end of the stage, enough trees have died and the living trees have enough variation that small gaps form and understory trees, shrubs, and herbs begin to reappear.



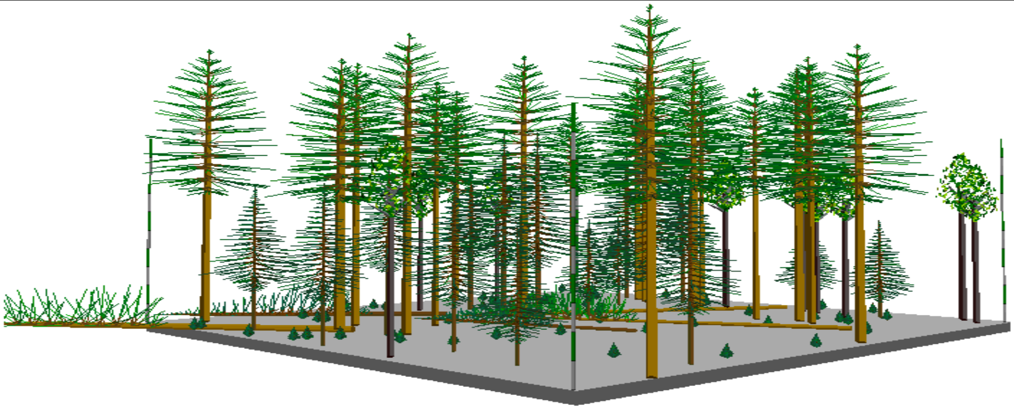
Stand Type 3 — Understory (UDS)

Stand Development Process — Understory Reinitiation (UR)

In Southwestern Oregon the understory reinitiation process is very important, especially on drier sites. Most of the older, natural stands may have recycled through this process several time through their life history, in successive events (fire), to develop older forest structures. These stands have developed more diverse herb or shrub layers than CSC stands and have trees larger than sapling size. Tree canopies may range from a single-species, single-layered, main canopy with associated dominant, codominant, and suppressed trees, to multiple species canopies. However, significant layering of tree crowns has not yet developed.

The least developed stands in this category consist of a single-species, single-layered, main tree canopy with a diversified understory of shrubs and herbs. Adequate light reaches the ground to allow shade-tolerant and intolerant herb and shrub species (e.g. huckleberry, buckbrush, ceanothus, manzanita, poison oak and hazel) to flourish. This category also includes stands where the herbs, shrubs, and understory trees are vigorous and beginning to diversify. Vertical layering may be developing but is not yet extensive.

The understory reinitiation process occurs after stem exclusion, when enough light and nutrients become available to allow forest floor herbs, shrubs, and tree regeneration to again appear in the understory. The amount of brush and herbaceous species is minimal at the beginning, but increases to a substantial part of the stand by the end of the stage. In all UDS stands, the shrub and herb layers are likely to continue to diversify and maintain or improve their vigor. These stands offer good potential to develop into highly diversified vegetative communities. Depending on the intensity and timing of density management activities, stands could shift back and forth between the CSC and UDS stand types over time. For this plan, only those stands which are intensively managed to remain UDS will be classified as so.



Stand Type 4 — Layered (LYR)

Stand Development Process — Understory Reinitiation (UR)

LYR stands have extensive layering of herbs, shrubs, and tree crowns; vertical structure is more complex than in UDS stands. Shrubs or herbs are present and tree canopies have two or more levels. Trees of 18 inches or larger dbh and 100 feet or more tall are predominant in the overstory.

More complex LYR stands have a mixture of tolerant (e.g. western hemlock, grand fir) and intolerant tree species (e.g., Douglas-fir, incense cedar, noble fir, ponderosa pine and sugar pine); hardwood species (e.g. Pacific madrone, tanoak, golden chinquapin and canyon live oak) as well as shrub and herb species (vine maple, huckleberry, rhododendron, ceanothus and manzanita). Tree crowns show significant layering from the tallest trees to the forest floor. Shrub and herb layers are diverse, in terms of species and in vertical arrangement. The plant community provides a wide range of habitat niches from the forest floor through the canopy.

Older Forest Structure (OFS), as defined on the next page, is merely a LYR stand that has attained substantial amounts of down wood and snags. Highly diverse LYR stands may have all the required attributes of OFS, but lack the minimum tree diameters needed to provide habitat for wildlife species such as northern spotted owls, pileated woodpeckers, and flying squirrels. These LYR stands may provide habitat for some other species commonly associated with older forests.

Stand Type 5 — Older Forest Structure (OFS)

Stand Development Process — Understory Reinitiation

This stand type occurs when a LYR stand develops the structural characteristics below, which are typically linked with older forests or old growth. OFS stands will not necessarily emulate all the processes and functions of very old forests. In addition to the variety of trees typically found in a layered stand, OFS stands have all of the following four characteristics.

- At least 8 or more live trees per acre that are at least 28 inches in diameter at breast height. For soil types with 50 year site indexes below 80 for Douglas-fir, the diameter standard is lowered to at least 8 or more live trees per acre that are at least 24 inches in diameter at breast height.
- Two or more tree canopy layers. Often one layer is a shade-tolerant species or a hardwood component.
- Snags — at least 6 per acre, 2 of which are at least 24 inches dbh; the remaining 4 must be at least 12 inches dbh.
- 250 to 350 cubic feet per acre of sound down logs (decay class 1 or 2), or 1,200 to 1,800 cubic feet of down logs in any or all decay classes 1-5, including at least 2 logs per acre greater than 24 inches in diameter.

In addition, the following characteristics are normally associated with older forest conditions, but they may be present to varying degrees and widely differing distributions. These conditions are not required to meet the OFS definition.

- At least 1 large remnant tree per 5 acres. The tree has some of the following characteristics — deeply fissured bark, large limbs or “platforms”, broken tops, evidence of fungal decay, dwarf mistletoe, or other evidence of decadence.
- Multiple tree species — at least 2 species; 1 is a shade-tolerant species.
- Some trees within the stand contain defect or indicators of decadence.
- Diverse understory vegetation including herbs and tall shrubs.

The understory reinitiation process described under the UDS and LYR stand types is also the developmental process occurring in OFS stands. OFS stands are essentially LYR stands that have achieved the structural characteristics defined above.

Old Growth

The final stage of stand progression identified by Oliver and Larson is old growth structure. This definition is based upon natural stand progressions that could take 200 to 1,000 years or more in the Douglas-fir associations typical on Southwest Oregon state forests. Oliver and Larson (1996) state:

> "Different aspects of Old Growth Structure can for the most part be created in a relatively short time frame; but for stands to complete the process of growing without intervening disturbances takes more time and often requires careful planning of protected locations for the stands, intensive protection from fire, and luck to keep the stands from blowing over or being destroyed by insects or other disturbances.
>
> For non-timber management objectives such as recreation and wildlife habitats, most concern is for an old growth structure, not the old growth process of stand development."

Numerous definitions exist for old growth. The following definition is taken from the Region 6 Interim Old Growth Definition, June 1993.

> "Old-growth forests are ecosystems distinguished by old trees and related structural attributes such as large trees for species and site, wide variation in tree sizes and spacing, accumulations of large dead woody material, number of canopy layers, species composition, decadence, multiple canopy layers, gaps and patchiness and ecosystem function. The age at which old growth develops and the specific structural attributes will vary widely according to forest type, climate, site conditions, and disturbance regime. For example, old growth in fire dependent forest types may not differ from younger forests in the number of canopy layers or accumulation of down woody material."

Many characteristics of old growth structure that are beneficial to non-timber resources can be produced through proactive management much faster than the 200 to 1,000 years needed by natural events. Observations from several studies (Carey et al. 1996; McComb et al. 1991; Tappeiner et al. 1992) suggest that structural characteristics are the key factors that determine the importance of the stand as habitat for a given wildlife community, not the length of time or the process involved to develop the characteristics. The oldest and most complex stand structure developed on state lands through management will be referred to as "Older Forest Structure" (OFS). These older forest structure stands do not necessarily function exactly like old growth stands, but it is anticipated that the important characteristics will be present so as to provide many of the same benefits to wildlife and biodiversity.

In Southwest Oregon state forests, large disturbances or timber harvest eliminated almost all old growth stands before the state acquired the lands. Currently only scattered old growth trees and a few remnant patches of old growth are known to exist in the planning area. The size and characteristics of existing old growth patches and remnant old growth trees may vary considerably depending on species, site conditions and history of development. As the *Southwest Oregon State Forests Management Plan* is implemented, scientific research and monitoring will be necessary to determine if OFS can provide the functions of old growth, or if the characteristics of OFS should be modified to better emulate specific old growth functions.

Hardwoods

Hardwood stands are classified along with conifer stands in one of the five stand structure types. However, for the purpose of facilitating discussion, hardwood stands are defined as those stands where hardwood tree species comprise more than 70% of the tree canopy. Seventy percent is a subjectively set measure which identifies when the hardwood canopy is the dominant vegetative feature that characterizes the tree canopy and thus will likely control the focus of stand management practices. Common hardwood tree species in Southwest Oregon include: Pacific madrone, golden chinquapin, tanoak, canyon live-oak, Oregon white oak, and California black oak on drier, better drained sites, and red alder, Oregon ash and big-leaf maple along streams and in wetland areas.

Hardwoods will normally be maintained as part of all forest stands. If conifer-dominated stands are allowed to remain in the closed single canopy type for extended periods of time, hardwoods may fall behind the main canopy of conifers and eventually be eliminated from the stand. Density management practices can encourage or discourage hardwoods in forest stands. Maintaining a component of hardwoods within conifer stands is encouraged, and it is anticipated that most stands will have hardwood in them for a prolonged period of time.

At this time it is assumed that a small percentage (probably 10% or less) of the land base will be managed as hardwood-dominated stands. Field managers may choose to manage hardwood stands in the forest for a variety of reasons. Some examples include: for current or anticipated economic benefits of hardwood products, for disease management, or to introduce or maintain additional vegetative diversity within conifer-dominated landscapes. The district implementation plan will better estimate how much of the land base currently consists of hardwood stands and what portions may be managed as hardwood stands in the future. If managers determine it is desirable to manage greater portions of the landscape in hardwoods, the forest management plan may have to be adjusted.

Determining the Appropriate Array of Stand Types

The stand structures are not an end in themselves. The desired stand structure array presented later in this chapter is designed to emulate the diversity of stand types historically associated with conifer forests in Southwestern Oregon recognizing that the actual quantity and distribution of these stand types was highly variable through time. Within this context, the stand type array described in this plan must be viewed as adaptive, subject to periodic review and possible revision throughout the life of this plan. 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.

Determining the landscape percentages — Both objective and subjective processes were used to determine the desired future condition (DFC) percentages for stand structure types given later in this chapter, under Landscape Management Strategy 1. Foresters and biologists from the planning team considered the following factors and information.

- The current and historical array of stand types on lands in the planning area, and the knowledge that it will take many decades to achieve the DFC in relation to the older stand types. Sound science includes the process of developing a strong working hypothesis based on existing scientific knowledge, and applying it within a monitoring and adaptive management framework that ensures necessary changes are made through time. Given the anticipated time frame required to achieve the initial array proposed, there will be many opportunities through periodic reviews to change the DFC array as better information comes available.
- The array of habitat necessary to provide for all native wildlife species.
- The current arrangement of, and management intentions for, other forest lands in the planning area. Federal lands surround a majority of the state land acreage in Southwest. The commitment to Threatened and Endangered species on federal land and the availability of large amounts of habitat in comparison to the smaller state land acreages influenced the DFC. Stand conditions and management on adjacent ownerships, especially private lands will be considered more closely during development of the district implementation plan, and through comprehensive watershed assessments and analyses.

Precise desired future condition vs. ranges of stand types — The planning team decided to use ranges for the desired future condition array instead of setting an exact percentage for each type. First, the stand types as defined do not always appear on the landscape as clearly defined, discrete types. Regeneration stands blend into closed single canopy stands with the onset of crown closure. The exact point at which a closed single canopy stand should be classified as understory, or an understory stand as layered, is open to individual interpretation.

Second, there is no single right answer for the appropriate balance of the stand structures. Historically, the stand structures present in the southwest Oregon state forests have varied greatly. Large wildfires that resulted from native American burning and subsequent European settlement significantly influence the diversity of stand structure types within specific watersheds or regions. Wildlife populations always fluctuated in accordance with the amount of available habitat, as well as from other natural factors.

There is currently no research that supports one specific, idealized array of stand structures optimal for all species. However, since these native species co-evolved with these disturbance regimes and the forest conditions that resulted, it is reasonable to conclude that providing for the habitat needs of all native species will require producing all habitat types or surrogates.

For all these reasons, a precise DFC array is unnecessary for the stand structure percentages, and the loss of flexibility could lead to poor long-term forest management. The planning team identified ranges that would provide a reasonable chance of successfully providing the full array of habitats for native species, without boom and bust cycles.

Regional differences — The Southwestern Oregon DFC array was developed to reflect the local conditions in the planning area. These conditions focused on physiographic characteristics, historical disturbance, and plant and wildlife species diversity. Southwest forests should not be compared to Northwest forests because the range of conditions under which southwest forests grow and develop varies widely. For example: stands in the CSC type may respond with a developed understory condition of primarily shrubs and hardwoods after light thinning as compared to western hemlock regeneration found in the Northwest. Most of the stand productivity in Southwest can occur in the CSC phase because of less competition for water from hardwoods. Intensive silvicultural treatments such as shelterwood treatments, brush and hardwood control and underplanting may be needed to move a CSC stand towards a LYR or OFS condition. A UDS stand that is left to develop on its own, may develop into LYR but the understory may be comprised of less desirable hardwood species rather than conifer. The stand types are not clearly defined across the landscape and CSC stands may also have patches of UDS scattered throughout. LYR and OFS may appear similar with the exception of the amount of snags and large woody debris. It can be assumed that in Southwest forests, CSC and UDS may provide more habitat diversity as compared to Northwest forests. These two stand types may be difficult to distinguish on the landscape with the exception of extremely overcrowded stands.

The appropriate level at which to consider stand conditions and management on adjacent ownerships is during development of the shorter-range district implementation plan and through comprehensive watershed assessments and analyses which are based on current stand inventories.

Landscape Management Concept 2: Landscape Design to Provide for a Functional Arrangement of Stand Types

The second basic concept of structure-based management is “landscape design to provide for a functional arrangement of the stand types in terms of habitat values” (page 4-4).

Structure-based management 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. Generally speaking, individual watersheds will contain a mix of all stand types. However, some watersheds may have only one or two of the stand types at any point in time. Interior forest habitats will be part of the mix. Decisions on the mix in any given basin will be made at the district level in its implementation plan. As comprehensive watershed assessments and analyses are completed, these desired future conditions will be re-evaluated and revised based on recommendations from that process.

The concepts discussed under this heading are:

- Managing biodiversity.
- Landscape design principles.
- Landscape management concepts.

This chapter presents an overview of these ideas.

Managing Biodiversity

Managing for biodiversity requires managing at various levels of biological organization: species, genetic variation within species, communities of organisms, and functional diversity. Managing for diversity also requires recognition that certain concepts and many details of managing ecosystems require further testing and refinement. Thus, an adaptive management approach is required that integrates management, research, and monitoring.

For the Southwest Oregon state forests, an operational approach for biodiversity management is the “coarse filter — fine filter” concept proposed by Hunter (1990). The coarse-filter component is based on the premise that maintaining a range of seral stages, stand structures, and sizes, across a variety of ecosystems and landscapes will meet the needs of most organisms. Individual species or habitats that require special consideration, such as species with unique or limited distributions (not addressed using the coarse filter), are managed specifically under a fine-filter approach. Fine-filter management superimposes specific management actions in addition to those required under the coarse-filter management. Collectively, coarse- and fine-filter management maintain and restore ecosystem diversity.

Forest management for biodiversity is characteristically implemented at two levels: the forest stand and the broader landscape. The stand is a relatively homogeneous area forming an operational unit to which a silvicultural treatment is applied. Stand management defines the composition and structure through time. The landscape represents the distribution of many stand-level management units across a large area, and changing over time.

Landscape-Level Management for Biodiversity

Landscape management for biodiversity should be based on the following principles.

1. Manage for a variety of seral stages, stand structures, and stand sizes across the landscape, emulating natural patterns. Take the stand structures, seral stages, etc., of neighboring landowners into consideration as well as their future management goals and directions.
2. Maintain habitats of individual species or groups of species at particular risk of extinction.
3. Maintain unique ecosystems. Examples include riparian areas, springs, wetlands, rock outcrops, and talus slopes.
4. Manage fragmentation to provide for adequate interior forest habitats.

Stand-Level Management for Biodiversity

The landscape-level principles address the broad distribution of forest stands over the landscape and through time. Stand structure and function differ with seral stage, ecosystem, and disturbance history. Stand-level management deals with the structure and function of the individual stand. Within individual stands, the most important structural features for maintaining diversity are:

- Dead and dying wood (snags, wildlife trees, and down wood).
- Large and old trees.
- Vertical and horizontal structure.
- Herb and shrub communities.

Relationship between Coarse and Fine-filter Planning

Coarse-filter planning provides the foundation for protecting biodiversity. When special habitat requirements dictate, fine-filter habitat requirements should be superimposed on the coarse filter to ensure that overall biodiversity goals are reached. Fine filter/coarse filter planning for the Southwest Oregon state forests will be accomplished at the landscape level through district implementation planning. Planning considerations at this level are best capable of integrating the two approaches and assessing trade-offs. The main goal will be to maximize compatibility between coarse- and fine-filter planning efforts. It is also at the implementation plan level that short- and long-term resource and commodity trade-offs are identified and adjustments made. It is expected that adjustments would be made through time as commodities and natural resources change, and planning goals are modified accordingly.

Landscape Design Principles

The following discussion is based on the paper, "Landscape Management to Meet Wildlife Diversity Objectives" (McAllister 1997).

A **landscape** is defined as an area of land containing a mosaic of habitat patches, often within which a particular "target" habitat patch is embedded (Dunning et al. 1992). There is no one size of landscape for all classes of wildlife, since each organism scales the landscape differently. Planning for wildlife diversity at the landscape level requires consideration at a range of spatial scales.

Habitat **patches** may be thought of as environmental units differing in quality for one or several species (Wiens 1976). While a forest stand may be a convenient management unit for silvicultural planning, it may not be synonymous with a habitat patch for a particular wildlife species. The lower size limit of a patch for a particular organism is that scale at which the organism no longer perceives it as suitable habitat. The upper limit of size is defined by an individual's home range (Kotliar and Wiens 1990). Patch size for populations or subsets of populations (metapopulations) will be larger.

The term **matrix** refers to the landscape patch in which other habitat patches are embedded. The matrix is the dominant and most connected landscape element, and therefore exerts the greatest habitat contribution. The relationship of the matrix to embedded patches is known as **fragmentation** (Franklin and Forman 1987).

Landscapes exist in a larger scale **context**. Generally, landscapes are evaluated at the watershed level or across several watersheds. An even larger context must be considered for some species, such as migrating birds. Forest managers must understand the relationship of a particular species to its landscape and the surrounding landscapes.

Landscape structure is composed of two key landscape elements: **composition** and **pattern**. Both affect ecological processes and wildlife. Landscape composition refers to the presence and amounts of each patch type, independent of placement.

Landscape pattern is also important for many species. Landscape pattern refers to patch size, shape, and placement; the distance between suitable patches; the spatial arrangement of patches; and connectivity.

Certain landscapes affect wildlife populations through **source/sink relationships**. In these landscapes, productive source patches supply emigrants to less productive patches termed sinks. Both landscape composition and pattern of source and sink patches can have an influence on overall population size (Thomas et al. 1990).

Three factors have been found to define the functional patch size: 1) actual size, 2) distance from a similar patch, and 3) degree of habitat difference of the intervening matrix (Harris 1984). The presence and abundance of a species in a particular patch can be strongly affected by the composition of adjacent patches.

These **neighborhood effects** or **edge contrasts** can be both positive and negative. In the case of habitat generalists such as deer and elk, the edge between different patches is generally considered beneficial. For other species, notably interior habitat specialists, high contrast edge can have negative effects, including predation, competition, nest parasitism from other species, and micro-climatic effects from surrounding open areas (Rosenberg and Raphael 1984, Chen et al. 1992, Harris 1984).

The degree of isolation or connectivity between suitable habitat patches affects many wildlife species. **Corridors** have the opposite function of boundaries. Corridors can facilitate movement of individuals between habitat patches, serving to connect separate but similar habitat within the landscape mosaic.

In western Oregon, the most important wildlife habitat to consider is older forests. This habitat is important because it is in limited supply, and because it provides important habitat for over 118 wildlife species (Harris 1984). Emphasizing management for mature forest habitat also ensures maintaining other habitats during the course of expected forest development.

All mature forest patches do not function as effective habitat. **Interior habitat area (IHA)** is defined as that portion of the older forest patch that remains functional after negative effects of high contrast edge are removed. Three factors influence the amount of IHA in relation to total patch size: 1) degree of edge contrast with surrounding patches; 2) patch configuration, which changes the amount of edge, and hence the amount of IHA; and 3) size of the older forest patch. Harris (1984) found that in landscapes where older forest patches are adjacent to high contrast edge (REG or early CSC) patches, habitat conditions within the older forest can be negatively affected for up to six tree heights (600 feet) from the boundary (see also Chen et al. 1992).

Interior Habitat Area Principles

This plan places an initial focus on the development of mature forest patches and interior habitat areas (IHAs) in planning for a desired future condition. This does not mean that other patch types are less important. All patch types are essential if habitats are to be provided for all species. The rationale for this initial focus is as follows:

- IHAs are associated only with mature forest patches.
- The wildlife associated with IHAs is usually the component needed to reach wildlife diversity goals in forested landscapes.
- The planning area has a limited acreage of mature forest conditions that produce IHAs.
- Forest development will progress through other patch types on its way to becoming interior habitat.

Types of Landscape Considerations to Be Addressed at Each Scale

Different wildlife conservation issues and different landscape functions are addressed at each scale in landscape planning.

Landscape Management Concept 3: Managing for Key Structural Components

The third concept of structure-based landscape management is “active management to provide for key structural components within stands and on the landscape” (page 4-4). These key components are listed below, followed by the reasons why it is important to provide them in the managed forest. Increasing the complexity of the forest environment will increase the overall diversity of habitat niches and will benefit the maintenance or enhancement of existing biodiversity.

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

Structure-based landscape management requires managing the structural components of stands, as well as arranging structure types on the landscape. This challenge requires managers to weigh all factors important to the long-term sustainability of the forest ecosystem, and also to consider the short and long-term productivity of the forest for human needs. Effective control of wildfires may be adversely affected by multi-layered canopies, down wood, and tall snags. Through careful planning of the spatial arrangement and temporal occurrence of stands and structural components on the landscape, managers can find reasonable approaches to develop the desired forest structural characteristics for wildlife and biodiversity, while still protecting the forest from unwanted wildfire. It is likely that trade-offs will have to be made in specific locations within districts. However, on a district-wide basis, both fire control and the desired future condition can be achieved.

The structural components will be retained during any management activities unless they create clear safety or fire hazards, or if their retention would result in unacceptable additional operational difficulties, environmental hazards, or threats to public improvements. Examples of unacceptable operational difficulties include situations where the location of a tree might require relocating a road to a less stable place, or require that a substantially longer road be built to avoid the tree. Examples of situations where a decision may be made to remove a residual tree, snag, or patch of trees include situations where if the tree(s) came down through windthrow or other natural causes, they would likely damage improvements such as bridges or buildings, or cause road washouts or other road damage. It is expected that the vast majority of structural components will be retained, and there will be few situations where these components must be removed.

Remnant old growth trees — Old growth is described earlier in this chapter (page 4-17). Existing old growth in the planning area occurs as widely scattered individual trees, and occasionally as small isolated patches. Because the occurrence is limited, the Department of Forestry will retain existing old growth where possible to provide this element of diversity in present and future stands. The discussion below about residual live trees applies to remnant old growth trees also.

Residual live trees — Residual live trees help to meet the short-term habitat needs of species, to serve as a source of future snags and down wood, and to provide legacy trees in future stands. Legacy trees are living trees that are carried forward into a new stand following disturbance, with the intent that they will remain.

A key structural component of older forest structure stands is the presence of large trees. One way to sustain this structural component within a managed forest is to retain enough residual green trees in regeneration harvest units to provide the required level of large trees when the stand develops the other characteristics associated with older forest structure.

Snags — Snags help to meet the habitat needs of cavity-using species and to serve as a source of future down wood. Snags can be provided in all stand types, through a combination of existing snag retention, natural mortality in maturing stands, and artificial creation.

Standing dead trees are important to many species of wildlife, including woodpeckers, other cavity-nesting birds, raptors, bats, marten, bear, and many other birds and mammals. Snags provide nesting, roosting, foraging, perching, and denning habitat for various species of wildlife in the forests of Southwest Oregon.

Down wood — Down wood on the forest floor provides many important functions in forested ecosystems. Some of the identified functions are mineral cycling, nutrient mobilization, maintenance of site productivity, natural forest regeneration (nurse logs), substrates for mycorrhizal formation, and provision of diverse habitats for wildlife species. Down wood is an integral component of the structure of old forest stands and provides a biological legacy from old stands to young stands after catastrophic events. This legacy can also be provided in managed stands if appropriate requirements are incorporated into timber harvest plans.

Multi-layered forest canopies — Complex layering of forest canopies generally creates diverse habitat niches and benefits biodiversity. The more heterogeneous and complex the physical environment becomes, the more complex the plant and animal communities that can be supported, and the higher the species diversity (Krebs 1972). This is because structurally diverse habitats provide more available niches than do more homogeneous habitats.

Multiple native tree species (conifers and hardwoods) — Increased tree species diversity within and among stands generally creates more diverse habitat niches and benefits biodiversity. Hagar (1992) found that the presence of hardwoods within Douglas-fir stands was an important factor influencing the presence and abundance of several species.

The presence of multiple tree species within a stand may lead to several wildlife habitat benefits.

- Different growth rates, tree forms, and shade tolerance result in increased vertical and horizontal within-stand diversity.
- Different tree species support different insect communities, which may lead to a greater diversity of foliage- and bark-gleaning wildlife species.

Herbs and shrubs — Diverse herb and shrub vegetation layers provide important forage for wildlife, provide diverse habitat niches, and benefit biodiversity. Herbs and shrubs in recently harvested units provide an important source of forage for big game species. Native plants such as bitter cherry and elderberry provide important forage for a large variety of non-game species. Large bigleaf maple trees are an important source of natural cavities and habitat structure in the forest. Unfortunately, these same plants compete with the planted and seeded trees that will grow to form the new forest stand. Plantation vegetation management is designed to control vegetation that is competing with commercial tree species. Overly aggressive vegetation management assures a successful plantation, yet greatly reduces the habitat value of the young plantation for wildlife. Aggressive vegetation management also truncates the herb-shrub (regeneration) stage and accelerates the onset of the closed single canopy stage, which has a much lower wildlife habitat value.

Gaps — Gaps increase the horizontal diversity within stands, provide important forage for wildlife, provide diverse habitat niches, and benefit biodiversity. A within-stand "gap" is an interruption in the continuity of the vegetative community in a stand. These gaps are generally small openings (½ to 2 acres) where herbs, shrubs, and new trees are being established, within larger stands with a dominant overstory tree canopy. One example of a gap is an opening created by windthrow in a densely stocked stand of trees.

Landscape Management Concept 4: Active Management for Social and Economic Benefits

Managing for Diverse, Sustainable Forest Products and Revenues

The major emphasis in managing stand structures will be to maintain vigorously growing stands and to move stands through the early and middle forest stages as quickly as possible. This emphasis will require extensive thinning and partial cutting. These activities will produce lower quality timber from young stands. Final harvests of these stands will result in the harvest of high quality wood.

The periodic thinnings required to move stands towards the more diverse structures described in this plan can be expected to extend the age at which volume production culminates (culmination of mean annual increment, or CMAI) (Curtis 1995).

Maintaining a variety of stand structures across a landscape over time provides more consistent employment in silvicultural operations and in the processing of forest products. It sustains a constant labor force, and consistent supply of forest products, rather than the historical boom and bust when large regions were harvested in a short time. SBM produces complex forests which can be managed for varied 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. (Oliver 1992, 1994)

Managing for Fish, Wildlife, and Forest Recreation

With the development of a variety of stand structures across the landscape, the 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 for salmonids and other native fish and aquatic life.

Existing forest recreation opportunities on these state forest lands are diverse (Oregon Department of Forestry and Oregon Department of Parks and Recreation 1993). Many existing uses such as angling, hunting, horseback riding and off-road vehicle use are highly compatible with active forest management and have co-existed with these activities for decades. Other popular uses, such as remote hiking and camping generally occur in less actively managed areas of the forest. The diverse array of stand types and arrangements envisioned under SBM will over time and space provide a diversity of recreational opportunities. These opportunities will range from developed camping and trail use in close proximity to main highways, to remote hiking and viewing opportunities in “special stewardship” areas. Traditional uses 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).

Basic Concepts for Aquatic and Riparian Conservation

For Southwest Oregon state forests, 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. For this reason, 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 prescription. This type of two-tiered approach was cited by the Independent Multidisciplinary Science Team (IMST) as necessary to achieve a high likelihood of restoring and maintaining properly functioning aquatic systems (Independent Multidisciplinary Science Team 1999).

The structural components in a landscape include the physical habitat occupied by salmonids and other organisms, along with the materials that maintain the integrity of that habitat. Functional interactions include the flows of energy and materials within the ecosystem. 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 (Independent Multidisciplinary Science Team 1999).

The key concepts for aquatic and riparian conservation are:

- Management for proper functioning of aquatic systems.
- The blended approach — a combination of landscape level and site specific strategies.
- Use of watershed assessment and analysis to refine strategies and plan management activities during plan implementation.

Aquatic-Riparian Concept 1: Management for Proper Functioning of Aquatic Systems

The functioning of natural riparian and aquatic areas depends on the interaction of three components: vegetation, landform and soils, and hydrology. Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, reducing erosion and improving water quality; filter sediment, capture bedload and aid floodplain development; improve flood-water retention and ground-water recharge; stabilize streambanks; develop ponds and channels of sufficient depth and duration to provide fish habitat; and support biodiversity. (USDI Bureau of Land Management 1993, revised 1995) In determining what constitutes "properly functioning 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 varied in quality for specific species, 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 would more closely emulate the natural disturbance regimes under which these species evolved.

The biological and ecological objective of the strategies in this plan is to maintain or restore the key ecological functions of aquatic, riparian, and upland areas that directly influence the freshwater habitat of aquatic species, within the context of the natural disturbance regimes that created habitat for these species.

Riparian Area Management

Riparian area management to contribute to properly functioning aquatic habitats occurs through two major approaches: 1) management towards a desired future condition in these riparian areas; and 2) management to support targeted functions and processes in specific riparian areas.

Key Terms

Active channel width — The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.

Average high water level — The stage reached during the average annual high flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.

Bog — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

Channel migration zone (CMZ) — An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.

Inner gorge — An area next to a stream or river where the adjacent slope is significantly steeper than the gradient of the surrounding hillsides. In the absence of an on-site inspection and determination by a Department of Forestry geotechnical specialist or other qualified person, these areas are defined as having a slope gradient adjacent to the stream of 70 percent (35 degrees) or greater, and where the height of the slope break is at least 15 feet (measured vertically) above the elevation of the channel.

Certain RMAs will be managed for conditions associated with mature forests. This is based on the assumption that the vegetative conditions associated with these conditions support a majority of the functions and processes of properly functioning aquatic habitats. Other RMAs will be managed in a manner that supports the maintenance or restoration of identified aquatic functions and processes. A more detailed explanation of these approaches is presented later in this chapter, under the heading, “Aquatic and Riparian Strategies.”

Management will occur within riparian areas only when the actions are consistent with achieving or maintaining the desired conditions specified for the water body. For areas that do not meet the desired condition, management actions will be designed to move the stand towards these conditions in a timely manner. Riparian areas that meet the desired conditions will simply be maintained in that state with limited or no management activity.

Key Terms

Stream — A channel that carries flowing surface water during some portion of the year, including associated beaver ponds, oxbows, side channels, and stream-associated wetlands if these features are connected to the stream by surface flow during any portion of the year. Ephemeral overland flow is not a stream since this type of flow does not have a defined channel.

Stream-associated wetland — A wetland that is immediately adjacent to a stream. This includes wetlands that are adjacent to beaver ponds, side channels, or oxbows that are hydrologically connected to the stream channel by surface flow at any time of the year.

Stream reach — A section of stream that is geomorphically distinct, and that can be delineated from other adjacent sections based on channel gradient, form, or other physical parameters.

Wetland — An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The process to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989).

Desired Conditions

Fish-bearing streams (Type F) and large/medium non-fish-bearing streams (Type N) — The goal of management along fish-bearing streams and larger non-fish-bearing streams is to grow and retain vegetation so that, over time, riparian and aquatic habitat conditions become similar to those associated with mature forest stands. For sites conducive to conifer production, these are generally the conditions associated with conifer stands of approximately 80 to 200 years of age or older. For sites where hardwoods are expected to be the natural plant community, mature hardwood stands will be the desired condition. This plant community is often more common on riparian sites because of the presence of saturated soils (high water table), or due to the effects of periodic floods. Mature forest conditions should support a relatively high proportion of the functions and processes associated with properly functioning aquatic habitats.

Small non-fish-bearing streams (Type N) — Along small non-fish-bearing streams, the overall goal of riparian vegetation management is to grow and retain vegetation sufficient to support the functions and processes identified as important within the various streams, and to contribute to achieving properly functioning conditions in downstream fish-bearing waters. The functions of these streams will be maintained by the influence and contributions of adjacent stands managed to meet the landscape-level stand structure desired conditions, and by vegetation retained in riparian areas during harvest activities. Management activities will also be designed and implemented in a manner that maintains water quality, supplements wildlife habitat, and contributes to the overall supply of instream large wood within a watershed.

This plan recognizes that a variety of small Type N streams exist across the forest landscape, and that these streams may differ in their physical characteristics, dominant functional processes, and contribution to watershed-level processes. As a result, the management of these Type N streams will vary according to which functions and processes are dominant within an individual stream. Riparian vegetation retention will be implemented in a manner that maintains or restores these dominant functions. The following section summarizes the key functions and processes that are emphasized in the different small Type N streams.

- **Perennial streams —** These streams are characterized by their potential ability to influence water temperature in downstream reaches. Steeper gradient streams may also periodically transport large woody debris and coarse sediments to downstream reaches. Fine sediment and leaf litter (nutrient) storage processes are somewhat limited in the steeper streams due to their natural hydrologic ability to transport smaller materials. The presence of large wood may enhance nutrient storage processes, and substantially affects the morphology of steep channels primarily through the storage of coarse sediments. These streams are also often recognized as providing important habitats for certain sensitive amphibian species.

  Lower gradient perennial streams generally lack the hydrologic force necessary to transport large woody debris or coarse sediments, but they possess the ability to transport fine sediments during normal storm events. These streams are often the sites where large wood and coarse sediments "settle out" and are stored during flood events. Fine sediment and leaf litter (nutrient) storage processes are dominant in these streams during most times of the year. The presence of large wood enhances these processes, and can directly influence channel morphology in non-confined reaches.

  Riparian vegetation will be managed on these streams to protect stream bank stability, provide leaf litter input, and to maintain water temperature to provide cool water sources to downstream reaches. Water temperature protection will be focused in the downstream portions of these streams where the greatest influence on fish-bearing stream temperatures is most likely to occur. Vegetation retention will also be prioritized on reaches (emphasis areas) that may support amphibians. Management will provide a source of large durable wood for recruitment to these channels. In steeper streams, the wood will function as localized sites to sort and store coarse sediments, and as a potential supply of large wood for downstream reaches during periodic transport events. In all channel types, large wood will enhance fine sediment and leaf litter (nutrient) storage and routing processes. Instream material to support these processes will be provided by adjacent riparian stands, and may be delivered from steeper, upstream reaches.

- **Seasonal high energy streams—** The presence of a relatively wide active channel on these seasonally flowing streams indicates that periodic high flows can be a prevalent channel-forming feature. The relatively steep gradient, in combination with the potential for high flows, indicates a capacity for these streams to potentially transport coarse sediment and large wood. Where the influence of large wood is lacking, segments of these channels are often observed to have scoured to a bedrock-dominated form. With large wood, these channels commonly exhibit a stepped profile as a result of coarse sediment storage. The presence of large wood can substantially affect the morphology of these channels. Fine sediment and leaf litter (nutrient) storage processes are somewhat limited due to the natural hydrologic ability of these streams to transport smaller materials. Large wood transport events are assumed to be limited to infrequent high flow events and debris flows. The lack of perennial flow minimizes the influence of these streams on water temperature in downstream fish-bearing reaches.

  Management along these streams will be focused on providing a source of large, durable woody debris to maintain a stepped profile channel form, and to create habitat beneficial to aquatic species. The wood will function as sites to sort and store coarse sediments within the stream, and to provide a large wood supply for downstream reaches during periodic transport events. Large wood in these streams will also function to trap smaller materials, which will enhance the storage and processing of leaf litter (nutrients). Riparian vegetation will also be managed to protect stream bank stability, and provide leaf litter input. Since these streams do not flow perennially, management will not be focused on water temperature in downstream reaches, or moderating site-specific changes to near-channel riparian micro-climate.

- **Seasonal potential debris flow track reaches—** The physical setting and characteristics of these streams indicates a high probability of large wood delivery to downstream fish-bearing waters should slope failure events occur. The morphology of these channels is conducive to transporting large wood during debris flows. The presence of high risk sites near these channels indicates a potential that debris flow events could occur. During these events, it is assumed that vegetation retained along the debris flow track will either reduce the energy of the event and cause the materials to become temporarily stored within the channel, or become entrained within the debris wedge for delivery to downstream reaches. Management will focus on maintaining vegetation that has a high probability of interacting with debris flows along this track. The intent of this strategy is to maintain large trees that can provide the functional habitat-forming elements of these natural disturbance events.

  The presence of vegetation along these channels will support stream functions and processes during the period when debris flow events do not occur. Riparian vegetation will provide nutrient (leaf litter) input. Large wood recruited to these channels will sort and store coarse sediments, and influence channel morphology. This material will also enhance nutrient storage and processing functions. The lack of perennial flow minimizes potential influences on summer water temperature in downstream fish-bearing reaches.

- **Other seasonal streams—** Individually, these streams are assumed to have limited overall influence on watershed-level aquatic conditions due to their small size, flow pattern, and morphological characteristics. Their small size and seasonal flow pattern limits their individual potential to influence downstream water temperatures. The size, morphology, and physical setting of these streams also indicate a lower probability that large wood transport to downstream reaches is a significant function. The major functions of these waters are assumed to be the recruitment, routing, and processing of leaf litter, and transport, sorting, and storage of fine sediments.

  The plan assumes that individually, these streams have a limited contribution to watershed-level functions and processes that support properly functioning aquatic habitats. Management along these streams will primarily be designed to maintain some of the functions associated with leaf litter and sediment storage and routing processes. Tree retention and understory vegetation growth near these waters will provide leaf litter to the stream, and large wood input. In-channel large wood from retained trees and snags will also enhance the processes of leaf litter and fine sediment storage, routing, and processing. The integrity of these channels will also be protected during all management activities. Although the site-specific vegetation retention standards are less than on other streams, the majority of these streams will be in a forested condition for significant time periods as managers achieve the landscape stand structure desired conditions. During this time, it is assumed that the developing forest stands will contribute components that will support the functions and processes of these streams. The assumptions concerning these streams will be tested over time through watershed assessments, monitoring, and research.

Aquatic-Riparian Concept 2: The Blended Approach — a Landscape Level Approach Combined with 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.

Historical Conditions, Disturbance Regimes, and Riparian and Aquatic Habitats

Conditions over the landscape are dynamic, not static. Aquatic and riparian habitats in Southwest Oregon have always represented a continually shifting mosaic of disturbed and undisturbed habitats. Every stream would undergo periods when habitat conditions were better and times when habitat conditions were worse, and at any time, some streams offered better habitat than others. (Independent Multidisciplinary Science Team 1999)

Historically, forest stands in Southwest Oregon ranged from dense mature or old growth conifer forests, to sparsely forested open conditions created by fire, floods, wind, or other disturbance factors. Streamside forests probably had similar proportions of old and young forests, although the proportion of hardwood stands and young stands may have been higher near large streams due to more frequent disturbances, including floods, debris flows, and beaver activity, and related competition with shrub species.

It is becoming increasingly evident that riparian and aquatic ecosystems are maintained over the long term by periodic disturbances. As just one example, wildfires left burned forests with many structural elements such as snags and fallen trees, many of which were ultimately delivered to stream channels through landslides or other mechanisms. Natural disturbances such as wildfires, windstorms, and floods have affected and created Oregon's forests for millennia. Native flora and fauna evolved with these disturbance events. There is considerable debate about the frequency and magnitude of these events, and it appears that forest disturbance frequencies vary considerably throughout Oregon's forests, based on location, climate, and ecosystem. The typical disturbance pattern in an area is known as the disturbance regime.

In the past, forest managers often did not recognize the structural needs of the streams and forests. In the rehabilitation of the Tillamook Burn, salvage logging was done before new trees were planted. Many snags were removed that, if left, would have provided large woody debris to the streams over time. Similarly, historic timber harvest did not attempt to maintain large conifers and fallen trees in riparian and aquatic habitats. Finally, due to concerns about fish passage and floods, woody debris was deliberately removed from stream channels. Thus, past management activities have contributed to the very low levels of large woody debris currently in most stream channels on western Oregon state forests.

More specific assessment efforts are necessary to accurately describe the current conditions of riparian and aquatic habitats, including the levels of structural components such as large woody debris and large streamside conifers. This information will be the basis for site-specific prescriptions that use both active and passive management strategies to produce the desired conditions. While active management can potentially produce the desired results several decades sooner than passive management, it also has some short-term risk. Prescriptions must balance the benefits and risks based on site-specific conditions.

Thus, in developing a set of strategies to restore and maintain properly functioning aquatic systems it is necessary to apply principles of landscape ecology to manage habitat at both the site-specific and landscape level. This type of a blended approach seeks to emulate disturbance patterns in both upslope and riparian areas (Independent Multidisciplinary Science Team 1999)

Aquatic-Riparian Concept 3: Watershed Assessment and Analysis

Watershed assessment and analysis must be a critical process in refining and planning management activities related to implementation of this forest management plan. With a greater understanding of the interrelated processes occurring in watersheds, plans and activities can be better structured, potential consequences better anticipated, and communication and resource understanding improved.

There is a need on state forest lands to employ a goal-driven process to characterize the watershed features of its management basins. These features include the riparian, aquatic, terrestrial, and cultural conditions, processes, and interactions that affect the overall watershed character and response to management activities. In order to assess these components so that they provide insight into management effects and resource potential, a relatively high-level assessment must be applied to key watersheds.

Important goals for developing and implementing a watershed assessment and analysis process on these state forest lands are to:

1. Collect data on and evaluate baseline condition assumptions by:
    - Identifying and assessing the condition of limiting factors.
    - Determining if the riparian and aquatic strategies are addressing the appropriate process and function concerns within the watershed.
2. Provide information for the refinement of district implementation plans.
3. Contribute watershed-level information to a comprehensive review of forest management plan goals and strategies.

Successful implementation of watershed assessment and analysis can provide qualitative and quantitative information useful to managers as they develop plans and set objectives for their management basins. Watershed analysis is a tool to guide management and policy decisions to the best possible sustainable use of a watershed’s resources, and to assure that the broader goals of restoring and/or maintaining watershed health and providing for properly functioning aquatic systems are achieved.

Coordination with other watershed users is a critical step in a successful watershed assessment and analysis. Not only is the extent of land use activities identified, but also important information is gathered about reference condition, current use, issue prioritization, and future expectations. Watershed assessments and analyses should be coordinated with adjoining private and federal landowners wherever possible, as well as with the broader public.

To be successful, a watershed assessment and analysis must provide relevant, understandable, and logical information to managers and policy makers. Managers and policy makers must be able to use this information to improve actions and plans. Prioritization of analysis issues and data collection should be directed to this goal. To be most effective, information from watershed assessments and recommendations from watershed analysis should be processed through the adaptive management framework and processes developed for implementation of this plan, so that proposed changes are implemented in a timely way, and review and approval take place at the appropriate levels.

Basic Concepts for Forest Health

Forest Health Concept 1: Active Management for a Diverse and Healthy Forest Ecosystem Resilient to Biotic and Abiotic Influences

The desired forest condition is one in which biotic and abiotic influences do not threaten resource management objectives now or in the future. Biotic influences, such as insects, diseases, and vertebrates, are integral parts of the forest ecosystem. These disturbance agents, which can damage or kill trees, are for the most part native species that have been functional parts of Southwest Oregon forest ecosystems for thousands of years. (A few agents, such as white pine blister rust, have been introduced and have become naturalized). Abiotic factors, such as weather extremes, drought, fire, climate change, and pollution, are often unpredictable or uncontrollable, but history shows that they too can cause severe damage.

When disturbance agents damage or kill trees, they affect the structure and composition of forests. These effects can be either positive or negative, depending on management objectives. Birds and other animals use dead and/or decayed trees for nesting, hiding, and foraging. Selective killing of certain tree species or individuals contributes to biodiversity by creating canopy gaps that provide space, light, and nutrients for a variety of plant and animal species. When forests are “out of balance”, often the result of human activities, large-scale insect outbreaks or disease epidemics can occur, which can result in catastrophic and unwanted changes to the forest.

A general principle of forest management is that high biodiversity provides stability and resiliency to the forest, especially with regard to pests. A diversity of tree species provides some assurance that pest outbreaks will not kill all of the trees, largely because most native pests have some degree of host specificity. Structurally and compositionally diverse forests also will contain habitats and conditions suitable for the many natural factors that help keep pest populations and levels of damage within acceptable levels.

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. Management objectives for Southwest Oregon state forests vary over the landscape and often differ from one stand to the next. These various objectives help determine the desired future condition of the forest, which in turn drives stand management activities. Management actions must consider the effects of disturbance agents, which are a permanent part of the forest ecosystem. By integrating forest health strategies and forest management, we ensure the most options for the future as we continually adjust and adapt our management.

The best way to maintain a desirable forest condition is to prevent an undesirable condition from occurring. This is accomplished primarily through active management of stands. Prevention strategies generally involve establishing tree species and genotypes that are well-suited to the site, ensuring a diversity of species to avoid catastrophic losses, manipulating stand density to avoid stress that may predispose trees to pest injury, and manipulating stand structure and composition to reduce fuel loading in order to minimize the effect of catastrophic wildfire.

Forest Health Concept 2: Integrated Pest Management

Our aim is not elimination or eradication of pests on state forests (except perhaps in the event of an introduced exotic pest), but rather to manage the forest in such a way that pest effects are within acceptable ranges, which vary over time and space with changing objectives and constraints. The undesirable effects of these various influences can be mitigated through several prevention and suppression strategies. Many of these strategies involve applying existing silvicultural treatments and technologies. However, new approaches to management should be explored, and existing methods monitored closely to ensure that the best strategies are used. The forest health strategies apply to upland and riparian areas.

In some cases pest populations and associated damage can exceed the desired levels. In this case suppression might be appropriate. Any 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. IPM techniques may include the use of natural predators and parasites, genetically resistant hosts, environmental modifications, and, when necessary and appropriate, chemical pesticides or herbicides.

Integrated Forest Management Strategies

The integrated management strategies in the following section are based on the conceptual foundation and principles described in the first part of this chapter.

The technical approach and strategies in this forest management plan are a substantial departure from previous approaches to planning for state forests. Previous plans in Southwest Oregon have focused almost exclusively on strategies for the timber resource, with little or no development of specific strategies for other resources.

This plan presents a set of integrated strategies that are the basis for managing the forest landscape as a whole. They are designed to be applied through a system of active management that realizes a high level of the forest product producing potential from these lands, and thus a high level of revenue to beneficiaries. 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, which include upslope components such as roads and slope stability, and forest health strategies. Together, this set of integrated strategies will apply across the landscape. These integrated strategies will contribute to a range of habitats likely to accommodate most wildlife species and encourage broad forest biodiversity. Over the long term, they will provide for most species most of the time. Thus, this set of integrated strategies represents the “coarse filter” discussed earlier.

It will take many decades to produce the desired forest, riparian, and instream conditions. Over the short term, the integrated strategies may not provide for the short-term habitat needs of some species. When necessary to provide short-term habitat considerations for wildlife and fish species of concern, additional conservation tools may be used. Management around specific sites or for specific species is detailed in district implementation plans, annual operations plans and operational policy.

The integrated strategies will largely be implemented through active forest management practices that focus on the production of the identified desired future condition in relation to forest and stand structures. These structures are expected to produce valuable wood products and contribute to the range of habitats and biodiversity. Previous state forest management plans set timber volume targets as the objective for forest management. This plan stresses both the achievement of forest structure conditions in the long term, and also regular, sustainable, timber harvest through silvicultural operations. This approach does not minimize the importance of timber management. Instead, it takes the proactive view that appropriate forest management activities, properly applied, can be used to produce a diversified forest landscape and a sustainable timber harvest.

It is essential that the integrated strategies be viewed in an adaptive management context. It will take many decades to fully implement the strategies and produce the desired landscape. Over time, monitoring will tell us if the strategies are accomplishing their intended purpose. As monitoring provides feedback, the plan will be fine-tuned and improved through adaptive management.

The integrated strategies provide general guidance for management of Southwest Oregon state forests. Because forests are complex, the specific application of strategies may vary from site to site. Structure-based management will be implemented across the landscape through implementation planning (Landscape Management Strategy 4), as well as through annual operations plans. District implementation plans will describe the activities and harvest objectives associated with structure-based management that will move the forest towards the vision and the specific desired future condition, for specified time periods (generally ten years or less). These district plans provide a perspective on how quickly the transition to the DFC will occur and an estimate of the timeline to achieve the vision.

Landscape Management Strategies

Under structure-based management (SBM), landscape strategies will gradually move the forest to a more desirable range of stand structures and landscape conditions, as described in this chapter. Once attained, this range of stand types and their relative abundance across the landscape will remain reasonably stable, although individual stands will continue to change. Because the structures will be in a dynamic balance across the landscape, the forest will provide a steady flow of timber volume and revenue, jobs, habitats, and recreational opportunities.

The approach is based on active management, with the main emphasis on the use of sound silvicultural approaches for producing timber and revenue. These silvicultural practices are designed to contribute to the range of habitat types or forest structures used by indigenous species and to enhance biodiversity. SBM will move forest management away from approaches that stress conflict and trade-offs between uses, and towards an approach that stresses integration and compatibility of uses over time and space. Instead of managing the forest to produce habitat for individual species, we will manage the forest to produce the range of habitats needed by indigenous species. This approach will reduce the likelihood of having to manage in a crisis situation for individual species or for individual sites.

Landscape Management Strategy 1

Actively manage the state forest landscape and forest stands to produce the desired future array of stand structure types and produce 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 time frame for achieving the array described.

Table 4-2. Stand Structure Types: Percent of the Landscape

Regeneration	5-20 percent (10% used for analysis)
Closed Single Canopy	35-55 percent (45% used for analysis)
Understory	5-15 percent (10% used for analysis)
Layered	10-20 percent (15% used for analysis)
Older Forest Structure	10-30 percent (20% used for analysis)

The percentages in the preceding table are based on the hypothesis that such an array of stand types, properly arranged on the landscape, will contribute to the habitat needs of all native species. Because of the inherent uncertainty in this hypothesis, and the ongoing accumulation of knowledge through research, it is the Department of Forestry's intent to conduct an ongoing review through adaptive management. 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 needed to meet that goal.

The following techniques, among others, will be used to accomplish this strategy.

- Partial cuts to enhance tree growth and biodiversity in vegetative communities.
- Regeneration harvests in stands that have poor potential for growth or development of layered or older forest structure types.
- Regeneration harvests in all stand types as excess acres in those types are identified through implementation planning and it is determined that they are not necessary to produce other stand structure types or are not consistent with landscape design (Landscape Management Strategy 2). There will be regeneration harvests of stands in CSC, UDS, LYR, and OFS. These harvests create the open habitats provided in regeneration types.
- All stands will not necessarily be managed to produce OFS. Generally speaking, only those stands that have the structural potential to be managed for OFS and that are located in those areas of the landscape identified for OFS will be managed to become

this type. Some stands will be managed to stay within the closed single canopy stage while others will be managed to pass through all the stand stages.

- Specific decisions on the location and arrangement of stand types for the desired future condition will be made through the district implementation planning process described in Landscape Management Strategy 4, and in Chapter 5 of this plan.
- The Department of Forestry will continue to manage the forests using good business practices and will consider an array of economic information in making forest management decisions.

Implementation of Landscape Management Strategy 1

The path toward accomplishing Landscape Management Strategy 1 will not necessarily be the most direct path. If the plan were carefully followed and no major natural disturbances occurred, it would take decades or centuries before forest stands would be smoothly flowing into and out of the various structure types. Natural disturbances will occur and current stand conditions, cyclical economic trends, and the necessity to meet volume and revenue goals will all affect how quickly forest management practices can produce the desired results. A district implementation plan will be included when the draft forest management plan is considered for adoption. This implementation plan will describe how the district will transition from the existing management approaches to the new strategies. The implementation plan will include projected management activities, expected timber harvest, and expected achievements for wildlife habitat and other resources.

Natural disturbances — As with any plan, a significant natural disturbance such as an extensive stand replacement fire would result in the need to reevaluate existing plans.

Genetic tree stock — The District has good local seed sources for all species intended to be planted, which should continue to be used. Whenever relatively rare species are encountered in timber sales, representative trees should be maintained in residual stands. The District should identify the largest likely rehabilitation projects after any catastrophic stand replacement event and develop sufficient seedbanks to handle these in any of the District's areas.

Current stand type distributions — In the planning area as a whole, due to management and fire history, most of the state forest lands are in the closed single canopy, understory, and layered stages. A lower but substantial number of acres are in the regeneration stage. Very few acres are in the older forest structure stage. The current stand type distribution will affect how quickly the desired stand structure conditions can be attained. Existing inventories are evaluated in conjunction with timber volume and revenue constraints to determine how quickly the district can move toward the desired future condition.

Cyclical economic trends: timber and revenue — Most stand structure work is accomplished through timber harvest revenues or through work accomplished in timber sale contracts. Current economic conditions are very good for marketing commercial thinnings and young stand management. Historically, this has not always been the case. Economic conditions could get even better or they could worsen to the point that commercial thinning is no longer feasible. Over the short term, as economic conditions fluctuate, the pace of stand structure management will also fluctuate. Over the long term, it is likely that markets will support the stand management activities required for SBM.

Landscape Management Strategy 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.

The district, through the district implementation plan, will develop a landscape design that is consistent with the landscape design guidelines that follow. The application of these principles and guidelines will be discussed and reflected in the landscape design section and desired future condition display contained within the 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 the covered species. Landscape design in southwest Oregon state forests will be influenced by the small size and scattered distribution of the ownership. Emphasis will be placed on providing habitat connectivity and travel corridors to suitable habitat on adjacent federal lands.

Landscape Design Guidelines

- Range of patch sizes.
- Connectivity between basins and across the landscape.
- Corridors for key species.
- Maintenance of habitat areas as identified for specific species.

Landscape Management Strategy 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.

- 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

There are no numerical standards given for remnant old growth trees, multi-layered canopies, multiple native tree species, herbs and shrubs, or gaps. Managers are expected to retain or develop these characteristics in stands when they find opportunities that are consistent with the overall stand management objectives.

The structural components identified will be retained during any management activities unless they create clear safety or fire hazards, or if their retention would result in unacceptable additional operational difficulties, environmental hazards, or threats to public improvements. It is expected that the vast majority of structural components will be retained, and there will be few situations where these components must be removed. The following guidelines will govern exceptions to retention of the structural components:

Guidelines for Determining Exceptions

- **Safety concerns —** Where retention would constitute a significant safety hazard or result in a violation of state or federal law, individual trees or snags may be removed.
- **Pest management concerns —** Where retention would constitute a significant threat to surrounding stands due to the presence of insect or disease agents, individual trees or snags may be removed. The Department of Forestry's forest entomologist or forest pathologist will make the determination of significant threat.
- **Severe operational concerns —** Where retention would result in impacts on the Department of Forestry's ability to protect other key biological resources identified in this plan, individual trees or snags may be removed.

Landscape Management Strategy 3a. Remnant old growth trees — Retain remnant old growth trees or patches of old growth.

Existing old growth in the planning area occurs as widely scattered individual trees, and occasionally as small isolated patches. Because of this limited occurrence, the Department of Forestry will retain all existing old growth patches and individual old growth trees to provide this element of diversity in present and future stands. Remnant old growth trees may vary in age, size, species and structural characteristics such as thick, fissured bark, broken or flat tops and decadence. Until the desired future condition of stand types is achieved, existing older forest structure stands will not be removed in areas that are designated as OFS in desired future condition in the implementation plan.

Landscape Management Strategy 3b. Residual live trees — Retain an average of 5 green trees per acre during regeneration harvest.

Residual live trees will be retained to meet the short-term habitat needs of species, to serve as a source of future snags and down wood, and to provide legacy trees in future stands. Legacy trees are living trees that are carried forward into a new stand following disturbance, with the intent that they will remain in perpetuity. In the long term, legacy structures will be present in all stand types across the landscape. Sufficient trees will be retained to compensate for windthrow or other mortality that may occur during stand development.

Guidelines for Residual Live Tree Retention

- Retained trees will include a component of defective trees where available.
- Retained trees will include a component of sound, healthy trees with good crowns.
- Retained trees will include a component of hardwood trees, especially bigleaf maple and/or Oregon white oak when available.
- Trees will be retained in a variety of arrangements throughout each harvest unit, including uniform or random distributions as well as dispersed clumps.
- Trees will be retained at higher levels in some units, and lower levels in others, with the intent to achieve the average of 5 trees per acre for all regeneration harvest units in a given annual operations plan.
- Additional trees (above the 5 per acre desired condition) will be retained where necessary to supplement snag or down wood recruitment goals.

Landscape Management Strategy 3c. Snags — During harvest activities, retain all existing snags. Manage to provide at least 2 hard snags per acre, at least 15 inches in diameter, on average across the landscape on the district. Manage to provide at least 6 snags per acre in older forest structure stands, at least 2 of which must be 24 inches or larger in diameter.

Snags will be provided to meet the habitat needs of cavity-using species and to serve as a source of future down wood. Management will be designed to provide snags within all stand types through time, through a combination of existing snag retention, natural mortality in maturing stands, and artificial creation.

Guidelines for Snag Management

- Snags will be retained in a variety of arrangements throughout the landscape. Uniform or random distributions as well as dispersed clumping will be used to provide for a variety of habitat and predator/prey conditions.
- Where fewer than 2 hard snags per acre exist in a planned harvest unit, the district will consider using snag creation prescriptions or additional live tree retention to supplement snag levels.
- Snag creation prescriptions may be applied in any partial cut harvests, but will be emphasized in larger diameter stands.

Landscape Management Strategy 3d. Manage to achieve OFS stands that contain 250 to 350 cubic feet per acre of sound down logs (decay class 1 or 2), or 1,200 to 1,800 cubic feet of down logs in any or all decay classes 1-5, including at least 2 logs per acre greater than 24 inches in diameter.

Guidelines for Down Wood Management

Down wood will be provided to meet the habitat needs of wildlife species, to provide for other key ecosystem functions, and to provide the structural legacy necessary to achieve older forest structure in the future. Achievement of the down wood component of older forest structure will often require a significant amount of time (many decades), especially in areas where existing stands are deficient in this material. Management will be designed to provide down wood within all stand types through time, through a combination of existing wood retention, natural mortality in maturing stands, and artificial creation.

- Retain and, where necessary, supplement the supply of down wood at the time of partial cut or regeneration harvests.
- When salvaging windthrow and other dead timber, retain a portion of the down wood.
- Retain and, where necessary, supplement the supply of down wood during site preparation or other management activities.
- Down wood will be retained in a variety of arrangements within individual harvest units and throughout the landscape. Uniform or random distributions as well as dispersed clumping will be used to provide for a variety of habitat and predator/prey conditions. The desired conditions will not be present on every acre or on every individual unit, but will be present as an average across the district.
- Rely on the contributions of retained snags and residual trees that fall to the forest floor through the course of forest development to contribute down wood through the life of each stand.
- Emphasis will be placed on retaining large diameter logs in later partial cuts and in regeneration harvests.

Landscape Management Strategy 3e. Multi-layered forest canopies — Manage vegetative communities to create complex multi-canopied forests or at least to increase the amount of layering in most stands.

In order to meet the stand structure criteria for the complex and older forest structure stands, it is necessary to develop multiple canopies in many stands. Stands managed in the closed single canopy type will not have multi-layered canopies.

Landscape Management Strategy 3f. Multiple native tree species (conifers and hardwoods) — Manage to include a variety of native species.

Individual stands may be predominantly single species (conifers or hardwoods), and the forest overall may be predominantly conifer. However, maintaining or establishing components of other species (conifers and hardwoods) is desirable.

Landscape Management Strategy 3g. Herbs and shrubs — Manage vegetative communities to encourage diverse herb and shrub layers.

Development of multiple layers of vegetation will increase the amount of vertical diversity in the stand, and provide additional habitat niches that can support increasing numbers of wildlife species.

Landscape Management Strategy 3h. Gaps — Manage stands for gaps to provide horizontal diversity. Natural openings due to windthrow, insects, and disease, etc. will suffice in many cases. However, where a deficiency exists, consider creating gaps through management activities.

A within-stand gap is an interruption in the continuity of the vegetative community in a stand. In most cases we consider such gaps to be small openings (½ to 2 acres) where herbs, shrubs, and new trees are being established, within larger stands where the dominant feature is an overstory tree canopy.

Landscape Management Strategy 4

Develop an implementation plan for the district that provides more specific information on the application of Landscape Management Strategies 1 through 3, for a ten-year period.

An implementation plan will be developed that contains more detailed information describing how the 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. The implementation plan will include information that describes:

- The current stand type amounts and distribution on the district, and the location of any specific habitats for species that may occur, or that may be identified for species of concern.
- The desired future stand condition array for each management basin in the district, in a regional context, and how this array is arranged across the district landscape to meet the landscape design strategy.
- Proposed management activities for the time period that will be necessary to move towards the identified stand type array and landscape design, and to move towards the goals for structural habitat components.
- Land management classifications that have been applied to lands in the district to reflect the management approaches and strategies adopted in the FMP, and described in the implementation plan. This will include areas designated as riparian management areas, monitoring controls, or specific habitat areas identified for species of concern.
- Specific management activities, outputs, and achievements anticipated for the next ten-year period. This will include:
  - — Annual activity ranges for specific silvicultural operations during the ten-year period (i.e., acres of regeneration harvest per year, acres of partial cut per year, etc).
  - — Estimates of the acres of each stand type that will be moved towards another stand type through the identified management activities.
  - — Estimates of the amounts of each structural habitat component that the Department of Forestry expects to be created through the identified management activities.

Implementation planning is an ongoing process in which Oregon Department of Forestry personnel will organize resource information, identify and coordinate management activities, and assess progress toward meeting the goals identified in the forest management plan. District personnel apply the goals and strategies provided by the *Southwest Oregon State Forests Management Plan* to real stand and forest conditions within specific watersheds or groups of watersheds that comprise identified management basins. Stand management activities are then identified for the foreseeable future (variable time, but roughly ten years) based on the specific opportunities and constraints inherent to each management basin.

Information from each management basin is then used to develop the district implementation plan. The implementation plan is used in the development of annual operations plans and budgets. Following completion of comprehensive watershed assessments and analyses, the district implementation plan will be re-evaluated and updated to reflect the key recommendation from that process.

The draft forest management plan will be accompanied with a district implementation plan. The implementation plan will provide reviewers with necessary information to evaluate the draft forest management plan. The information in this initial implementation plan will be improved and refined in the following years. Future updates on the status of the forest management plan will be accompanied with more fully developed implementation plans.

See Chapter 5 for a description of the approval process for the district implementation plan and the opportunities for public input into the process.

Adaptive Management Measures for Landscape Management Strategies

Key Working Hypotheses:

- An active and integrated forest management approach will provide for high levels of sustainable and predictable timber and revenue while concurrently providing habitat for native fish and wildlife species.
- Providing for biodiversity at the landscape level requires providing for an array of forest conditions through time and space that emulates conditions created by historic disturbance regimes.
- Providing for a diverse array of forest conditions through time can be accomplished in a managed context through the application of silvicultural principles.
- Timber markets will exist over time for the range of timber types and qualities that will be produced from state forests. The diverse "portfolio" of products available from a diverse array of stand structures will strengthen the ability of state forests to capitalize on changing markets.
- A diverse array of forest conditions will provide diverse recreational opportunities on these state forest lands.

Key Assumptions/Questions to be Addressed through Monitoring:

- There is a predictable relationship between forest stand structure and habitat requirements of native species.
- Active silvicultural management can accelerate the development of more complex stand structures.
- Active silvicultural management towards more complex stand structures can produce high levels of sustainable timber and revenues from forest operations.
- Older forest structure stands will provide habitat for native species that is similar in function to that provided by old growth forests.
- Multi-layered stand canopies are a measure of structural diversity that supports more complex plant and animal communities than stands that are not layered.
- A diversity of stand structures will provide for a broad range of biodiversity and a range of habitats for native species.
- The identified array of forest stand types (the desired future condition) provides the necessary quantity and arrangement of habitats to provide for native species.
- A diversity of stand structures will provide for diverse recreational opportunities and activities over time throughout the forest.
- Over the long term, the stand types can achieve the goals through a dynamic mosaic that shifts slowly across the landscape.

Aquatic and Riparian Strategies

This section presents the integrated strategies for aquatic and riparian areas. Additional conservation tools may be considered for fish species of concern as described later under the “Species of Concern” section.

The landscape level component of the blended approach is comprised of the landscape management strategies described earlier in this chapter. 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, watershed assessment and analysis is critical to the evaluation and refinement of both the landscape-level and site-specific approaches. Watershed analysis is a strategy designed to collect and synthesize key watershed information that will be used to further evaluate the two components of this blended approach.

In addition to the landscape management strategies, the integrated strategies for aquatic and riparian areas include:

1. Watershed assessment and analysis.
2. Riparian management areas.
3. Aquatic habitat restoration.
4. Alternative vegetation treatment in riparian areas.
5. Other aquatic habitats: wetlands, lakes, ponds, estuaries, bogs, seeps, and springs.
6. Slope stability management.
7. Forest road management.

Aquatic and Riparian Strategy 1

Implement watershed assessment and analysis.

Watershed assessment and analysis will be used during plan implementation 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.

Aquatic and Riparian Strategy 1a. Develop a comprehensive watershed assessment and analysis process for state forest lands that is consistent with, but more rigorous than, the existing OWEB process.

The Department of Forestry will develop watershed assessment protocols suited to its management needs, using the existing OWEB manual and protocols as a foundation. It is anticipated that this will involve development of more rigorous information collection protocols for specific "modules" based on information needs related to specific management strategies in the plan. The Department of Forestry's assessment process will facilitate coordinated activities with other landowners in watersheds that have a significant percentage in state forest lands.

Aquatic and Riparian Strategy 1b. Cooperate with local watershed councils and adjacent landowners, to assure that watershed assessments on Department of Forestry lands consider conditions and limiting factors on other lands to the greatest extent possible.

Coordination with other watershed users is a critical step in a successful watershed assessment and analysis. Not only is the extent of land use activities identified, but also important information is gathered about reference condition, current use, issue prioritization, and future expectations. Watershed assessments and analyses will be coordinated with adjoining private and federal landowners as well as the broader public. To the greatest extent possible, local watershed councils will be engaged to assist with conducting assessments.

Many watersheds containing state forest lands have already been the subject of assessment efforts by watershed councils and other entities. In addition, information relevant to specific assessment modules has been collected by the Department in recent years. Examples are aquatic habitat and fish presence survey efforts, and road hazard assessment efforts. These previous information collection outputs will be incorporated into refined protocols and supplemented where necessary to meet management needs.

Aquatic and Riparian Strategy 1c. Analyze information collected through watershed assessments and other inventory and assessment projects, and apply the results at the appropriate planning level through the adaptive management process.

Synthesis of assessment results will be a critical step. A primary goal is to integrate ecosystem information. Without an effective synthesis, assessment modules remain separate and disconnected — the information is merely additive rather than synergistic. During development of assessment protocols and methods under strategy 1a, the Department will develop and describe an interdisciplinary approach to analysis that integrates into subsequent planning levels described in this plan (implementation and annual planning). To facilitate this analysis and integration, protocol development and data collection decisions will be designed toward that end. Data collected will be compatible, on similar scales, and collected with the appropriate indicators to complement other module information.

Recommendations or outputs from the interdisciplinary process will be inputs into the adaptive management framework described in Chapter 5 of this plan. Thus, depending on the significance and scope of a recommendation, it may be implemented through adjustments to specific standards or practices, annual operations plan revisions, more formal updates to district implementation plans, or amendments to the broader strategies of this forest management plan.

Aquatic and Riparian Strategy 2

Apply management standards for aquatic and riparian areas. Establish and maintain riparian management areas adjacent to all streams, in accordance with Appendix C of this plan, and species of concern strategies where they apply.

More site-specific prescriptive standards for aquatic and riparian areas constitute a key piece of the second tier of the balanced approach, and will guide forest management activities to achieve properly functioning aquatic and riparian habitat conditions over time. All management actions will be consistent with these standards.

The standards will be applied until the adaptive management process results in identification of alternative strategies or standards that better meet the objectives for aquatic and riparian habitats. As new information and a better understanding of the watershed functions and processes become available, this knowledge will be integrated into the management of riparian and aquatic habitat.

The management standards include specific provisions for establishing riparian management areas and describe how management is to occur within these areas.

Riparian management areas will be established immediately adjacent to waterways for the purpose of protecting aquatic and riparian resources, and maintaining the functions and ecological processes of the waterways. Within these areas, special management considerations and operational restrictions will be applied, and the protection of aquatic resources will be a high priority.

The width of riparian management areas will vary by the type and classification of the water body. These widths were developed by considering the functions and processes to be achieved or maintained by management activities. The width of a riparian management area (RMA) is measured horizontally beginning at the average high water level of the water body, or the edge of stream-associated wetland, side channel, or channel migration zone (whichever is farthest from the waterway), and extending toward the uplands. The width of these areas will be expanded, if necessary, to fully encompass certain sensitive sites such as inner gorge areas, or other special sites noted in the management prescriptions.

Riparian management area widths are intended to be averages applied over the length of a management site. The actual extent of a specific RMA can be varied to tailor vegetation retention to site-specific conditions, or to address special resource considerations. For example, an RMA boundary will be expanded where a potentially unstable slope adjacent to a stream could deliver materials to the stream. The intent of this action is to increase the potential for large wood delivery should a disturbance event occur. Variations in RMA design will always be completed in a manner consistent with the management objectives for the specific aquatic or riparian area.

See “Basic Concepts for Aquatic and Riparian Areas” earlier in this chapter for related discussion and definitions of terms used in this strategy. See Appendix C for the specific management standards that will be applied in these areas.

Guidelines: The Four Zones of a Stream Riparian Management Area

Riparian management areas established along streams will contain four zones. The purposes and differences between these four zones are defined below.

Aquatic zone — The aquatic zone is the area that includes the stream channel(s) and associated aquatic habitat features. This zone includes beaver ponds, stream-associated wetlands, side channels, and the channel migration zone. The other zones of a riparian management area are established upslope from the outer edge of these features.

Stream bank zone — The stream bank zone is the land closest to the stream, including the stream banks. Most riparian functions are supported to some extent by vegetation in this zone, including providing aquatic shade, the delivery of down wood and organic inputs (leaves and tree litter) to the stream and riparian area, stabilizing the stream bank, contributing to floodplain functions, and influencing sediment routing processes.

- The stream bank zone is defined as the area within 25 feet of the high water level of the stream channel (including stream-associated wetlands, side channels, and the channel migration zone) for all streams. This zone exists on both sides of a stream.

Inner RMA zone — The inner RMA zone is the next area away from the stream, adjacent to the stream bank zone. Vegetation within this zone contributes substantially to desired riparian functions, including providing aquatic shade, delivering a high proportion of the potential large wood available, and contributing organic inputs to the stream. Vegetation within this area also provides some protection to certain aspects of riparian micro-climate. Because vegetation in this zone has a relatively greater role in supporting riparian functions and processes, a high priority is being placed on management actions in this area.

- The inner RMA zone extends from 25 feet (the outer edge of the stream bank zone) to 100 feet from the stream. This zone exists on both sides of a stream.

Outer RMA zone — The outer RMA zone is the portion of the riparian management area farthest away from the stream. Vegetation within this zone may still contribute to certain riparian functions and processes, but to a lesser extent than the two zones closest to the stream. The primary functions provided by vegetation in this area include additional contributions of large wood to the riparian zone and stream channel, and the protection of riparian micro-climate. In some cases, the outer zone may also partially buffer the two inner zones from certain disturbance events such as windthrow.

- The outer RMA zone extends from the edge of the inner zone at 100 feet out to 170 feet from the stream. This zone exists on both sides of a stream.

Guidelines: Stream Classification

Application of the management standards for riparian areas is based on a stream classification system. Streams are grouped into two major categories based on the primary beneficial uses of the stream. Streams are further classified according to size, based on average annual flow. Flow pattern (perennial and seasonal) is also considered for small non-fish-bearing waters. This classification system is generally consistent with the method used for administration of the Oregon Forest Practices Act, as described in the Department of Forestry's Forest Practice Technical Note FP1 — Water Classification (Oregon Department of Forestry 1994).

Beneficial Use Classification

Streams, and other aquatic habitats, are classified into two major groups based on the presence or absence of certain fish species. The following definitions will be applied in classifying streams.

Fish-bearing (Type F) — Waters that are inhabited at any time of the year by anadromous or game fish species, or by fish species that are listed as threatened or endangered under either federal or state Endangered Species Acts.

Non-fish-bearing (Type N) — Waters that are not fish-bearing (see previous definition).

Stream Size Classifications

Streams are further classified by size, based on estimated average annual flow. The following definitions apply to these size categories.

- **Small —** Average annual flow of 2 cfs (cubic feet per second) or less.
- **Medium —** Average annual flow greater than 2 cfs, but less than 10 cfs.
- **Large —** Average annual flow of 10 cfs or greater.

Flow Pattern

Small non-fish-bearing (Type N) streams are also classified according to the flow pattern exhibited in normal water years. For the purposes of this plan, the following definitions will be used.

- **Perennial Type N streams —** streams that are expected to have summer surface flow after July 15.
- **Seasonal Type N streams —** streams that only flow during portions of the year; these streams are not expected to have summer surface flow after July 15.

Some seasonal non-fish-bearing streams are further classified as:

- **Seasonal high energy streams —** Seasonal streams with physical conditions that favor the periodic transport of coarse sediments and woody materials during high flow events. For the purposes of this plan, and in the absence of specific geomorphologic identification, stream reaches with an average gradient exceeding 15 percent, and an active channel width of five (5) feet or more will be defined as seasonal high energy streams.
- **Potential debris flow track reaches —** Potential debris flow track reaches are reaches on seasonal Type N streams that have been determined to have a high probability of delivering woody debris to a Type F stream.

Oregon Department of Forestry field staff will make the determination of the probability that a reach will deliver woody debris to a Type F stream, using the following criteria:

1. The seasonal stream reach must terminate at or below a high risk site. High risk sites include:
   a. Active landslides (slopes with tension cracks, unvegetated soil scarps, or jackstrawed trees caused by slope movement).
   b. Slopes steeper than 80 percent, excluding competent rock outcrops.
   c. Headwalls or draws steeper than 70 percent.
   d. Abrupt slope breaks, where the lower slope is the steeper and exceeds 70 percent, except where the steeper slope is a competent rock outcrop.
   e. Incised channels (hill slopes adjacent to the channel and steeper than the upland slope) with slopes steeper than 60 percent.
   f. Any other site determined to be of marginal stability by a Department of Forestry geotechnical specialist.

2. The path and farthest expected extent of a debris flow will reach a Type F stream. If any one of the following three conditions is present along the path from the high risk site to the Type F stream, then a debris flow is likely to stop and the stream reach would be determined to have a low probability of woody debris delivery:
   a. The presence of a channel junction that is 70 degrees or more, provided the channel downstream of the junction is less than 35 percent gradient.
   b. The presence of a stream reach which is less than 6 percent gradient for at least 300 feet.
   c. An average slope from the high risk site along the potential landslide path to the stream that is less than 20 percent.

Aquatic and Riparian Strategy 3

Restore aquatic habitats.

The aquatic habitat restoration strategies are intended to eliminate human-induced conditions on the forest that may contribute to aquatic habitat deficiencies, or that may limit the timely recovery of desired aquatic habitat conditions. The restoration strategies will promote aquatic habitat conditions that will support the short-term survival needs of depressed salmonids, in order to reduce the potential for further declines in these populations. Also, these strategies will make it more likely that properly functioning aquatic habitat conditions will be attained in a timely manner. Finally, these strategies will encourage forest conditions that will support the ecological processes necessary to naturally create and maintain complex aquatic habitats on a self-sustaining basis.

This approach addresses aquatic habitat restoration on a more comprehensive basis than is currently done, and uses both short-term and long-term management actions. These strategies will improve levels of aquatic function in the short term (to meet the immediate habitat needs of depressed species and place aquatic habitats on a trajectory toward desired conditions), while at the same time actions are carried out to restore the ecological processes and functions that create and maintain self-sustaining habitats over the long term. The following strategies and actions will be implemented as part of the aquatic habitat restoration strategy.

Aquatic and Riparian Strategy 3a. 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.

This strategy will be implemented primarily through the watershed assessment and analysis strategies described earlier. Road inventories and risk assessments, aquatic habitat inventories, and riparian vegetation surveys will be key sources of information.

Aquatic and Riparian Strategy 3b. Identify, design, and implement projects to remedy identified problems in a timely manner.

- Aquatic habitat restoration projects will be designed with the intent of mimicking natural processes. The use of "engineered" or "constructed habitat" approaches to stream enhancement will be minimized.
- Projects will be designed and implemented using a multidisciplinary approach, and with direct consultation with the Oregon Department of Fish and Wildlife.
- Project planning and design will consider habitat conditions, stream processes, and the disturbance regime at both the watershed and site-specific scale.
- Projects will be designed and implemented consistent with the natural dynamics and geomorphology of the site, and with the recognition that introduction of materials will cause changes to the stream channel.

- A priority will be placed on projects that supplement natural “legacy” elements (large woods) that are lacking due to previous disturbance events, and/or management activities.
- Projects will be designed to create conditions and introduce materials sufficient to enhance or re-establish natural physical and biological processes. An emphasis will be placed on projects that re-introduce large “key” pieces of woods to stream channels in natural configurations.
- Wood placement activities will utilize materials that are expected to be relatively “stable” yet functional in these dynamic stream systems. The intent is to maximize the functional attributes of large woody material, and minimize potential conflicts with public safety in downstream reaches. Reliance on artificial “anchoring” methods (such as cables) will be minimized, and will only be used in cases of significant concern for public safety.
- Projects will be implemented in a manner that minimizes the potential for negative effects to riparian areas.
- “Constructed” habitat projects will only be used where these efforts are deemed necessary to support the continued survival or recovery of depressed salmonid species. These projects (when deemed necessary) will only be placed in areas where the created habitat type would be expected to occur naturally.

Aquatic and Riparian Strategy 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.

The alternative vegetation treatment strategies will apply alternative silvicultural approaches in riparian areas where basin-level stand conditions are inconsistent with achieving properly functioning aquatic habitat conditions in a timely manner. These strategies 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.

Aquatic and Riparian Strategy 4a. Complete basin-level assessments to evaluate whether alternative vegetation treatments are needed to achieve properly functioning aquatic habitat conditions in a timely manner. Where appropriate, use the information from the assessments to plan alternative vegetation treatments.

This strategy will be implemented primarily through the watershed assessment and analysis strategies described earlier.

Aquatic and Riparian Strategy 4b. Alternative vegetation treatment projects will be planned using a multi-disciplinary approach involving a variety of resource specialists.

These projects will be designed with the involvement of resource specialists from the Oregon Department of Forestry and the Oregon Department of Fish and Wildlife. The specialists involved in a given project will vary according to the resources and physical conditions present at the site.

Aquatic and Riparian Strategy 4c. Alternative vegetation treatment projects will be monitored and evaluated over time to assure that the objectives are being achieved, and undesirable effects are being minimized. The results of these evaluations will be incorporated into these management activities in an adaptive management context.

The plan recognizes that these treatments are experimental actions, and that over time managers will gain additional knowledge and experience through monitoring and research. This knowledge will be applied in an adaptive management context, in order to more successfully meet the multiple resource objectives for riparian and aquatic habitats.

Aquatic and Riparian Strategy 5

Apply specific strategies to other aquatic habitats.

The Southwest Oregon state forests contain other aquatic habitats besides streams, such as wetlands, lakes, ponds, 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 following strategies apply to these other aquatic habitats.

Establish and maintain riparian management areas adjacent to other aquatic habitat areas in accordance with Appendix C of this plan, and species of concern strategies where they apply.

These waters support diverse plant and animal communities, are connected to other waters in a basin, and play a significant role in the hydrologic patterns and functions of watersheds. Some species have evolved with specific adaptations to, or dependence on, the conditions found in and near these other aquatic habitats. These areas can also be sensitive to land management activities.

The strategies for other aquatic habitats will maintain the productivity of these habitats, protect the integrity of these sites and maintain hydrologic functions, provide suitable habitats for fish and wildlife dependent on these unique habitats, and contribute to habitat conditions needed for maintaining other native wildlife species of concern.

Aquatic and Riparian Strategy 6: Slope Stability

Landslides and other geologic processes can have dramatic effects on watersheds, including aquatic and riparian areas. The integrated strategies include the following strategies to address concerns about landslides and slope stability.

The objective in relation to landslides and slope stability management is to ensure a high probability of restoring and maintaining aquatic habitats through restoration of properly functioning landslide processes. This will be accomplished through application of risk-based management principles and Best Management Practices. Minimizing road-related landslides and chronic erosion (sedimentation to streams) is fundamental to this objective. Hazard assessment and risk-based management for in-unit slides, and ensuring that large wood is available in the track of potential debris slides and torrents, will promote properly functioning conditions for future aquatic habitat inputs. Monitoring and hazard assessment, combined with adaptive management, will provide assurance that this objective is realized.

Management Strategies and Standards

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 (Michael 1997, Prelwitz 1985).

Aquatic and Riparian Strategy 6a. Through the watershed assessment process developed under Aquatic and Riparian Strategy 1, complete a broad level assessment of landslide hazards on state forest lands in the planning area (Level 1).

The methods and procedures will be consistent with, but more intensive than the protocols described in the *Oregon Watershed Assessment Manual* (July 1999). Department of Forestry geotechnical specialists will take a lead role in developing assessment methods and procedures. The assessments will be used to assign risk levels to state forest lands within each watershed as follows:

- **High Hazard Area —** Areas that are likely to contain sites with relatively high probability of failure.
- **Moderate Hazard Area —** Areas that may contain sites with relatively high probability of failure.
- **Low Hazard Area —** Areas with a low chance of containing sites with relatively high probability of failure

Aquatic and Riparian Strategy 6b. During district implementation planning and annual operations planning, utilize geotechnical specialist expertise in evaluating alternatives that can minimize, mitigate for, or avoid risk in high and moderate hazard areas (Level 2).

Aquatic and Riparian Strategy 6c. During project planning and design, utilize geotechnical specialist expertise in designing operations that will minimize, mitigate for, or avoid identified risks (Level 3).

Geotechnical specialist input will be used in all aspects, when alternatives are being considered for proposed operations. The district will coordinate geotechnical specialist review and input at these levels and will be responsible for subsequent evaluation of alternatives and selection of the course of action.

Site-specific geotechnical evaluation will be used as follows:

Road alternatives will receive Level II, site-specific geotechnical evaluation, when the forest engineer needs this input to compare risk of alternative roads (i.e., mid-slope road to ridge-top road with longer span logging).

Annual Operations Plans (AOP) — Geotechnical specialist will provide initial hazard and risk assessment for timber harvesting and road construction operations in the AOP, early enough in the process to allow for proper consideration of alternatives (boundary changes, leave tree placement, etc.), in order to achieve the best decision for the resource. The district is responsible for requesting this review, and the geotechnical specialist is responsible for input. For timber harvesting and road construction operations the following process will be used:

- Operations in high hazard level areas (ones that are likely to contain sites with relatively high probability of failure) will be evaluated by the geotechnical specialist during the annual operations plan review for specific sites that will require on the ground assessment for risk (likelihood of delivery to aquatic system).

- Operations in moderate hazard level areas (ones that may contain sites with moderately high probability of failure) will be investigated during operations planning field work by district personnel, to locate high risk sites. If high risk sites are identified during fieldwork, the geotechnical specialist will be consulted and the site treated the same as high hazard sites.

- Operations in low hazard level areas (ones with a low chance of containing sites with high probability of failure) will not be expected to have any further geotechnical input. If high risk sites are identified during fieldwork, the geotechnical specialist will be consulted and the site treated the same as high hazard sites.

The effect of the forest operation on the landslide potential (probability of failure or landslide rate) will be judged based on slope, landform, underlying rock material, and type of operation (road building, clearcut, partial cut, thinning, etc).

Risk Findings:

If the risk is low (minimal or no likelihood of delivery to aquatic system), then no management modification will be recommended.

If the risk is moderate (potential to deliver but likelihood is low) then there will be further assessment of the condition and significance of the aquatic resource. If the aquatic resource is already significantly degraded or identified as part of a salmonid emphasis area, then the geotechnical specialist will develop recommendations for modifying the harvest operation. Otherwise, no modifications to the operation will be made.

If the risk is high (likely to deliver to the aquatic system) then the geotechnical specialist will develop recommendations for avoiding, mitigating, or minimizing the risk. This will include an evaluation of the potential debris chute or run-out channel, consistent with the criteria provided for identification of debris flow track reaches in the riparian management area strategies.

If the risk is high and the logistics of the harvest layout (topography and geometry) will allow simple boundary changes, then the potential initiation site (hazard) will be excluded from the operation area.

Aquatic and Riparian Strategy 7: Forest Roads Management

The *Forest Roads Manual* for the State Forests Program (Oregon Department of Forestry 2000a) contains specific processes, procedures, and standards for road system management. It also describes the roles and responsibilities of the various resource specialists and land managers involved in road system 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.

The construction and use of forest roads is an integral part of actively managing state forest lands. Roads provide the essential access for forest management activities, fire protection, and a variety of recreational uses. However, roads can be a major source of erosion and sedimentation on forests. Proper road system planning, design, construction, and maintenance will prevent or minimize water quality problems and associated impacts on aquatic resources, and significantly extend the useful life of a forest road. Quality information on the status and condition of existing roads is also essential to an effective maintenance and improvement program designed to meet the objectives stated above.

For the Department of Forestry transportation system, the vision is a road network that will provide efficient, effective access for all the necessary activities taking place in the forest. The transportation system will be actively managed to protect all forest resources. The road network will be kept to a minimum. Barriers to fish passage created by road crossings will be eliminated. Roads will be constructed in the best locations for carrying out anticipated activities, and the standard for forest roads will be a suitable match for the terrain and type of access needed. The roads will be effectively maintained to prevent degradation to other forest resources. Unnecessary roads will be closed or abandoned and, where appropriate, the land they occupied will be returned to active forest management. Adaptive resource management processes will be used to modify future practices as managers gain additional knowledge of resource needs and protection, and learn more appropriate methods for meeting the objectives of this plan.

The four primary areas of road system management are listed below and addressed in detail in the Department of Forestry's *Forest Roads Manual* for the State Forests Program (Oregon Department of Forestry 2000a).

- Transportation planning
- Road design, construction, and improvement (including drainage systems)
- Road maintenance
- Road closure

Aquatic and Riparian Strategy 7a. Through the watershed assessment process developed under Aquatic and Riparian Strategy 1, complete a comprehensive inventory of existing roads on state forest lands in the planning area.

Southwest Oregon District has already conducted a comprehensive road hazard inventory to a common standard specified through Oregon Plan protocols. The information from this inventory is being used to identify priority restoration and improvement projects related to the forest roads system.

It is anticipated that through the process of developing comprehensive watershed assessment protocols for state forest land, as described in Aquatic and Riparian strategy 1a, additional information needs may be identified. Any additional information needed would be collected through the application of the identified protocol and incorporated into the subsequent analysis and revision to district level plans.

Aquatic and Riparian Strategy 7b. Through development and updating of the district implementation plan, apply the processes and standards for transportation planning described in the State Forests Program *Forest Roads Manual*.

The initial district implementation plan will not contain all of the transportation planning elements described in the *Forest Roads Manual*. Following completion of watershed assessments, and as the district implementation plan is subsequently revised and updated, the complete transportation planning process will be applied.

Aquatic and Riparian Strategy 7c. Forest road design, construction, improvement, and maintenance will be carried out in accordance with the processes and standards described in the State Forests Program *Forest Roads Manual*.

Aquatic and Riparian Strategy 7d. Identify and prioritize roads for closure and/or abandonment using information gained from the comprehensive forest roads inventory, and in accordance with the standards described in *the State Forest Program Forest Roads Manual*.

Adaptive Management Measures for Aquatic and Riparian Strategies

Key Working Hypothesis:

- Active management through a combination of landscape level strategies and site specific standards will result in maintaining and restoring properly functioning aquatic and riparian habitats.

Key Assumptions/Questions to be Addressed through Monitoring:

- Aquatic and riparian systems in the planning area were historically subjected to random disturbance events at a variety of scales that resulted in a wide range of riparian stand conditions adjacent to aquatic areas at any given point in time.
- The combination of the landscape management strategies and the aquatic and riparian strategies will provide an array and frequency of riparian stand conditions across the landscape through time that provides for properly functioning conditions.
- In riparian areas where mature forest condition is the desired future condition, and young stands currently predominate, active management is more likely to restore properly functioning conditions in a timely manner than more passive approaches.
- Active management of stands in riparian areas will supplement natural elements, particularly large woody debris, that are lacking due to previous disturbance events, and/or management activities.
- Compliance with management standards for forest road design, construction, improvement and maintenance will minimize road-related landslides and sediment loading to streams.
- Application of the three level hazard and risk evaluation process described, will minimize the occurrence of management related landslides, and restore properly functioning conditions in relation to natural landslide events.

Forest Health Strategies

Forest Health Strategy 1

Actively manage the forest to maintain or improve forest health.

The most effective way to maintain or improve forest health is through active management of stands. Generally, management activities are intended to promote tree vigor, keep pest populations and damage within desired levels, encourage high biodiversity, and provide long-term productivity. Active management for forest health may include:

a. Maintain appropriate stocking levels through thinning.
b. Favor appropriate tree species.
c. Maintain or create desired stand structures.
d. Take advantage of natural influences of pathogens and insects on trees and stands to create desired conditions.
e. Maintain a diversity of tree species.
f. Take advantage of genetic variation within tree species.
g. Plant disease-resistant seedlings.
h. Plant seedlings that are well-suited to the site and avoid unnecessary planting stress.
i. Prevent buildups of pest populations through sanitation and salvage.
j. Maintain healthy riparian management areas.
k. Minimize injury to trees during stand management activities.
l. Avoid damage to soils.

Forest Health Strategy 2

Manage the forest to minimize unwanted fire.

Conduct silvicultural activities which would reduce fuel loading and improve forest health.

a. Monitor all fuels treatment areas for follow-up treatments.
b. Whenever possible, special forest products will be sold to maximize benefit prior to burning.
c. Where applicable, develop long-range periodic prescribed burn treatments.

d. Conduct prescribed fire operations on Southwest Oregon forest land.
e. Conduct mechanical operations on Southwest Oregon forest land.
f. Coordinate and cooperate with adjacent private and federal forest landowners to create fuel breaks and other fuels modifications.

Forest Health Strategy 3

Detect and monitor pest populations, damage levels, and trends.

A critical step in forest health management is to describe the extent, distribution, and severity of damage caused by major forest pests. Monitoring activities over time allow description of changes in forest condition and help evaluate the effectiveness of management. See the discussion of monitoring under “Adaptive Forest Resource Management” in Chapter 5. Several components of this strategy are listed below.

a. Aerial surveys
b. Ground surveys
c. Stand exams/resource inventories
d. Trapping
e. Geographic Information System (GIS)
f. Participation in the national Forest Health Monitoring Program

Forest Health Strategy 4

Use the integrated pest management (IPM) process to implement suppression or prevention actions when pest populations or damage exceed acceptable levels.

The Insect and Disease Control Law (ORS 527.310 to 527.370) states that the State Forester shall implement the Integrated Pest management process (described in ORS 634.122) on state forests. IPM is not a strategy per se, but a coordinated decision-making process that uses the most appropriate of all reasonably available means to minimize the impact of forest pests in an environmentally sound manner to meet site-specific management objectives. The steps in the IPM process are listed below.

- Define the management unit.
- Define the site-specific management objectives.
- Establish detection and monitoring systems for pests or damage.
- Evaluate pest conditions in the management unit.
- Establish pest population or damage thresholds, and take action only when exceeded.
- Develop potential strategies and evaluate them with the following criteria: Effectiveness, operational feasibility, cost-effectiveness, ecological soundness, environmental impact, management objectives for the site
- Implement the selected strategy.
- Monitor and evaluate results of the activity.
- Maintain current and accurate records.

- Structure the program so it can be adjusted to accommodate changes or varying situations.

Forest Health Strategy 5

Assess and manage forest genetic resources.

Reforestation projects on state forest lands will take advantage of the highest quality seed to assure that forest trees and forest stands are well-adapted to planting locations and are capable of growing vigorously with resilience to forest health threats. Local diversity can be maintained by storing local seed in the event of a catastrophic event. The Department of Forestry is also involved in genetic improvement efforts to improve levels of pest resistance.

Forest Health Strategy 6

Participate in research and cooperative programs that align with our management objectives, to improve our knowledge and actively enhance forest health and biodiversity.

Often forest health problems are best investigated through a structured and credible research effort. By cooperating in research projects, we can assure that results will be applicable to state forest lands. Some current examples include the Cooperative Tree Improvement programs, the Regional Forest Gene Conservation Program and local and regional management research projects such as research on blister rust-resistant seed stock.

Forest Health Strategy 7

Cooperate with other agencies and associations to prevent the introduction of non-native pests.

With the recent increase in international trade of wood and other products, there is increased potential for the introduction of exotic forest pests in northwest Oregon. The department supports regulatory and monitoring efforts coordinated by APHIS (USDA program, Animal and Plant Health Inspection Service) and the Oregon Department of Agriculture. If a new pest is introduced, we will participate in interagency eradication efforts if necessary.

Adaptive Management Measures for Forest Health Strategies

Key Working Hypothesis:

- A diverse array of forest conditions will enhance overall forest health and reduce the risks of catastrophic loss from insects and disease.

Key Assumptions/Questions to be Addressed through Monitoring:

- Implementation of the forest health strategies will keep the effects of pests and pathogens to acceptable levels, while recognizing that these levels will vary over time and space as objectives and constraints change.
- High biodiversity provides stability and resiliency to the forest, especially with regard to pests. Active management can promote tree vigor, encourage high biodiversity, and provide long-term productivity.
- Dense stands of single tree species provide conditions that favor rapid spread of root and foliage diseases and other pest-caused damage. Thinning of stands can promote vigorous growth, allows selection of tolerant or resistant species or genotypes, and limits spread of pests and pathogens.
- Thinning, selective harvesting, interplanting, and underplanting can increase the proportion of pest-tolerant or –resistant species in a stand.
- Different stand structures will influence occurrence and distribution of pests and pathogens. Active management will allow forest managers to take advantage of these natural processes.
- Planting seedlings that are well-adapted to the specific site are less susceptible to damage by pests and pathogens than are seedlings from an inappropriate seed source.
- Timely harvest of dead, dying, or diseased trees will reduce the spread of some pests and pathogens.
- Limiting mechanical injury to trees will minimize the occurrence of stem decay and other diseases.
- Limiting disturbance of soils during harvest will minimize stress of trees which, in turn, will minimize their susceptibility to pests and pathogens.
- Long-term monitoring of the extent, distribution, and severity of disease and pest damage will allow forest managers to evaluate the effectiveness of management and to determine necessary adjustments in management practices.

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 all 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.

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). Species of concern identified as part of this management plan are currently present or have the potential to be present on state forest lands. In some areas, there is little suitable habitat for these species available elsewhere on adjacent lands (i.e., federal lands), and in other cases there is substantial habitat on neighboring lands (i.e., federal lands in the Siskiyous and west of the Cascades).

As stated, this plan relies on integrated management strategies intended to maintain and enhance habitat for species of concern, as detailed in this chapter. These integrated strategies include:

Landscape Management Strategies

- **Structure-based Management**: Application of silvicultural tools to attain an array of forest stand structures across the landscape, in a functional arrangement, and produce structural components (e.g., canopy layering, understory development).
- **Snags, Green Trees, and Downed Wood**: Actively manage state forests retaining and developing structural components such as snags, green trees, and down wood as part of the landscape forest structure. This plan includes specific targets.
- **Landscape Design Principles**: Provide a functional arrangement of stand types considering characteristics such as patch size and distribution, fragmentation, corridors, and interior habitat.

Aquatic and Riparian Strategies

The plan relies on a functional approach to managing near aquatic and riparian resources. Goals for aquatic and riparian functions are dependant on stream classifications for fish streams and non-fish streams. Strategies include management of forest roads, steep slopes, and specific riparian management standards.

- **Stream Restoration**: Contributes to the timely recovery of desired aquatic conditions. Dependent on available resources, projects will be designed to create conditions and introduce materials sufficient to enhance or re-establish natural physical and biological processes.

Additional conservation tools will be implemented where determined necessary for species of concern, such as site protection. Management strategies will be implemented to address identified species of concern on a regional and district basis. This process will support district implementation planning.

Adaptive Management Measures for Species of Concern Strategies

Key Working Hypotheses:

- Identification and protection of key habitat areas for specific species will maintain existing populations as a source to colonize new habitat.
- Species will colonize new habitat as it develops over the longer term.

Key Assumptions/Questions to be Addressed through Monitoring:

- Landscape strategies provide additional habitat on the landscape for species of concern.
    - — Active silvicultural management can accelerate development of habitat suitability compared to passive management.
    - — There is a predictable relationship between stand structure and habitat requirements for species of concern.
- Landscape management and design strategies allow species that colonize new habitats to become firmly established and to occupy the new territories for long periods.
- Species of concern in newly developing habitats will successfully reproduce.
- Connectivity of habitats across the landscape is provided by the landscape strategies.
    - — Large, extensive areas of the landscape are not maintained in forest conditions that could be obstacles to species dispersal.
    - — Higher quality habitats are well-distributed across the landscape, including representation in areas otherwise dominated by lower-quality conditions.
- Management actions will not result in extirpation of species of concern in any portion of the planning area.

Strategies for Specific Resources

The rest of this chapter presents the management strategies for additional individual resources in the Southwest Oregon state forests. These strategies are designed to meet specific goals that the integrated strategies alone may not achieve. These specific actions will occur within the overall framework of the integrated strategies and fine-filter strategies.

Taken together, all the strategies presented in this chapter are the heart of the *Southwest Oregon State Forests Management Plan*. They are the specific actions that will be taken to achieve the plan's management goals and move toward the forest vision (Chapter 3).

Agricultural and Grazing Resources

Agriculture

1. **Agricultural uses will be considered on a case by case basis. Permits will be issued when these activities are compatible with other forest resources and activities.**

   Agricultural activities on state forests in Southwest Oregon have been insignificant in the past and are not expected to change in the future. If the demand for agricultural use should increase, the Department of Forestry will consider these activities to the extent that they are compatible with the other resource goals.

   Agricultural uses are permitted under ORS 530.050(4) and ORS 530.490(2). Board of Forestry policies allow for non-exclusive permits to be granted for special uses. Agriculture is considered a special use. Agricultural activities are only allowed within the scope of a special use permit. These permits allow the department to control the activity and protect other resources by the provisions used in the permit.

Grazing

1. **Grazing leases on Board of Forestry lands will be considered on a case by case basis and issued when they are compatible with managing for greatest permanent value of the lands and do not conflict with other resources.**

   Grazing activity has been insignificant in the Southwest Oregon state forests and is expected to remain so. Anyone requesting a grazing lease will be responsible for preparing a grazing management plan. This plan will address the following items.

   - Suitability and carrying capacity of the land for grazing.
   - How livestock will be kept out of areas where land use designations preclude grazing.
   - How grazing will be managed to protect or be compatible with timber production, cultural resources, fish and wildlife, soils, special forest products, and water resources.
   - How livestock will be prevented from trespassing onto adjacent lands.

Before the plan is approved, the Department of Forestry must determine that the plan adequately addresses all concerns and that the department's share of revenues generated under the plan will cover all costs of administering the plan.

2. **Grazing leases on Common School Forest Lands will be considered on a case by case basis and those leases will be issued by the Division of State Lands (DSL) when they are compatible with other resources.**

   The Department of Forestry and DSL have overlapping land management responsibilities on Common School Forest Lands with regards to grazing. The respective responsibilities of the two agencies are described in detail in a contract that was approved by the State Land Board (Oregon Division of State Lands and Oregon Department of Forestry 1993). Although DSL is assigned the authority and responsibility to manage grazing leases, the Department of Forestry is responsible for the overall management, control, and protection of Common School Forest Lands. The contract makes the Department of Forestry responsible for preparing long-range management plans that govern all forest resources, including grazing. The Department of Forestry will rely on DSL's expertise in grazing and will regard DSL's grazing management plans as extensions of the long-range plan. The Department of Forestry will actively review grazing plans but will rely on DSL to administer grazing leases on Common School Forest Lands. DSL's management of grazing must comply with the current administrative rules for rangeland management on Common School trust lands.

Air Quality

1. **To protect visibility in Class I wilderness and national park areas:**
   a. **Conduct prescribed burning outside the restricted July 1 to September 15 period.**
   b. **Advise the Department of Environmental Quality (DEQ) of any significant changes in prescribed burning that would cause emissions to exceed allowable increments over baseline levels, in accordance with the Prevention of Significant Deterioration Rule.**
   c. **As a long-term (15-year) effort to further remedy existing impairment and prevent future impairment, develop and implement best available technology (BAT) in cooperation with DEQ, federal landowners, and private landowners.**

2. **Comply with the Oregon Smoke Management Plan.**

   The resource description for air quality outlines the objectives of the Smoke Management Plan and lists procedures for conducting prescribed burning in southwestern Oregon. Because it is an element of DEQ's state implementation plan, the Smoke Management Plan contributes to meeting National Ambient Air Quality Standards. As a whole, it reduces emissions from prescribed burning in western Oregon, minimizes smoke intrusions into designated population areas, and supplements the Visibility Protection Plan for Class I wilderness areas and national parks.

3. **Continue to implement alternatives to prescribed burning, and use burning techniques that reduce smoke emissions.**

   Prescribed burning will remain a necessary tool in order to reduce fuel loads, prepare sites for reforestation, and provide certain types of wildlife habitat. During the past several years, smoke emissions from state forests have been reduced through the use of techniques described in the air quality resource description. New techniques may be developed as part of the "best available technology" initiative, discussed in strategy 1 above. Because circumstances vary in different locations, smoke-reduction techniques must be prescribed on a site-specific basis. Some techniques, such as small wood utilization, may be driven by market conditions.

Cultural Resources

The cultural resource strategies recognize that historic sites, relics, and structures are a public resource and provide important clues to the historic use of state forest lands. Forest management activities such as timber harvest, road construction, and recreation site development can irreversibly destroy the integrity of historic sites. A cultural resource management program for Southwest Oregon state forests will be applied to meet both legal protection mandates and internal protection priorities.

1. **Complete an inventory and assessment of cultural resource sites and conduct a prehistoric and historic cultural resource review.**

   In order to effectively manage cultural resources, an inventory of sites must be available to district staff. Cultural resource sites may range from sites with legally mandated protection to sites with little or no significance. Each site identified will be assessed and rated for its legal or nonlegal protection status. The Department of Forestry will rate sites for significance using the following categories:

   - Mandated Protection (Class I)
   - Internal Protection (Class II)
   - No Protection (Class III)

   Table 4-3 on pages 4-87 and 4-88 describes the categories of site significance, the criteria used to designate sites, and the relative management objectives for each site category. The tools and guidelines needed by managers will be developed for use at the district level, with coordination from area staff and specialists.

   A prehistoric and historic cultural overview is a professional-level review, including extrapolation and interpretation of existing literature and information specific to Southwest Oregon state forests. Such an overview provides the understanding and context for making cultural resource and other resource management decisions. The State Historic Preservation Office (SHPO) will provide guidance to the Department of Forestry in determining the elements to include in an overview. The overview would be accomplished through a professional services contract.

2. **Develop a cultural resource database for tracking and planning purposes, including a system of recording, filing, and retrieving cultural resource site data from GIS overlays and basin level inventories.**

   As the Department of Forestry moves toward a GIS-based information and inventory system, existing cultural resource databases will be incorporated and more easily available to staff planning long and short-term management actions. Making cultural resource data easily accessible will greatly aid in protecting cultural sites and meeting long-range plan goals. Some work has already been done to prepare a database for conversion to GIS compatible files, but this work is incomplete and will need to be reviewed and refined.

3. **Develop a procedure for integrating site protection into forest activity plans by providing practical guidelines for recognizing, assessing, recording, and protecting sites.**

   As the cultural resources management program is being developed, new or known sites will be encountered by Department of Forestry field staff in carrying out management plans and activities. A system will be developed to provide guidance in recognizing, recording, and protecting sites in the short term, as well as after strategy 1 is implemented. This system will identify procedures best carried out at the intermediate planning level (management basin) and at the annual planning level (activity area or site).

   Much of the work necessary to accomplish the cultural resource strategies has already occurred through comprehensive recreation planning efforts or is underway in existing planning efforts. It is anticipated that the remaining work called for by these strategies will be completed during the initial 10-year implementation period.

Table 4-3. Cultural Resource Classes and Objectives

ODF Class	Site Protection Categories	Site Criteria and SHPO Site Examples	Management Objectives
I **Mandated Protection**	**A. Pre-Historic Archaeological Site:** Created/used before Euro-American inhabitancy.	• The site has a record of creation/use by an indigenous culture (OAR 736-51). • Sites may include lithic quarries, lithic scatters, camps, villages, burials and sites of objects such as symbols, tools and facilities.	• Management activity excluded to protect sites from any excavation, alteration, disturbance or removal of remains. • If disturbance is necessary and detrimental to structure/site integrity, then a SHPO Archaeological Permit is required if any excavation, alteration, disturbance or removal of remains in the immediate area. Permits to be reviewed by qualified archaeologist. • Extend Level 1 objectives and consideration to sites that are soon to qualify for higher levels of significance (sites within 5 years of age minimum).
	B. Historic Archaeological Site: Created/used by humans after Euro-American inhabitancy.	• The site has a record of creation/ use by recent post-European culture (proof of existence, not remains). • At least 75 years old, and consider 45 year old sites in planning horizon. • Sites may include shipwrecks, homesteads, camps, towns, monuments, tools, facilities, grave sites and cemeteries.	• Same as above.
	C. Historic Sites: Created/used by humans after Euro-American inhabitancy.	• Aboveground structural remains or work of a master. • At least 50 years old, and consider 45 year old sites in planning horizon. • Sites include bridges, tunnels, trestles, rockwork, roads and trails that usually have structural or marked remains.	• Same as above, except that: SHPO Archaeological Permit not required (may be exemption).

Table 4-3 continued. Cultural Resource Classes and Objectives

ODF Class	Site Protection Categories	Site Criteria and SHPO Site Examples	Management Objectives
II Internal Protection	**B. Historic Archaeological Sites:** --------------------- **C. Historic Sites:**	• Less than 75 years old • Valuable for public use and education -- • Less than 50 years old • Valuable for public use and education Examples: railroad grades, camp sites, lookout remains, sites related to ODF history (tree genetic trials, guard stations).	• Give highest protection to sites close in age to Level 1 significance. • Protect the site from disturbance where possible, survey, remove, and catalog site/relics if destruction unavoidable. • No legal requirements, except complete protection of grave sites and any work of a master.
III No Protection	**B. Historic Archaeological Sites:** **C. Historic Sites:**	• Less than 75 years old • Not valuable for public use value	No special management action required. Before disturbance gather information on the site, record in CR inventory, and map. Remove relics, label, and store for Interp/Ed programs or archival use.

Energy and Minerals

1. **Survey, evaluate, and identify aggregate rock sources important for the long-term management needs of Southwest Oregon state forests.**

   The amount and quality of rock sources on state forest land is limited and needs to be reserved for future forest management needs. For the long-term management of the aggregate rock resource, there needs to be a higher level of certainty about the amount and kind of rock potentially available. Good quality information has been developed for most of the larger important state forest rock quarries. However, we need to develop the same level of information for known high potential sites, other smaller sites, and for sites discovered through future surveys.

   The district will evaluate its need to update existing rock source plans and, if necessary, identify additional aggregate rock sources on state forest land using existing information from the Department of Forestry or other sources. In addition, staff should examine the short and long-term availability of commercial sources, other private landowner sources, and other governmental agency sources. Development opportunities on non-state owned sites could be established through use of mutually beneficial cooperative agreements.

   The assessment for each state forest rock source should include information about the potential amount and extent of rock, the quality or type of rock, quarry development constraints (access, amount of surface disturbance, amount of overburden and placement, etc.), initial development plans, and maintenance or reclamation plans.

2. **Review and update Division of State Lands (DSL) and Oregon Department of Forestry (ODF) roles, responsibilities, and procedures dealing with mineral and energy resource assessment and prospecting and mining permit applications involving state forest land.**

   It will be necessary to review and update joint DSL/ODF roles, responsibilities, and procedures to ensure they are fully aligned with all the resource goals and strategies addressed in this plan. The review could cover a broad array of issues, but would include the items on the next page.

- Board of Forestry and Common School Fund management mandates and guidelines.
- Procedures and responsibilities for reviewing permit requests, setting royalty rates, resolving resource conflicts, and developing reclamation strategies.
- Administration of issued permits.
- Energy and mineral resource assessment and data sharing opportunities with the Division of State Land and Department of Gas and Mineral Industries.
- Update of the existing DSL/ODF Rock and Mineral Sales Interagency Agreement (“Interagency Agreement”).

Land Base and Access

Land Base

1. **Minimize the amount of forest land used for roads, road corridor clearings, landings, and mineral extractions by ensuring that construction and development specifications are designed to efficiently meet management activity objectives.**

   This strategy addresses land base goal 1 by minimizing the amount of forest land used for management infrastructures and other resource developments. Roads, landings, rock quarries, or other developments are necessary to manage forests effectively. However, planners must ensure that each proposed development is necessary, designed to appropriate specifications, and uses no more forest land than necessary. Planners should develop and analyze an array of alternatives, and choose specifications that accurately reflect management objectives and site-specific constraints.

2. **Follow the procedures in ORS 197.180 and OAR 660-30, 660-31, and the Department's State Agency Coordination Program, OAR 629-20, to assure that land use programs and activities are consistent with Statewide Land Use Planning Goals and are compatible with acknowledged county comprehensive plans and land use regulations.**

   All state agencies must comply with the Statewide Planning Goals, by assuring that land uses are compatible with acknowledged local government comprehensive plans and land use regulations. The Department of Forestry's State Agency Coordination Program and OAR 629-20 describe the procedures to be followed. Counties and cities with state forest land within their boundaries have reviewed and commented on the compatibility of the *Southwest Oregon State Forests Management Plan* with their comprehensive land use plans.

   The procedures in OAR 629-20 will also be followed in order to ensure that other levels of forest planning are compatible with acknowledged city and county plans and land use regulations. Other levels of forest planning include management basin plans, annual operation plans, transportation plans, and land acquisitions through sale or exchange.

3. **Continue with an active land exchange and acquisition program where there are favorable consolidation opportunities.**

   The Department of Forestry will actively pursue beneficial land acquisition and exchange opportunities as a means to increase management efficiency and economic values, and to enhance forest stewardship and other forest resource values. This will be carried out in accordance with Board of Forestry policy and administrative rules.

   Southwest Oregon District has an existing land acquisition and exchange plan that identifies potential consolidation and divestment opportunities. In carrying out this strategy, the district will review and update acquisition and exchange opportunities, establish priorities, and implement specific transactions by following procedures and reviews as outlined in Board of Forestry policy and rules.

4. **Develop and implement a land survey plan in order to establish and/or reestablish state forest boundaries necessary to meet management activity needs.**

   Established property corners and posted property lines are an essential part of the forest infrastructure. They help to identify land ownership and confirm locations of management activities, which in turn helps to achieve efficient conservation of state forest land (land base goal 1). Many property corners and lines for state forest land have already been established as part of the required work for past timber sales and other stand management activities. However, a significant number of property corners and lines must still be established and posted to meet broader resource management and public access needs, as well as future timber harvest needs. The establishment of property corners and lines will also aid in the development of accurate GIS land ownership overlays.

   The district will determine the total survey workload remaining, set survey priorities in relation to planned forest management activities, and develop a survey project proposal.

Access

1. **Develop a database and GIS overlay of the road and trail network, to use for planning and tracking purposes.**

   Many management activity plans are dependent on or affected by roads, including timber and special forest product sales, road improvement and maintenance plans, fire suppression access, fish and wildlife habitat issues, public access, and recreation management. It is important to have accurate information about existing and planned road and trail networks, in order to meet access system and resource management needs. The conversion of this information into a GIS overlay will help planners to use it most efficiently.

2. **Construct, improve, and maintain road and trail systems using engineering design, construction techniques, and maintenance programs consistent with the type and level of use, level of difficulty and hazard, amount of resource risk, and the minimum standards set by the Forest Practices Act.**

   It is essential to provide forest access for fire protection, management activities, and public use. To minimize potential impacts from forest roads and trails, the district will use a variety of techniques to match its specific access needs.

   Road and trail system management will be accomplished in accordance with the processes and standards described in the State Forests Program *Forest Roads Manual* and in the *Draft Recreation Design Standards and Management Guidelines* (Oregon Department of Forestry 1999).

3. **Consult and coordinate with adjacent landowners concerning possible road sharing opportunities to avoid unnecessary duplication of road systems.**

   Avoiding duplication of road systems will help to achieve access goal 2. The district will continue to consider using adjacent landowner roads that logically provide better access for management activities. Road use with other landowners will be reciprocated on equal terms, where this exchange is appropriate and would reduce the overall road density on the landscape.

Plants

The integrated forest management strategies will provide the foundation for protecting biodiversity, and will meet the habitat needs of most plant species native to the Southwest Oregon state forests. The following strategies apply to all Southwest Oregon state forests.

1. **Maintain a variety of seral stages, stand structures, and stand sizes across the landscape by implementing the integrated forest management strategies. These include the landscape management, aquatic and riparian, and forest health strategies.**

   The goal of “providing habitats that contribute to maintaining or enhancing native plant populations at self-sustaining levels” is achieved through the general biodiversity approach that is implemented through the integrated forest management strategies. The overall result of this strategy will be a diversity of native plant communities across the landscape.

2. **Protect riparian vegetation during forest operations by applying aquatic and riparian strategies.**

   Plants that grow in riparian areas have important roles in wildlife habitat, hydrology, and nutrient cycling, and riparian features such as trees and understory vegetation are protected in order to maintain the biological and hydrologic functions of these areas.

3. **Protect endangered, threatened, candidate, and rare plants as identified by the Oregon Natural Heritage Program by following procedures for complying with state and federal Endangered Species Acts for plants.**

   Special procedures were developed to manage individual species and habitats whose needs are not adequately addressed through the general strategies for plants. These procedures specifically address plants that are classified as endangered, threatened, candidate, and rare (i.e., identified by the Oregon Natural Heritage Program as species of concern). The procedures for endangered, threatened, and candidate plants are found in the document, *ODF State Lands Program — Procedure for Complying with Federal and State ESAs for Plants* (Oregon Department of Forestry). The procedure for rare plants will be the same as for candidates.

4. **Contribute to statewide efforts to reduce the quantity and range of invasive, non-native plant species.**

The Department will apply integrated pest management principle to address incidences of invasive, non-native plants on state forest land, and will cooperate with other agencies and landowners in cooperative efforts to address such problems. The Department will take steps to assure that management activities are not contributing to existing or new invasions of non-native plant species. This will include vegetation management efforts to control such species on state forest land, and the use of native plant species in re-seeding projects on state forest lands.

Recreation

State forest lands in southwest Oregon have light recreational use. The strategies for the entire planning area address the broader needs of all Southwest Oregon state forests.

1. **As time and resources are available, develop recreational opportunities on state forest lands, emphasizing dispersed recreation.**
2. **Manage recreational use of the forests to minimize adverse impacts to other resources and adjacent ownerships, and to minimize conflicts among user groups.**
3. **Look for opportunities for informing the public about the management of state forest land**.
4. **Pursue cooperative agreements with user groups, and other agencies and organizations, to diversify the funding for recreation management projects and programs.**

Scenic Resources

The scenic resource strategies recognize that landscape aesthetics are a public resource, and forest management activities such as timber harvest and road construction can greatly affect the visual quality of the landscape.

The visual management program for Southwest Oregon state forests will be applied at both the landscape and stand level. The program will be compatible with other resource goals and values. The silvicultural practices used in implementing structure-based management will provide the necessary tools to effectively apply landscape design principles.

1. **Identify and classify areas for level of visual sensitivity in accordance with the Land Management Classification System described in Oregon administrative rule. Conduct management activities consistent with the requirements of the administrative rule.**

   Areas will be identified which are highly sensitive to visual impacts from management activities. These will be areas adjacent to or seen from major highway corridors designated as visually sensitive by the Oregon Forest Practices Act; those areas with established, high public use vistas, viewpoints and significant natural features; areas directly adjacent to campgrounds; and lands highly visible from urban centers.

   By applying visual landscape analysis and design principles, timber harvest can occur in most of these areas and meet administrative rule requirements. A full array of silvicultural treatments, harvest methods, and logging systems would be considered for use when planning operations. These methods include various degrees, combinations and shapes of clearcutting, patch cuts, commercial thinnings, and partial cuts.

   Some highly sensitive areas, in which timber harvest would significantly impact visual quality, will be classified so that the growing and harvesting of trees and other incompatible resource uses will be secondary to the visual values. Any timber harvest that may occur in theses areas would be for salvage, stand health, or scenic enhancements.

   Visual sensitivity level is an indicator of public and Department of Forestry concern for visual impacts on the landscape resulting from a forest management activity. An area’s degree of visual sensitivity will be determined by assessing the relative importance of a number of factors, including the factors listed below.

Viewer Factors:

- Number of viewers
- Viewer perception
- Viewing distance and duration
- Viewing angle and position

Physical Factors:

- Cultural modifications: logging patterns, powerlines, roads, structures
- Landform: diversity of form and line; outstanding features (exposed peaks and ridges)
- Vegetation: diversity of pattern and color; natural openings; continuity
- Water: land/water interface, waterfalls, lakes, significant streams
- Uniqueness: scarcity of form or feature

2. **Identify other areas of visual sensitivity according to criteria for moderate and low sensitivity levels. Conduct management activities consistent with visual management objectives identified for moderate and low sensitivity levels.**

   Table 4-4 on the next page shows the overall visual management program that will be applied on Southwest Oregon state forest lands, including the high visual sensitivity areas that the Land Management Classification System addresses. Visual management objectives are set and applied based on the level of an area's visual sensitivity. The moderate and low sensitivity level areas will be determined through an inventory and assessment process using criteria listed above and in the table. Once visual sensitivity levels have been established, visual management objectives will be applied that give direction to visual landscape design and planning of forest operations.

3. **Develop a visual resource management handbook and training manual for use by managers to help them effectively incorporate landscape design concepts into management basin plans, annual plans, and operations.**

   The visual resource management system described in these strategies is different from the system currently used by the Department of Forestry. In order to effectively implement such a visual management system, managers will need training and supporting tools, such as a visual management handbook and landscape design computer software. These tools could be acquired by contracting with a landscape design company to develop a comprehensive training package tailored to the Department of Forestry's needs. The package would include a training course, training manual, and management handbook. The Department of Forestry can use as a model training courses and manuals that have been developed for various forest management agencies and private company landowners.

   Much of the work necessary to accomplish the scenic resource strategies has already occurred through comprehensive recreation planning efforts and through land management classification. It is anticipated that the remaining work called for by these strategies will be completed during the initial 10-year implementation period.

Table 4-4. Scenic Classifications and Management Objectives

Visual Classification	Vantage Point	Land Management Classification System Criteria and Visual Objectives
Level 1 **High Sensitivity (as designated by the Land Management Classification System)**	• Highway corridors designated as visually sensitive by the Forest Practices Act • Established high use vistas, viewpoints, and natural features • Designated campgrounds • Urban views	**Landscape Perspective:** Management activity is not highly evident and closely fits character of the landscape. Partial cut, patch cut, and thinning harvest methods are preferred. Visual objectives have high priority in balancing resource considerations. **Stand Perspective:** Management activity is apparent. Clearcuts are screened by various types of visual buffers; exposed areas have clean, orderly, managed appearance. Example techniques: low cut stumps, small amount of residual slash, seeded road cuts & fills; precommercial thinning, pruning, and signs may be evident.
Level 2 **Moderate Sensitivity**	• Secondary highway corridors • High public use forest roads • Low use vistas, viewpoints, and natural features • Trails and trailheads • Designated camping areas • Rural communities	**Landscape Perspective:** Management activity may dominate but fits landscape line, form, and texture. Visual management techniques are fully considered but must be compatible with meeting harvest plans, operational needs, and other resource priorities. **Stand Perspective:** Management activity dominates but has orderly, managed appearance. Example techniques: low stumps, moderate amount slash residual, precommercial thinning may be evident.
Level 3 **Low Sensitivity**	• Low public use or low visibility areas	**Landscape Perspective:** Management activity dominates and landscape characteristics are considered only when compatible with operational and other resource needs and priorities. **Stand Perspective:** Activity dominates. Residual affects from harvest, road, or other management activities do not need to be addressed for visual management considerations.

Soils

The integrated management strategies provide an overall framework for maintaining long-term soil productivity as well as other resource values. The additional strategies below describe some specific ways that soils will be protected during forest management activities.

1. **Comply with all Oregon Forest Practices Act requirements for soil protection.**

   OAR 629-24-422 has general provisions for protecting forest soils during forest operations; for example, adapting the logging method and type of equipment to the given slope, landscape, and soil properties in order to minimize soil deterioration. The water protection rules (OAR 629, Division 635 through 660) protect long-term soil productivity and hydrologic functions within riparian management areas and wetlands.

   Specific actions that implement this strategy are detailed in presale plan reports and in written plans (as required) for riparian management areas. Timber sale operators must comply with the administrative rules and sale contract provisions that address the protection of soils during harvesting operations. The next strategy, geotechnical assistance, further ensures that soils will be protected in the planning, design, and layout of roads and harvest units.

2. **Minimize management-induced slope soil movements by obtaining timely geotechnical input.**

   Timber sale planners should use input from geotechnical specialists in designing roads and harvest units. This input is based on interpretive geology and the use of soil and rock mechanics in slope stability analysis. It provides a rationale for risk assessment and mitigation in forest land management decisions. Geotechnical models developed by engineering geologists are the best available tools for predicting the likelihood of inducing slope movements through land management activities. The use of geotechnical analysis in management decisions makes it possible to minimize the number or magnitude of management activity-induced soil movements, and to protect other resources.

   This strategy will be achieved through application of the processes and standards for hazard and risk assessment, and geotechnical specialist input as described in Aquatic and Riparian Strategy 6 — Slope Stability Management.

3. Maintain quantities of organic material in the soil (duff and litter).

a. Conduct prescribed burns under conditions that minimize the impact to soil organic materials. For example, take into consideration the amount and distribution of fuels, fuel moisture, weather conditions, and topography.

b. During timber harvest, use logging systems that minimize disturbance to the existing duff, litter, and woody debris, except where disturbance is desirable to facilitate regeneration. To the greatest extent practicable, retain logging residue (limbs, tops, cull logs, etc.) while not creating an unacceptable fire hazard.

This strategy recognizes the importance of maintaining duff and litter as part of the soil. Organic materials increase soil fertility, retain moisture, slow water runoff, prevent erosion, and add to long-term soil productivity. Limbs, cull logs, and duff also contribute to biodiversity by providing habitat for many species of small animals.

Special Forest Products

The following strategies have been developed to fulfill the vision that special forest products will be managed as a viable commodity program. These strategies will enable the special forest products program to provide benefits for local communities and the special forest products industry and to become more profitable over time. In recognition of the developmental nature of this program, the strategies will be implemented based on individual district need and in phases that will allow for adjustments to be made as experience is gained. A commitment of resources, especially additional human resources, may be needed in order to conduct the program in a businesslike manner. The special forest products program will build on business practices that are already in place, such as the procedures for competitive bidding and negotiated sales. Business elements that are missing or in need of modification will be developed and brought up to date.

The Department of Forestry believes that these strategies will enhance the overall efficiency of the State Lands Program. In addition, Oregon's Economic Development Department has an interest in helping this segment of the state's economy to grow. The Department of Forestry's link to this effort will be to provide a reliable source of raw materials for commercial and personal use.

1. **Where special forest products are an active resource, develop inventories for specific, high demand products.**

   a. **Identify the major products that will be emphasized (for example, moss, salal, boughs, mushrooms, beargrass) as well as the other incidental products that may be requested.**

   b. **For the major and incidental products, delineate logical sale units and personal use areas that can be made available throughout the district over time.**

   These logical units could be based on an inventory as well as operational considerations. The objective will be to market products through identified sale units, and to minimize costs associated with walk-in requests for permits.

   c. **Develop a harvesting schedule based on the productivity of special forest products for both commercial harvesting and personal use.**

   Like agricultural products, some special forest products can be cultured to enhance both quality and quantity. Harvest scheduling will be based on the products' productivity using the best available information on growth, culturing, and harvest. The actual sale offerings may be affected by operational considerations, other public use, and district resources available for sale administration.

2. **Develop the following resources to assist with special forest product management.**

   a. **Develop a manual to guide special forest product sales.**

   The manual will contain all of the guidance needed to offer sales and personal use permits. Examples are: procedures for competitive bidding or negotiated sales, contractual considerations, pricing guidelines, and accountability guidelines. Along with the manual, a state-wide pricing list would be developed and updated annually for all known special forest products. In addition, information will be provided about each product, such as how it is harvested, processed, and marketed; what characteristics determine product quality; the harvesting season; how long between harvests; cultural requirements; proper harvesting methods; sustainability of the resource. The manual will assist foresters in deciding how to offer sales, write contracts, and administer the sales. It will assist them in handling requests for products that are not routinely requested.

   b. **Develop a standardized accountability process (load tickets, etc.).**

   A load accountability system will be developed that ties purchasers with each load of material sold from state forest lands. Currently there is no way of identifying products that are removed from state forest lands. This system will identify each load of products removed from state forest lands and make it easier for law enforcement to identify legal removal. This system would standardize our business practices while providing for local administration.

   c. **Review and revise, as needed, the Department of Forestry's directives that pertain to special forest products.**

   The Department of Forestry sets forth its operational procedures and business practices in a series of directives. For the most part, special forest products can be handled under the existing directives. However, some of the directives were written with timber in mind, and do not sufficiently cover special forest products.

   d. **Coordinate and disseminate special forest product information between districts, and communicate about special forest product activities with adjacent landowners.**

   The Department of Forestry needs a focal point for information to be received and disseminated to the districts. Information sharing about new products, harvest techniques, ongoing research, and enforcement concerns is useful and needs to be reviewed and made available to the districts. Information can be gained and shared through association with the Western Oregon Special Forest Products Committee, U.S. Forest Service, Bureau of Land Management, and other agencies. Also, communications with adjacent landowners will minimize user conflicts. Special attention should be given to intermixed land ownerships or differences in operating procedures that could lead to conflicts.

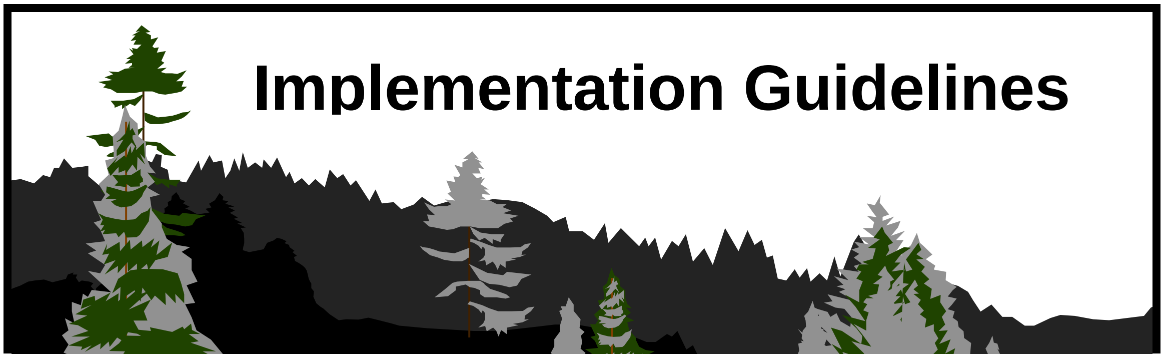
Chapter 5

Implementation

This chapter describes guidance and standards for processes and activities that will be undertaken to implement the strategies described in this forest management plan. This includes guidelines for implementation planning, guidelines for asset management, processes for monitoring and adaptive management, and opportunities for ongoing public involvement in plan implementation.

The main headings in Chapter 5 are:

Implementation Guidelines



Responsibilities

The district forester is responsible for implementing all aspects of the *Southwest Oregon State Forest Management Plan*. The key areas include the management strategies for all resources, district monitoring projects, and district public involvement processes.

In Salem, the State Forests Division staff, including administrators and technical specialists, are responsible for providing guidance and direction on statewide division issues. They also may have specific responsibilities as identified in the forest management plan.

State Forests Management Division and Southern Oregon Area staff specialists, including geotechnical specialists and wildlife biologists, are responsible for providing technical assistance to district and other state forests personnel in the development of implementation plans, operations plans, and monitoring plans. They are also responsible for providing technical assistance to district and other state forests personnel for field reviews, and for both landscape-wide and site-specific recommendations on specific management activities. They may also have specific responsibilities for monitoring and research projects.

Plan Scope

This plan supersedes the *Long Range Timber Management Plan for the Southern Oregon Region State Forests* (Oregon Department of Forestry 1987).

Plan Duration

This plan will be in effect until it is replaced by a new plan. OAR 629-035-0030 requires that the Board of Forestry review the plan at least every ten years.

There are several reasons why it is anticipated that the plan will endure for a decade or even longer. First, the *Southwest Oregon State Forest Management Plan* is a goal-driven plan. The plan strategies will be most successful in achieving the goals if they are applied over the long term, in an adaptive management context. Second, the strategies give field managers substantial flexibility in using existing or new approaches to meet the goals. Monitoring and adaptive management information will be used to incorporate changes necessary to successfully implement the strategies. Third, the Board of Forestry and the public will have access to periodic updates through monitoring reports and implementation plans that will describe how the plan is being applied and provide insight into how well the goals are being achieved. These updates will be a primary mechanism for the Board to determine if there are portions of the plan that should be amended or if development of a new plan is necessary.

Forest Management Plan Amendments

Monitoring and adaptive management are cornerstones of this plan. Therefore, amendments to the *Southwest Oregon State Forest Management Plan* may be necessary. The state forester may make amendments to the plan when such changes do not alter the goals of the forest management plan, the likelihood of attaining those goals, or the broad approach described in a strategy. Some examples of appropriate amendments could include:

- Changes to fine-tune the desired future condition array for stand types, targeted retention levels for snags, down wood, etc. Such changes should be based on monitoring data or research information.
- Changes to strategies that call for doing surveys or developing databases, or other such tasks that may become unnecessary.

Changes such as these would then be incorporated in an administrative rule on the next review of the forest management plan.

Amendments that substantively change a basic approach or strategy can only be implemented through the administrative rule process. One example of a substantive change in a strategy would be proposed elimination of one of the forest stand types in the desired future condition array. Any proposals for substantive changes would have to be approved by the Board of Forestry and taken through the administrative rule process before implementation could occur.

Implementation Levels

Funding for plan implementation will vary based upon cyclical economic trends. All resource management in the plan is funded through revenues produced from the state forests. Over the long term, it is likely that revenues will support the management activities necessary to meet the forest management plan goals. However, there may be periods of time where revenues limit funding. For this reason, the following priorities are established for conducting activities:

1. Legally or contractually required activities.
2. Minimum activities necessary to achieve the social, economic, and environmental benefits identified in OAR 629-035-0020 including high priority monitoring activities, while emphasizing activities with higher economic return.
3. Fully implement all strategies and monitoring plans.

Implementation plans and operations plans will identify the planned activities that will be pursued within given time periods based on the anticipated funding levels.

District Implementation Plans

As described in Landscape Management Strategy 4 (pages 4-53 – 4-54), a district implementation plan will describe the management approaches and activities the district will pursue in order to carry out the *Southwest Oregon State Forest Management Plan* (FMP). The district implementation plan will include information that describes:

- The current condition of stand types and their distribution on the district.
- The desired future condition array for each management basin in the district.
- How the landscape design guidelines were used to arrange the desired future condition array across the district landscape.
- The projected timeline for reaching the desired future condition.
- The extent and location of special habitat areas for species of concern, if determined they are needed.
- Proposed management activities for the ten-year period that will be necessary to move towards the desired future condition.
- The location and extent of specific areas where less active management or no management is proposed for the ten-year period.
- The land management classifications that have been applied in accordance with OAR 629-035-0050 to 629-035-0060 to reflect the management strategies of the FMP.
- The management activity levels, outputs and achievements anticipated for the ten-year period.

Prior to adoption of the forest management plan, a draft implementation plan will be developed by the district. The implementation plan will provide reviewers with the necessary information (as described above) to evaluate the draft plan and guide management for the first decade of implementation. The information in the implementation plan will be improved and refined during the first few years of implementation. Watershed assessment and forest inventory projects will generate additional valuable information during this time period. As new information becomes available, the district will incorporate it into its implementation planning framework and develop a revised implementation plan that will then be available for public review.

Concurrent with development of the implementation plan, the district will apply the land management classification system in a manner that is consistent with the goals of this forest management plan.

The initial district implementation plan and the associated land management classifications will be available for public review and comment for a 90-day period prior to consideration for approval by the State Forester. Implementation plans that undergo major revisions will be available for public review and comment for a 30-day period prior to consideration for approval by the State Forester. The following circumstances will be considered major revisions:

- Revisions that propose changes to the annual harvest level ranges of more than 25% (based on combined acreage of regeneration and partial harvests).

Additional details on the public involvement process can be found later in this chapter.

Annual Operations Plans

Annual operations plans will describe the actual projects the district will pursue to implement the forest management plan for a fiscal year. These plans must be consistent with the longer-term implementation plans. Resource specialists, from both the Oregon Department of Forestry and the Oregon Department of Fish and Wildlife, will have an opportunity to provide input on the plans.

The operations plans must be submitted to the district forester for approval. The district forester must consider any written comments from resource specialists and the public before approving or denying approval of an operations plan. Once the operations plan is approved, it may be implemented.

Team Concept in Implementation

The forest is a diverse and complex weave of resources. This forest management plan has been developed by engaging and using effectively teams of resource specialists, field foresters and managers, academics and researchers, and various interests that use or benefit from the forest. Participants have come from local, state and federal government; universities; various interest groups; and the general public.

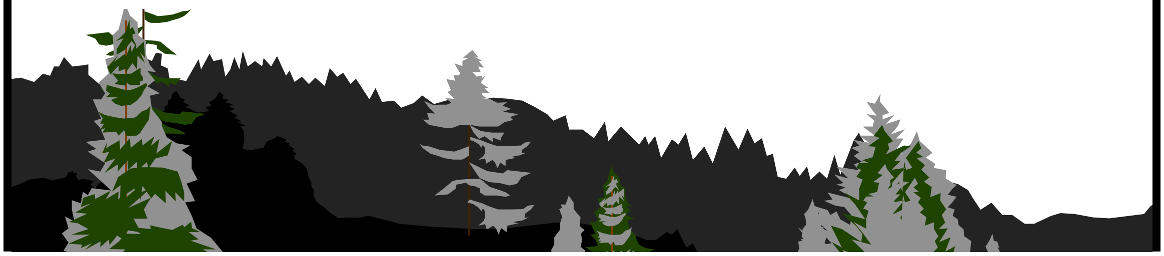
Implementation of the forest management plan is an exciting *beginning* on the road to realize the benefits that will flow from the many new and innovative ideas.

This forest management plan calls for the continued use of a number of teams formed for a variety of purposes. Listed below are a few examples of the people it will take to make the plan a success in the long term.

- Teams of field foresters and biologists developing landscape plans and site-specific prescriptions.
- Watershed assessment teams with various technical specialists.
- Monitoring teams of resource specialists, foresters, resource interests, and the general public.

Not all decisions require the use of a team. But when evaluating approaches or complex resource relationships, a well-directed team is a powerhouse of talent and knowledge. Successful implementation will demand a strong commitment to the ideas in the plan, by the same broad cross-section of resource specialists, managers, researchers, and resource interests that helped build the plan.

Asset Management Guidelines



The Southwest Oregon state forests are a tangible asset of the people of Oregon, and of the counties and local taxing districts where the forests are located. These forests and their rich resources provide both an ecological and economic foundation for local communities and the southwestern Oregon region. The forests must be managed to ensure that healthy, productive, and sustainable forest ecosystems continue to provide social, economic, and environmental benefits to the people of Oregon, into the future.

Description of Key Forest Assets

Timber

The timber stands on the southwest Oregon state forests are an asset to the counties and local taxing districts, and to the Common School Fund. Administrative rules require that these lands be managed in an environmentally sound manner to provide sustainable timber harvest and revenues to these government entities. Prudent and careful management of the timber resource is an important theme in all planning for and management of these forests.

Management of the timber asset includes investment of time, dollars, and resources to realize the forest’s ability to generate sustainable timber harvest and revenue over the long term. Investments include direct expenses in young stand management activities such as precommercial thinning and fertilization; and in forest infrastructure, such as roads and bridges. There are also indirect expenses for overall planning and long-term management, such as forest inventory and GIS systems, research projects, and monitoring projects.

The timber resources are renewable and sustainable, and therefore the forest’s revenue-generating potential is very long-term.

Fish and Wildlife

The southwest Oregon state forests provide habitat for many species of native wildlife. In this role they have both direct and indirect social, cultural, and economic benefits for local communities and for the citizens of Oregon. Populations of several big game species (deer, elk, and bear) support a recreational hunting industry with local and regional economic benefits. To manage this asset, it is important to maintain forest conditions that provide habitats that support harvestable levels of game species.

Populations of trout, salmon, and steelhead are another key asset and support a large recreational fishing industry with significant economic and social benefits. To maintain this asset, it is critical to make investments that will maintain or restore properly functioning aquatic habitats. Investments in this area also contribute to improved availability of these same species to support commercial fishing interests offshore.

A variety of other wildlife species have value for non-consumptive uses such as wildlife viewing. As such, there is a tangible asset value in maintaining diverse habitats that contribute to sustainable population levels for these species.

Water Resources

The waters that flow from the state forest lands are another major asset to local communities. In order to maintain the asset value of the water resources, it is key to protect and maintain high levels of water quality.

Guidelines for Asset Management

Maintaining and/or enhancing the value of the assets described in this plan is fundamental to maintaining the ability of these forest lands to provide for sustainable timber and revenue, and to produce the other resource values described in administrative rule. The asset management guidelines that follow derive from language in state law, Board of Forestry policy, and Department of Forestry policy. Implementation of this forest management plan will be consistent with these guidelines to assure that the asset value of these forests is maintained or enhanced through plan implementation.

- Conserve forest lands by maintaining the state forest land base.

- Maintain a land exchange and acquisition program that actively pursues acquisitions and exchanges as a means to consolidate state forest lands for management efficiencies, economic values, or enhanced stewardship practices.

- Actively manage in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts.

- Maintain a budgeting and financial management system that assures that revenues derived from these state forest lands are sufficient to cover the department's costs of implementing this plan.

- Prioritize and undertake investments in stand management activities such as precommercial thinning and fertilization that are designed to increase timber quality and/or quantity.

- Maintain key investments in development and protection of forest infrastructure, such as roads, bridges and recreational trails and facilities.

- Maintain key investments in information systems such as forest inventory and GIS systems to support overall plan implementation and to contribute to assessing the value of assets over time.

- Prioritize and undertake investments in research and monitoring projects to ensure the success of adaptive forest resources management under this plan.

- Develop strategic plans for addressing identified critical forest health issues so as to minimize the effect of insect and disease on the timber asset.

- Implement marketing strategies designed to maximize the value received for products sold from state forest lands.

- Implement timber accountability strategies and systems designed to assure that the state and other beneficiaries receive anticipated revenue from the sale of timber and other products.

Summary of Asset Management

In addition to generating the annual revenues, which are detailed in the implementation plans, and annual operations plans, the base asset value of the land and timber is expected to increase as a result of implementing this forest management plan. This increase in value is expected to result from several factors:

- Increasing bare land values in Oregon.
- Increasing standing timber volume and average stand value on these forests as average stand age and size increase through time. This will be accomplished through active density management (precommercial thinning and partial cutting) and investments in pruning and fertilization.
- Increasing value of facilities and infrastructure on these state forest lands. This includes roads, bridges, recreational facilities, trails, and other infrastructure investments.

- Increasing ability of these lands to provide direct and indirect economic benefits associated with diverse wildlife habitats, properly functioning aquatic systems, broad recreational opportunities, and high levels of water quality.

Implementation of the plan's strategies is expected to result in revenue to the state, counties, and local taxing districts.

Tables 5-1 and 5-2, below and on the next page, show the total current standing volume of timber and estimated value of the land and timber on the southwest Oregon state forests. These numbers were calculated using timber volumes from the 1998 OSCUR forest inventory (Forest Biometrics FPS 5.3b), estimated bare land values from recent land transactions and 1999 3rd quarter Douglas-fir pond values for the Grants Pass Unit. These values are for combined BOF and CSL lands.

Table 5-1. Size Class and MBF Summary of Southwest Oregon Stands

Size Class	Acres	MBF 6"-12" dib	MBF 12"-16" dib	MBF 16"+ dib	Net MBF
0"-.5" Reprod	23	0	0	0	0
.5" – 5" Saplings	1,352	56	0	0	56
5"-8" Premerch Poles	2,660	2,765	0	0	2,765
8"-16" Thinning Size	7,079	85,587	13,781	0	99,368
16"-23" Medium Sawtimber	5,047	47,669	60,468	33,026	141,163
23"-75" Large Sawtimber	1,350	6,098	10,925	47,307	64,330
Totals	17,511*	142,175	85,173	80,333	307,682

*Silviculturally capable lands
(Derived from 1998 Inventory data using the Forest Biometrics Forest Projection/Planning System)

Table 5-2. Southwest Oregon 1999 Market Value Analysis

Main Cover	Size Class	District Acres	Volume MBF	Bareland Value $	Reprod Value $	Timber Value $	Total Value $	Value per Acre $
Conifer & Hardwood	Reprod 0"-.5"	23	0	7,751	8,625		16,376	375
	Sapling .5"-5"	1,352	56	455,624	1,622,400		2,078,024	1,200
	Premerch poles 5"-8"	2,661	2,765	896,757	10,644,000		11,540,757	4,000
	Thinning size 8"-16"	7,080	99,368	2,385,960		44,715,600	47,101,560	6,316
	Med. sawtimber 16"-23"	5,047	141,163	1,700,839		77,001,000	78,701,839	15,257
	Large sawtimber 23"-75"	1,350	64,330	454,950		40,685,075	41,140,025	30,137
Totals		17,513	307,682	5,901,881		162,401,675	180,578,581	
Other:		559		55,900			55,900	100
Nonforested								
Totals		18,072	307,682	5,957,781	12,275,025	162,401,675	180,634,481	9,995

Footnotes:

1. District acres include Board of Forestry and Common School lands combined.
2. Bareland value: Nonforested @ $100/acre, all other acres @$187/acre. (BOF and CSL bareland values estimated from 1995-1998 land exchange values, 1997 estimated BLM bareland values and current county assessed values. All values are averaged to represent combined BOF and CSL site index ranges.
3. Timber values derived from 3rd quarter 1999 Douglas-fir pond values for the Grants Pass unit. Sorts used include: 4saw @ $450/MBF, 3saw @ $550/MBF, and 2saw @ $675/MBF.

Adaptive Forest Resource Management

> Adaptive policy design stresses the use of methods and concepts that are often not simple to explain, demand the explicit admission of ignorance, and place a premium on imagination rather than on precision of thinking. Anyone who is convinced that it is important to design and use adaptive policies should be prepared for an uphill battle: he implicitly places high importance on long-term objectives and will have to act as an active advocate of these objectives while trying to be dispassionate about the available scientific evidence.
>
> *C. J. Walters, 1986*

The issues surrounding forest management are ecologically, socially, and economically complex. This complexity, along with our limited understanding of forest ecosystems and the unpredictable character of many natural events, contributes to uncertainty about the outcomes of forest resource management decisions. Changing social values and goals further increase uncertainty and contribute to controversy. Adaptive resource management is presented as the conceptual and operational framework to address these issues in the context of the *Southwest Oregon State Forest Management Plan*.

Adaptive management is an approach to resource management that explicitly acknowledges uncertainty about the outcomes of implementing management policies, and deals with this uncertainty by treating management activities as opportunities for learning how to manage better. Management activities are not just modified as a result of new information. Rather, they are deliberately designed to increase understanding about the system being managed.

In other words, we don't know exactly how everything will turn out, and therefore we plan our actions so we can learn from them. We use what we learn to do better in the future.

This section describes the concepts, process, and strategies of adaptive management. This section also describes 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.

Basic Concepts for Adaptive Management

The following key concepts provide the foundation for adaptive forest resource management as it is described in this plan:

- Adaptive management is a system of making decisions that recognizes that ecosystems and society are always changing.
- 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.
- Adaptive management requires a well-defined framework for dealing with change.

Concept 1. Adaptive management is a system of making, implementing, and evaluating decisions that recognizes that ecosystems and society are always changing.

Adaptive management is a systematic, rigorous approach for learning from our actions, improving management, and accommodating change (Holling 1978; Lee 1993; Nyberg 1998; Walters 1986). In the administrative rules which govern state forest management (OAR 629-035-0000 to –0110), 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. It is the goal of the Department of Forestry, through the application of adaptive management techniques, to 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 involves:

- Explicitly recognizing that there is uncertainty about the outcome of management activities.
- Deliberately designing management policies or plans to increase understanding about the system, and to reveal the best way of meeting objectives.
- Carefully implementing the policy or plan.
- Monitoring key response indicators.
- Analyzing the outcomes, considering the objectives and predictions.
- Incorporating results into future planning decisions.

Concept 2. Adaptive management is not a replacement for decision-making at any level, but a system for making better decisions.

Adaptive management is more than simply altering objectives and practices in response to new information. It is a formal, rigorous approach to management where activities are treated as opportunities for generating information about the system being managed. With traditional approaches to management, learning is haphazard, and improvements in management are slow and incremental, often because of inadequate or inappropriate monitoring and failure to incorporate results into future planning and decision-making.

Although adaptive management has many benefits, it is not a universal remedy. It can help resolve disagreements stemming from gaps in knowledge, but it cannot resolve conflicts over values. Similarly, it can help managers respond to changes in values, but it cannot predict them. Adaptive management is a way to learn how to manage consistently within an overall vision, but it is not a process for developing that vision.

Adaptive management cannot eliminate surprise events (Hilborn 1987). Managers can deal with surprises only by expecting the unexpected, by modifying management when surprises occur, and by implementing plans that do not foreclose management options. Adaptive management does not eliminate uncertainty. It helps managers deal with it.

Adaptive management is not a replacement for research. Among other roles, research can lead to better predictions and hypotheses about the effects of management activities. Such information is particularly valuable when social, budgetary, or ecological constraints dictate that management apply a single treatment everywhere.

Finally, adaptive management does not relieve decision-makers and managers of the obligation to proceed with caution when the risk and cost of negative outcomes are high, for example, when an activity has a high probability of causing irreversible ecological damage. Adaptive management is not an excuse for continuing with harmful activities.

In summary, adaptive management is not really much more than common sense. But common sense is not always in common use (Holling 1978). Pilot projects, test modeling, and market surveys are all ways that adaptive management is used in other professions. These techniques can be extended to natural resource management, with the inclusion of environmental considerations, and the integration of systematic and rigorous assessment and planning processes.

Concept 3. Successful adaptive management requires a well-designed process, including a strong monitoring program.

There are six main elements of adaptive management (after Nyberg 1998) that will be applied as this plan is implemented.

1. Problem assessment.
2. Design experiment and monitoring plans.
3. Implement plans.
4. Monitor.
5. Evaluate outcomes.
6. Adjust activities and policies.

The framework formed by these six elements (see the figure below) is intended to encourage a thoughtful, disciplined approach to management, without constraining the creativity that is vital to dealing effectively with uncertainty and change. In practice, some of the steps will overlap, some will have to be revisited, and some may be better done in more detail than others. All of the steps are essential to adaptive management. Omission of one or more will hinder the ability to learn from management actions. In addition, to build a knowledge base, it is crucial to document the key elements of each step and communicate the results, especially for long-term projects.

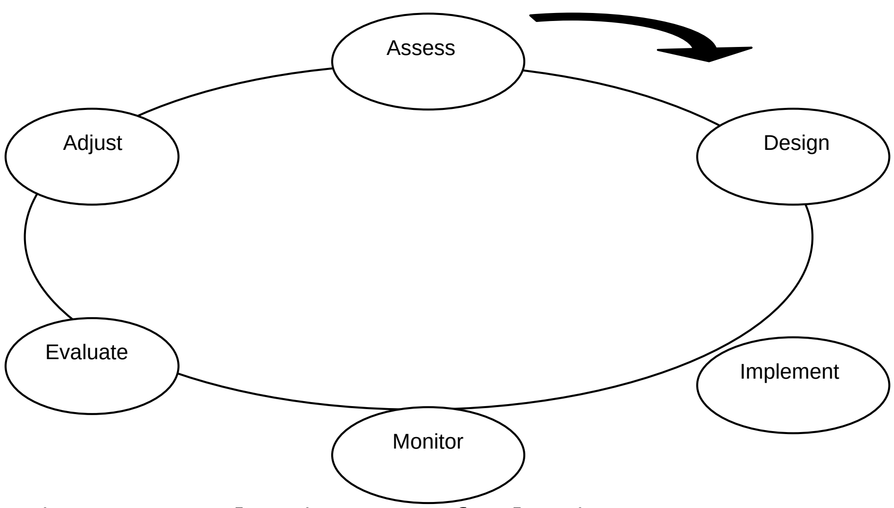


Figure 5-1. The Six Steps of Adaptive Management

These elements are discussed briefly in the following sections. Although these elements describe a framework that will be useful in a broad range of management activities, here the framework is meant to be applied to the development of management experiments to test the integrated forest management strategies in the forest management plan. Management experiments range from relatively small-scale, short-term operations on a unit, to long-term tests of silvicultural prescriptions at multi-watershed scales.

Step 1: Assessment — Define the scope of the management problem (e.g., a particular stand structure type), synthesize existing knowledge about the system, and identify potential outcomes of alternative management actions. Make predictions about outcomes, in order to assess which actions are most likely to meet management objectives.

This step sets boundaries on the spatial and temporal scales and the range of factors to be considered. Problems can be bounded effectively by defining the following parameters:

- The breadth of factors considered (e.g., timber production, biodiversity, etc.).
- The depth of detail.
- The spatial scale and resolution (e.g., stand, landscape, bioregion).
- The time scale and resolution (e.g., 20 years, one rotation, 500 years).

During this exploration and forecasting process, key gaps in understanding of the system are identified. These gaps may limit the ability to predict outcomes.

Management experiments should focus on those questions where the expected value of information is high. Once uncertainties and key questions have been identified, hypotheses can be developed to test assumptions about management actions (Underwood 1995). To make decisions, managers need to know more than simply whether a treatment results in a particular effect. Managers also need to know:

- The magnitude of a response to a management activity.
- The response over a range of conditions.
- The reason for a particular response.

Step 2: Design — Design experiments and related monitoring plans that are informative and provide reliable feedback.

The Department of Forestry intends to use a mix of active and passive approaches. In many instances a range of management actions will be compared. It may be worthwhile to evaluate several designs, one of which may be a passive design, in which only the "best" alternative is tested. In some situations, actions will be tested in a small-scale pilot project before testing them at a larger scale, in order to narrow the range of plausible actions and refine methodologies. In situations or areas where the risk of damage is high and irreversible, mangers may decide to postpone any management intervention until research and trials in less vulnerable areas provide more information.

In the design of the management experiments, it is important to select indicators that are relevant to the objectives and responsive to management actions. Indicators are measurable attributes of system behavior that allow evaluation of management options and, eventually, assessment of outcomes. Indicators should be selected so that some respond in the short term, some in the medium term, and others in the long term, and at different spatial scales (e.g., site, landscape, region) (Holling 1978, Noss 1999, Walters 1986). Careful selection of response indicators goes hand in hand with development of the monitoring protocol, which should specify the following items (see also Step 4).

- The type and amount of baseline (pre-treatment) data required.
- Frequency, timing, and duration of monitoring.
- Indicators to be monitored at each interval.
- Appropriate spatial scales for monitoring different indicators.
- Who is responsible for undertaking different aspects of monitoring.

It is important to plan how the data will be managed and analyzed (e.g., access, analysis, interpretation, storage). Managers will need to define the intensity and degree of response in an indicator that will trigger a change in management actions or objectives. Adjustments should reflect the trade-off between the costs of acting if preliminary results later prove to be incorrect, and the costs of not acting if they later prove to be correct. A system should be established to communicate results and information.

For the FMP, research will be conducted to obtain information needed to inform decisions, and will include several different approaches, as described below.

- **Replicated management experiments —** Rigorous experimental design is important for distinguishing between alternative hypotheses and characterizing cause-and-effect relationships between management activities and observed outcomes.
- **Non-replicated management experiments —** For many problems in forest management, particularly large-scale disturbances, replication is often impractical or impossible. Although managers may be able to replicate treatments at a small scale, extrapolating the results to the large scale at which many management actions occur can be uncertain.
- **Other sources of information —** Although well-designed management experiments may be the most powerful way to discriminate between alternative hypotheses, it is sometimes impossible or impractical to design experiments at an operational scale, in an operational setting. In such cases other sources of information will be used to help identify the most likely hypotheses and best policies, and interpret outcomes. Such information sources include:

  — Results from research on ecosystem processes.
  — Extrapolation of results from small-scale experiments.
  — Descriptive or observational studies.
  — Retrospective studies of past management activities.
  — Observation of natural variability, rather than deliberate manipulation.
  — Local knowledge.
  — Expert opinion.

Step 3: Implement — Implement experiments and monitoring as designed. Decide when and what type of deviations are acceptable. Ensure that these circumstances are clear and accepted by all involved. Monitor implementation, and document any deviations from the plan.

Step 4: Monitor — Measure environmental characteristics and conditions over an extended period of time, in order to determine status or trends in various aspects of environmental quality.

Monitoring is often neglected, but it is critical to adaptation and improvement. Monitoring allows assessment of how management activities actually affect indicators. This information allows managers to evaluate the effectiveness of alternative actions, adjust hypotheses, and take appropriate corrective action. Monitoring can also determine if actions were implemented as planned, and may detect surprising events.

The challenge is to clearly understand why monitoring is an important activity, to decide which characteristics to measure, to determine what information these characteristics indicate, and to use that information to make better informed management decisions.

For the FMP, monitoring is organized into three categories.

- **Implementation monitoring** is used to determine if the objectives, standards, guidelines, and management practices specified in the FMP are being accomplished. Sometimes used as a synonym, **compliance monitoring** is used to determine if specified actions or criteria are met. Implementation, or compliance, monitoring asks the question, “Are we doing what we said we would do?”
- **Effectiveness monitoring** is used to determine if the design and execution of the prescribed management practices are achieving the goals, objectives, and desired future conditions stated in the FMP. Every management decision is intended to achieve a given set of future conditions. Effectiveness monitoring can be used to compare existing conditions to both past conditions and the desired future conditions to describe the overall progress or success of the management activities. Effectiveness monitoring asks, “Are the management practices producing the desired results?”
- **Validation monitoring** is used to determine whether data, assumptions, and coefficients used to predict outcomes and effects in the development of the FMP are correct. Validation monitoring seeks to verify the assumed linkages between cause and effect. Validation monitoring asks, “Are the planning assumptions valid, or are there better ways to meet planning goals and objectives?”

These types of monitoring are not mutually exclusive, nor are they conducted in a linear progression. Validation and effectiveness monitoring are most powerful when used in combination.

A well-designed monitoring program is statistically credible, cost-effective, and practical.

When done in conjunction with good experimental design and appropriate data analysis, monitoring can allow managers to:

- Determine whether practices are meeting objectives.
- Improve understanding of the mechanisms that underlie ecosystem function and change (to test alternative hypotheses).
- Determine the effect of management actions on the ecosystem.
- Identify thresholds and anticipate shifts in the state of the ecosystem.

Step 5: Evaluate — Analyze data and compare actual results to the forecasts made in Step 1. The evaluation should explain why outcomes occurred and include recommendations for future action.

Predicted responses to alternative treatments and how those responses will affect future management activities should be documented when the management experiment is designed. These feedback loops will provide a framework to guide change. Outcomes can be the result of the management activity, or of some unanticipated factors, or both. Negative or unexpected outcomes can be just as informative as positive, predicted outcomes. All results must be documented and communicated.

Step 6: Adjust — Verify or update the hypotheses used to make the initial forecasts, and adjust management actions as necessary. Review the objectives, and adjust as necessary to ensure they remain consistent with overall goals and values.

It should be specified at the outset how information will be used to adjust management, in order to facilitate timely and appropriate application of new information, and also to ensure that the monitoring program answers questions relevant to management decisions.

Predetermined quantitative or qualitative changes in key indicators should trigger predetermined changes in management activities or guidelines. These trigger points should be defined for a variety of time frames, so that changes in management are not unnecessarily delayed by indicators with long response times. Preliminary data can serve as early warning signals that trigger adjustments in management to avoid irreversible detrimental changes. The size of these adjustments should reflect a balance between the reliability of the data and the potential cost of not adjusting activities.

Additional information on adjusting management activities or objectives is presented later in this chapter, under the heading “Effecting Change.” A number of methods can be used to document plans and communicate results, including written progress and final reports, presentations, seminars, field trips, informal discussions, and posters.

Finally, managers and team leaders have a critical leadership role in encouraging the conditions that facilitate adaptive management. Institutional environment and individual attitudes are as critical to effective adaptive management and learning as the actual steps followed (see Senge 1990). In an atmosphere that is conducive to long-term learning, mistakes are recognized as the price of innovation and are treated as opportunities to learn, incentives to improve are greater than the fear of failure, there is less demand for quick fixes, and people are explicitly rewarded for innovation and learning.

Concept 4. Adaptive management requires a well-defined framework for effecting change.

The *Southwest Oregon State Forests Management Plan* must be implemented using a scientifically based, systematically structured approach that tests and monitors management plan assumptions, predictions, and actions, and then uses the information to improve management plans or practices. Monitoring and research must be linked to the process through hypothesis development, information gathering, analysis, and reporting.

Technical specialists and field managers must evaluate results and make recommendations for change to the appropriate decision-makers. Proposed changes may involve minor adjustments in management practices, or they may require significant changes at policy and planning levels.

There are four planning levels at which change may be proposed, considered, and initiated: the Forest Management Plan level, the District Implementation Plan level, the Annual Operations Plan level and the Management Activity level. The Forest Management Plan level demands the broadest review and most rigid approaches before change is allowed, whereas the Management Activity level requires the least review and provides the simplest avenue to change.

The range of decisions that will be made, how they will be made, and who will make them are described in more detail in the strategies that follow.

Strategies for Implementing Adaptive Management

The following actions will be taken to ensure a strong adaptive approach for forest management in the context of the *Southwest Oregon State Forest Management Plan:*

Adaptive Management Strategy 1: Implement an adaptive management process and framework that provides for change at the appropriate planning level and in a timely manner.

The range of decisions that will be made, how they will be made, and who will make them are described in the following tables and discussed in more detail in the text that follows.

Table 5-3. Effecting Change

Forest Management Plan **(Long Term – 10 Years or More)**	**District Implementation Plans** **(Periodic – Maximum 10-Year Interval)**	**Annual Operations Plans** **(Annual)**	**Management Activities** **(As Appropriate)**
Examples of What Might Change			
FMP • Stand type percents • Arrangement	• Landscape design • Silvicultural approaches, i.e., sequence of treatments, etc. • Management opportunities & objectives	• Approaches to meeting objectives, e.g., silvicultural prescriptions • Monitoring projects	• Techniques for culvert installation, snag creation, etc.
Examples of Public Involvement			
Formal • BOF meetings • OAR process • Public meetings • Technical specialist or citizen input committees Informal • Voluntary participation in monitoring program • Regular reporting processes, including monitoring reports • Public submittal of information	Formal • Public review & comment processes • Public meetings • Technical specialist or citizen input committees Informal • Voluntary participation in monitoring program • Regular reporting processes, including monitoring reports • Public submittal of information	Formal • Review & comment period Informal • Voluntary participation in monitoring program • Regular reporting processes, including monitoring reports • Public submittal of information	Informal • Voluntary participation in monitoring program • Regular reporting processes, including monitoring reports • Public submittal of information

(Table continued on next page)

Table 5-3 continued. Effecting Change

Forest Management Plan (Long Term – 10 Years or More)	Implementation Plans (Periodic – Maximum 10-Year Interval)	Annual Operations Plans (Annual)	Management Activities (As Appropriate)
Examples of Monitoring			
Framework Implementation • Are we doing what we said we would do? Effectiveness • Are the management practices producing the desired results? Validation • Are the planning assumptions valid, or are there better ways to meet goals and objectives?	**Identify and Implement Projects** Projects: • What is the condition of State Forests based on stand type percentages and habitat availability? • Is active management promoting habitat development by moving stands toward layered and older forest structures? • Are our silvicultural practices used to achieve forest structures sufficient to maintain a full array of forest products? • Is structure-based management helping to improve forest health on State Forests? Protocol development and implementation Data gathering and analysis Evaluation Communication		

When Department of Forestry managers and staff receive new information, they recommend changes to the appropriate official for each of the four planning levels, as shown below. This official makes the final decision. At all four levels, various sources of information can trigger change: public input, monitoring information, research information, and operational input.

Table 5-4. Decision-Makers for the Four Planning Levels

Planning Level		Who Decides
FMP	→	Board of Forestry/State Land Board
District Implementation Plans	→	State Forester
Annual Operations Plans	→	District Forester
Management Activities	→	Management Unit Forester

Effecting Change through Planning Processes

The plan's success will depend on timely changes in strategies, approaches, and prescriptions in accordance with new knowledge. As new information is available, it must be evaluated in the context of the guiding principles, goals, and strategies of the FMP.

As Tables 5-3 and 5-4 showed, decisions on change will be made by different people or groups at different levels. For example, if research or monitoring information shows that the forest stand type percentages in Landscape Management Strategy 1 should change by a substantial amount, a fundamental change in FMP strategies, this decision would be made by the Board of Forestry and the State Forester, after a formal public involvement process.

Where the proposed change does not significantly alter the fundamental strategies, changes may be instituted by field personnel without a formal approval process. For example, field staff could make a decision to create snags by girdling trees instead of blasting out the tops.

The methods for change at each level are discussed below.

Forest Management Plan

At this level, planning is typically at broad spatial and long temporal scales, and identifies general goals and strategies.

Information, decisions, and management in the FMP encompass landscape scales, policy concepts, and social, cultural, and environmental influences that may extend beyond state forest lands. These plans make forecasts for at least 10 years, and generally for 30 to 100 years or more. These plans are reviewed periodically and, at a minimum, at least every 10 years. It will frequently take 10 years or more to develop relevant monitoring information for these long-term forecasts.

What types of changes might occur at the FMP level?

Changes could occur in the FMP's fundamental concepts and strategies. The FMP integrated forest management and landscape strategies that would require this level of evaluation address:

- Stand type percentages.
- Patch characteristics and arrangement.
- Structural habitat components.
- Aquatic and riparian conservation strategies.
- Upland management activities.

Who makes the decision to change the FMP?
The Board of Forestry/State Land Board and State Forester will weigh the scientific, operational, and public information in a formal public process to determine changes to the FMP.

What will be the basis for recommending changes?
Monitoring projects will focus on the overall implications of the management strategies and assumptions in the FMP. This work will generally be long-term and at broad landscape scales that include many specific monitoring and research projects. This information will help guide changes in the strategies, objectives, and potentially even the goals of the FMP. For example, to determine if the FMP strategy on stand type percentages is successful, it will be necessary to determine if the percentages provide for the range of native species, if the habitat components provide the habitat as expected, and if the stand types and percentages provide functional habitat for the intended species.

What are the opportunities for public involvement in FMP changes?
Many opportunities will be offered for public involvement. Formal processes will include Board of Forestry meetings, FMP administrative rule hearings, public meetings and workshops, and public input or special interest committees. Less formal opportunities will exist for volunteer involvement in actual monitoring projects and comments on periodic monitoring reports.

District Implementation Plans

Changes at this level will occur over the whole planning area, or for a district or basin, and over time frames longer than one year but no more than ten years. The district implementation plans determine how the FMP strategies will be implemented. These plans include the management activities scheduled for the next ten years and estimates of the district's progress toward the FMP goals. These plans are reassessed periodically (at least every 10 years), or if some significant event occurs or information is received that would significantly change the planned activities or approaches.

What types of changes might occur at the implementation plan level?
Changes could be made to the long-term landscape design of stand types, anticipated sequence of stand treatments, the management opportunities that will be pursued over the next ten years, and other elements. Changes to the actual strategies themselves will not be made at this level.

Who makes the decision to change district implementation plans?
The State Foresterwill weigh the scientific, operational, and public information, when considering the approval and subsequent changes to district implementation plans.

What will be the basis for recommending changes?
Monitoring will focus on issues covered by implementation plans and issues relevant at district levels. Areas of interest will include silvicultural pathways, and approaches used to develop structural components such as snags, remnant old growth, and green trees.

The research and monitoring coordinator will organize the development of projects, interpretation of data, and proposals for change. Teams with appropriate technical and operational expertise will evaluate information and make proposals for change.

What are the opportunities for public involvement in implementation plan changes?
Many opportunities will be offered for public involvement. Formal processes may include public meetings and workshops, and technical specialist or citizen input committees. Less formal opportunities will exist for volunteer involvement in actual monitoring projects and comments on periodic monitoring reports.

Annual Operations Plans

Annual operations plans identify all major forest management activities that are proposed for the next year. This includes silvicultural prescriptions, recreation projects, road construction and maintenance, stream restoration projects, and any other major projects. Monitoring information will be gathered about the short-term effects, implementation, and contribution of these activities toward FMP goals. This information will be used to effect change from year to year, at scales ranging from site-specific to district-wide.

What types of changes might occur at the annual operations planning level?
Annual operations plans are specific action plans that describe specific projects. Silvicultural prescriptions, recreation projects, stream enhancement approaches, and other projects could be changed to improve outcomes. In the case of silvicultural prescriptions, examples might include thinning to lower densities or changing the mix of species being planted. For recreation, an example is a change in hiking or OHV trail standards.

Who makes the decision to change annual operations plans?
The District Forester will weigh the scientific, operational, and public information through the annual operations planning process, and then make changes and approve annual operations plans. The operations planning process includes review by Department of Forestry staff and a variety of technical specialists.

What will be the basis for recommending changes?
Monitoring will focus on issues covered by annual operations plans. Areas of interest will include the assessment of silvicultural prescriptions, methods used in stream restoration projects, effectiveness of operational approaches, and techniques to develop or retain structural components such as snags, remnant old growth, and green trees.

The district will work with the research and monitoring coordinator to develop necessary monitoring projects and interpret data from monitoring and research. The technical and operational evaluation team approach used at the FMP and implementation plan levels will be used for many issues; however, the district may choose to initiate change based upon local information that is soundly based.

What are the opportunities for public involvement in annual operations plan changes?
Annual operations plans are prepared by the district and will be made available for public comment prior to consideration for approval by District Foresters. Other opportunities may exist for volunteer involvement in actual monitoring projects and comments on periodic monitoring reports.

Management Activities

Agency personnel learn and make changes on a daily basis in the forest. In order to achieve the best possible results, it is critical to adapt practices to new information and changing conditions. Frequently, professionals on the ground can identify improved techniques that can be used immediately to achieve better results. In addition, some changes can be incorporated into an ongoing project based upon new information from monitoring and research, or from larger-scale information sources offering applicable and appropriate information.

What types of changes might occur at the management activity level?
At this level, change will generally involve adjusting specific techniques. Reasons might include learning a technique that will produce better results, or a more cost-effective way may be found to get a particular job done.

An example is the creation of snags from live trees. In this case, cutting or blasting tops out of trees may have been the preferred method, but based on research or operational concerns the decision may be made to girdle or inoculate trees instead. This decision does not affect the basic principle of developing snags, but merely changes how it is done.

Who decides to make changes at the management activity level?
Field supervisors will be responsible for weighing the scientific and operational advantages and disadvantages of changes and determining whether change is appropriate.

What will be the basis for recommending changes?
Change at the management activity level may occur without any formal process constraints.

What are the opportunities for public involvement at the management activity level?
These decisions are typical of the daily field work of natural resource professionals and are made in a tight time frame. Opportunities may exist for volunteer involvement in actual monitoring projects or in commenting on periodic monitoring reports.

Technical and Operational Adaptive Management Review Team

The research and monitoring coordinator is responsible for coordinating the development of monitoring projects, interpretation of data from monitoring and research, and development of proposals for change. Throughout the year information will be available from many sources, including Department of Forestry monitoring projects, research, operational feedback from the field, and the general public. The research and monitoring coordinator, together with Department of Forestry resource specialists and field administrators, will assess the information to determine key issues for the current year.

When the discussion topics are identified, the research and monitoring coordinator will assemble a team to evaluate the information from research, monitoring, operational input, and the public, and to make proposals for change. The expertise on the team will vary depending on the topic. Table 5-5 describes the pool from which team membership will be drawn.

Table 5-5. Adaptive Management Review Team Membership

Core Members	Pool Members
Research and Monitoring Coordinator	Field managers
Area Forest Planning Coordinator	Area resource specialists
Program Forest Planning Coordinator	Program resource specialists
	Other agency resource specialists
	Academics
	Consultants/contractors
	County representatives
	Citizen/interest group representatives

The team will provide reports to the state forests program director, interpreting the available information and making recommendations for change.

Evaluation of Technical Information

Information evaluation or data analysis may be done by the team or some other group, as deemed appropriate by the research and monitoring coordinator. For evaluation and analysis, the goal is to explain the data, its weaknesses, and strengths; identify triggers and thresholds for the data set and resource; reach conclusions; and make recommendations.

Triggers and thresholds are critical, in order to determine if change is needed. In a complex ecosystem, triggers or thresholds are rarely achieved with unequivocal certainty. The analyst will have to decide if the information indicates a sufficient risk to the system, given normal variability and error in data collection. To add to the complexity, biological triggers may differ from social or political triggers and thresholds.

In these complex situations, risk assessment becomes a significant part of the adaptive process. Risk evaluation is a critical concept that links monitoring and research information to effective and efficient adaptive management decisions. In cases where the system or population is particularly sensitive or the risk is high, the thresholds for change will be lower and triggers more sensitive. Where risk to the resource is not as great, thresholds may be higher and the triggers more demanding. More data may be needed to justify a change. Assessments of risk and resource sensitivity that affect thresholds and triggers will be presented to decision-makers along with recommendations.

Even during technical analysis, situations may arise where people will not agree on the interpretation of the data. A process will be developed for issue resolution, in order to help the team clearly articulate their concerns and differences and arrive at as much of a consensus as possible before offering their conclusions and recommendations. If technical issues cannot be resolved, then the only option may be to include one set of technical information and recommendations, along with a report of the differing opinions expressed by the team.

Adaptive Management Strategy 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.

The Application of Monitoring

Monitoring is an important step in the adaptive management process and is, therefore, a key element in the *Southwest Oregon State Forest Management Plan*. The basic principles of monitoring as it relates to adaptive management are presented earlier in this chapter. This section describes how monitoring will be used in the adaptive management strategies of the FMP.

Oregon administrative rules for state forest management (OAR 629-035-0000 to 0110) require forest management plans to include general guidelines for “implementation, monitoring, research, and adaptive management” that describe “the approach for determining whether the strategies are meeting the goals of the Forest Management Plans; and, the process for determining the validity of the assumptions used in developing the strategies.” For this FMP, Guiding Principle 14 commits the Department of Forestry to using an adaptive management approach, with monitoring and research as part of that approach.

It will take many decades to fully implement the strategies described in Chapter 4 of this plan, and to produce the desired future condition of stand types on the landscape. Over time, monitoring and research will indicate the extent to which the assumptions underlying the strategies are correct and if the strategies are accomplishing their intended purpose. As monitoring provides feedback, the plan will be fine-tuned and improved through adaptive management (McAllister et al. 1998).

Monitoring Framework

Information from monitoring and research will be planned for and used to assess the following items:

- **Assumptions and hypotheses —** Are the basic assumptions and hypotheses that support the strategies scientifically valid? (See Chapter 4. Also compare the summary of working hypotheses in Chapter 3.)
- **Resource condition —** Can historic and current conditions serve as a basis for estimating desired future conditions and likely trajectories of changes in resources?
- **Ecological/cultural trends —** Are resources changing due to ecological, social, political, and economic influences outside the scope of the plan's management actions?
- **Management actions —** How are the plan's strategies being implemented?
- **Management effects —** How are the resources changing in response to management actions?

These questions serve as the basis for developing specific monitoring projects or research needs. As information becomes available from the monitoring program, as well as from researchers and others working on forest management issues, it will be evaluated to determine additional information needs and necessary changes to the management strategies.

Key Questions

The Department of Forestry will conduct implementation, effectiveness, and validation monitoring. Initially, the department will emphasize implementation and effectiveness monitoring. A more formal research effort may be necessary to evaluate the validity of the underlying assumptions of the management strategies. The Department of Forestry will help support the necessary research at selected research institutions.

Implementation and effectiveness monitoring will concentrate on a series of key questions:

- Does the FMP provide for healthy, productive, and sustainable forest ecosystems that over time and across landscapes provide a full range of social, economic, and environmental benefits to the people of Oregon?
- Does the FMP maintain and restore properly functioning aquatic and riparian habitats?

- Does the FMP protect, maintain, and enhance native wildlife habitats, recognizing that forests are dynamic and that the quantity and quality of habitats for species will change across landscapes and over time?
- Does the FMP provide sustainable timber harvest?
- Does the FMP provide for healthy forests by managing forest insects and diseases and by using appropriate genetic sources of forest tree seed and trees?
- Does the FMP maintain or enhance long-term forest soil productivity?

The monitoring program must assess not only ecological processes and management activities, but also the cultural and economic circumstances linked to them. Therefore, monitoring projects must be designed to provide information to evaluate the integration of natural and social systems.

The key questions must first be broken down into components that can be addressed by specific monitoring projects. Projects will be developed around precise, well-focused monitoring questions that focus on specific information needs. Monitoring projects will be initiated as determined by requirements of the management experiments. Identification and definition of monitoring needs will be part of the decision analysis process during the "assess" and "design" phases of adaptive management.

Reporting and Information Management

A successful monitoring program requires acting on collected information in a timely manner. However, in order to have relevant, high quality data to act on, an organized system must securely store, analyze, and report project results using the collected data.

Data storage and analysis — Because the FMP focuses on landscape issues and large-scale responses to management, primary responsibility for data storage and analysis will be at the program level. Data will be stored in a central database, in order to maintain data integrity and consistency. Data collected at the district or site-specific scale will be available in raw form for archiving and use at the district if desired. However, the general approach early in the monitoring program will be to provide analyzed information back to the districts. Data will be made easily accessible to the public, except for data that are exempt from disclosure under public records law (e.g., specific locations of threatened and endangered species).

Analysis will be done with appropriate analytical tools. Potential tools include spatial analysis, univariate and multivariate statistical analysis, trend analysis, and basic graphical analysis. Planning for analysis will occur during the project development phase rather than in reaction to the data gathered. Primary responsibility for coordinating and completing analyses will be with the adaptive management team, as already described under the heading, "Effecting Change through Planning Processes."

Reporting — Information, analysis, and recommendations for action will be presented in an annual report. Preparation of this report will be coordinated with other reporting requirements (e.g., reports to the Board of Forestry) so that a single report can satisfy more than one requirement. At a minimum the report will include the following information.

- Objectives for the monitoring program.
- Effects on the covered species and/or habitat.
- Location of sampling sites.
- Methods for data collection and variables measured.
- Frequency, timing, and duration of sampling.
- Description of the data analysis.
- Evaluation of progress toward achieving measurable biological goals and objectives.

This report will be the basis for determining the need to adapt management policies, biological or habitat goals, or monitoring activities. This report will be available to the Board of Forestry, the public, and other state and federal agencies. The state forests management monitoring program will also provide an annual oral report and update to the Board of Forestry. Special project reports that stand alone may also be available, and monitoring program updates and project descriptions will be available on the Department of Forestry's web site. As the monitoring program develops, reporting mechanisms will be refined and improved.

Coordination

In light of increased monitoring occurring within state, federal, and non-governmental organizations in the Pacific Northwest, coordinated efforts are critical to the success of the plan. Coordination with regional monitoring programs (such as the federal *Northwest Forest Plan* and the *Oregon Plan for Salmon and Watersheds*) will help ensure the most efficient application of financial and human resources. Cooperation and exchange of information among programs will allow for a more extensive exploration of the effects of the landscape management objectives, and also for the generation of recommendations for adapting management or monitoring activities. Other forms of coordination include participation in multi-agency monitoring committees; contact, planning, and coordination with watershed councils; review, application, or modification of existing protocols; joint development of protocols with landowners, stakeholders, and other agencies; and data sharing.

Current Monitoring

Although the state forests management program has not had a formal monitoring program, conditions on state forest lands have been monitored for many years. Resource specialists, such as the insect and disease program staff and the wildlife biologists, have conducted aggressive monitoring and research projects to stay abreast of issues such as Swiss needle cast incidence and severity, and habitat protection and use for northern spotted owls and marbled murrelets. The state forests management program cooperates with the Oregon Department of Forestry's forest practices monitoring program, Oregon Department of Fish and Wildlife, Oregon State University, federal agencies, and private landowners. The state forests management program will use these contacts and data sources to help establish a formally structured monitoring program. In the future, monitoring projects, data analysis, and storage needs will be included in area and district implementation plans and in an annual program-wide monitoring report.

Adaptive Management Strategy 3: Conduct a comprehensive review of the goals and strategies of this FMP every ten years following adoption.

At the completion of the initial ten-year implementation period, and every ten years thereafter, the Oregon Department of Forestry will compile a ten-year Implementation and Monitoring Report, that summarizes the management activities that have occurred over the period, the results of monitoring and research efforts during that time, and any proposed changes to the FMP strategies to better meet the goals. In preparing this report, the department will collaborate with other agencies as necessary to obtain the best available information, and will support any major modifications proposed with information from independent scientific review. Examples of the types of issues that will be considered during the comprehensive review process:

- The overall effectiveness of the strategies in moving towards the desired future condition of stand types and a functional arrangement of those stands.
- What we have learned about species responses to specific activities and to the stand structures and the implications of this information to the FMP.
- The status of developing habitat and the extent to which species are colonizing and using that habitat.
- The ability of ODF to meet the range of resource goals described in the FMP.

Outcomes or recommended changes that evolve out of the ten-year comprehensive review will be implemented using the appropriate process, dependent on the significance of the change.

Adaptive Management Strategy 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 be conducted as part of a ten-year comprehensive review (described above). This review will be constructed to reevaluate the desired future condition stand type array described in Landscape Management Strategy 1 and determine whether the best available scientific information supports continuing to pursue that DFC, or if it supports some other desired future condition.

Public Involvement in Implementation

The Oregon Department of Forestry is committed to public participation in land management decisions (OAR 629-035-0080 and Guiding Principle 9). The guidelines in the *Draft Public Involvement Guidance* (Oregon Department of Forestry 2000b) describe the department's public involvement policies and procedures. Public participation in the development of forest management plans and this FMP was discussed in Chapters 1 and 2. Public input is also important in developing recreation plans.

The result of an effective public involvement program will be decisions that are made with a full understanding of public concerns and that are, in turn, better understood and trusted by the people affected. Although public participation is not by itself sufficient to ensure public acceptance of decisions, it is a necessary component.

Early and Continuous Involvement

The benefits of public involvement cannot be achieved by means of a simple public notice and comment period once plans or projects are completed. The Department of Forestry prefers to involve the public early, so that concerns can be addressed as part of the planning process, rather than after the fact in a review or mediation. Early public participation is particularly important in the case of large-scale, complex projects or plans such as this FMP.

Appropriate Scale and Flexibility

The public involvement program should be appropriate for the scale and complexity of the project. A long-term, extensive public participation program is required for large-scale, complex projects that call for comprehensive evaluations.

Public involvement must be a flexible process, adapting to different sets of environmental issues and public concerns. The Department of Forestry will design and implement public involvement programs that match the needs of the project, and that reflect the needs and preferences of people involved. Since public involvement is a dynamic process, the department may need to revise public participation plans when necessary.

Accountability and Timeliness

Participants in a public involvement process must be accountable for their actions. The Department of Forestry will ensure that the participation process is directly linked to the decision-making process. Participants should report back to their constituents in a fair and accurate manner, and follow through on any negotiated commitments. The department must ensure that members of the public have adequate time in which to review information and provide meaningful input (Oregon Department of Forestry 2000b). Stakeholders and other people involved should recognize that the decision-makers remain accountable for making the decision. Decision-makers should explain their decision, clearly demonstrating how the public's input has been used, or explaining why the results have not been incorporated in the decision.

Shared Process and Mutual Respect

Public involvement programs will often bring together people representing a wide range of perspectives, opinions, and values. The process should be conducted in an atmosphere of mutual respect.

Public Involvement Techniques

Techniques should match needs. There is no single best public involvement technique. There are many techniques, and each may be effective in a particular set of circumstances or in response to the preferences of a particular public group. Specific techniques are presented in the *Draft Public Involvement Guidance* (Oregon Department of Forestry 2000b).

Public Involvement in District Implementation Plans and Annual Operations Plans

Public involvement can provide local forest managers with additional information and ideas as they develop implementation plans and annual operations plans to achieve the goals of this forest management plan. Ongoing public involvement during implementation of this plan is also critical to gaining public understanding, acceptance and support for local plans and operations.

Public involvement opportunities will be provided as district implementation plans, land management classifications, and annual operations plans are reviewed and approved. These opportunities will be designed to meet the goals provided in OAR 629-035-0080 and Guiding Principle 9 (Chapter 3):

- To seek insight, opinion and data on planned management actions.
- To build understanding, acceptance and support for the forest management planning process and decisions.
- To offer information to the public about forest systems and forest stewardship.

- To provide the public with meaningful opportunities to comment and affect planning decisions at a time when public involvement can contribute positively to the planning decisions under consideration.

District Foresters will be responsible for developing and implementing public involvement opportunities that will meet these objectives. At a minimum, the following opportunities will be provided:

District Implementation Plans — Prior to submitting initial implementation plans and the associated land management classification maps to the State Forester for approval, there will be a ninety-day public comment period in order to gather public input. All public comments submitted in writing will be forwarded to the State Forester, along with the District Forester's recommended implementation plan and land management classifications.

The State Forester shall approve, modify, or deny the recommended implementation plans. If the State Forester modifies a recommended plan, the modifications will be incorporated into the original plan and appropriate revisions made to land management classifications. If the State Forester denies the recommended plan, the District Forester shall prepare a revised or new implementation plan and/or revised or new land management classifications as appropriate.

Prior to submitting a revised or new implementation plan, and/or revised or new land management classifications, after a previous denial, there will be a thirty-day public comment period to gather public input. All public comments submitted in writing will be forwarded to the State Forester, along with the revised or new implementation plan. The State Forester shall approve, modify, or deny this plan. The process described in this paragraph will be followed until approval of an implementation plan is obtained.

Annual Operations Plans — The District Forester must consider any written comments from resource specialists and the public before approving or denying approval of an operations plan.

Appendix A

Glossary

The following references were used in developing the glossary.

Oregon Department of Forestry. 1993. Elliott State Forest Draft Management Plan. Oregon Department of Forestry, Salem, OR. December 1993.

Oregon Department of Forestry. 1995. Eastern Region Long-Range Forest Management Plan. Oregon Department of Forestry, Salem, OR. May 1995.

USDA Forest Service, et al. 1994. Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. Also known as the Clinton Forest Plan or the Final SEIS. USDA Forest Service, Pacific Northwest Region, Portland, OR. February 1994.

Acknowledgment	Approval by the Land Conservation and Development Commission (LCDC) of a city or county's comprehensive plan; acknowledgment of compliance with the Statewide Planning Goals.
Active channel width	The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.
Activity center	A nest site or primary roost area for northern spotted owls.
Adaptive management	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. Adaptive management is a system of making, implementing, and evaluating decisions, which recognizes that ecosystems and society are always changing. It is a systematic, rigorous approach for learning from our actions, improving management, and accommodating change.
Aggregate	Sand and pebbles added to cement to make concrete, or used in road construction.
Alluvial	Describes soil, debris, and other materials that have been deposited by currents of water.
Ambient	Surrounding.
Anadromous fish	Those species of fish that mature in the ocean and migrate into freshwater rivers and streams to spawn; an example is salmon.
Anchor habitat	An existing key habitat area for a specific species; these blocks of habitat are left in place on the landscape as "anchors." An example is an aquatic anchor or terrestrial anchor..
Andesites	A type of volcanic rock; its composition is intermediate between basalt and rhyolite. The most common rock in the Cascades.
Annosum	A root disease in trees, caused by *Heterobasidion annosum*.
Aquatic	In or on the water; aquatic habitats are in streams or other bodies of water, as contrasted to riparian habitats, which are near water.

Aquifer	A sand, gravel, or rock formation that is capable of storing or transporting water below the surface of the ground.
Archaeological and historical resources	Those districts, sites, buildings, structures, and artifacts which possess material evidence of human life and culture of the prehistoric and historic past.
Archaeological object	An object that is at least 75 years old; is part of the physical record of an indigenous or other culture found in the state or waters of the state; and is material remains of past human life or activity that are of archaeological significance, including, but not limited to, monuments, symbols, tools, facilities, technological by-products and dietary by-products. (ORS 358.905)
Armillaria ostoyae	A fungus that infects many tree species, causing armillaria root disease.
Average high water level	The stage reached during the average annual high flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.
Basal area	The area of the cross-section of a tree stem near the base, generally at breast height (4.5 feet above the ground) and including the bark. The basal area per acre is the total basal area of all trees on that acre.
Best Management Practices	Oregon Forest Practices Act rules adopted by the Board of Forestry to minimize the impact of forest operations on water quality. These rules ensure that, to the maximum extent practicable, forest operations meet the water quality standards established by the Environmental Quality Commission. The rules focus on reducing nonpoint source discharges of pollutants resulting from forest operations.
Biodiversity	Society of American Foresters defines biodiversity as “the variety and abundance of species, their genetic composition, and the communities, ecosystems, and landscapes in which they occur.” Gast et al. 1991 characterizes biodiversity operationally as: “... the variety, function, distribution, and structure of ecosystems and their components, including all successional stages, arranged in space over time that support self-sustaining populations of all natural and desirable naturalized flora and fauna.”

BMPs	See “Best Management Practices.”
Board foot	The amount of wood equivalent to a piece of wood one foot wide by one foot high, by one inch thick.
BOFL	Board of Forestry Lands.
Bog	A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.
Breccias	Aggregates composed of angular fragments of the same rock, or of different rocks united by a matrix.
Burial	Any natural or prepared physical location whether originally below, on or above the surface of the earth, into which, as a part of a death rite or death ceremony of a culture, human remains were deposited. (ORS 358.905)
Certification	Approval by LCDC of a state agency program found to be consistent with the Statewide Planning Goals.
Channel migration zone (CMZ)	An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.
Class I areas	National park lands and some wilderness areas are designated as federal mandatory Class I areas under the Clean Air Act.
Class I-III	The Clean Air Act divides clean air into three classes; Class I allows for minimal degradation of air quality, while Class III allows a relatively greater degree of degradation.
Clean Air Act	Federal law passed in 1970, and amended several times since. The authority to implement the act is delegated to the states. The act is implemented, in part, through a permit system.

Closed single canopy (CSC)	This stand type occurs when new trees, shrubs, and herbs no longer appear in the stand, and some existing ones begin to die from shading and competition, in a process called stem exclusion.
CMZ	See "channel migration zone."
Colluvial	Describes soil, debris, and other materials that have been moved downslope by gravity and biological activity.
Common School Forest Lands	Common School trust lands that have been listed by the State Land Board for the primary use of timber production. See "Common School trust lands."
Common School trust lands	State lands owned by the State Land Board; the primary goal in managing these lands is the generation of the greatest amount of income for the Common School Fund over the long-term, consistent with sound techniques of land management. Common School trust lands that have been listed by the State Land Board for the primary use of timber production are called Common School Forest Lands. Other Common School trust lands are designated as rangelands or for other uses.
Composition	The different species of plants and animals that live in an ecosystem.
Corridor	Areas of habitat that connect separate but similar habitat patches, within the landscape mosaic. For example, an area of mature timber may connect larger patches of mature timber.
CSC	See "closed single canopy."
CSFL	See "Common School Forest Lands."
Debris slide	Rapid landslide occurring on a slope. The material moved may include soil, wood, and vegetation. The slide may or may not reach a stream channel. See also "landslide."
Department of Land Conservation and Development (DLCD)	State agency that administers Oregon's statewide planning program and provides professional support to the LCDC.
DEQ	Oregon Department of Environmental Quality.

Desired future condition (DFC)	An explicit description of the physical and biological characteristics of the northwest Oregon state forests in the future, as described in the forest vision.
DFC	See “desired future condition.”
Dispersion	The spreading or scattering of smoke.
Disturbance	A force that causes significant change in an ecosystem’s structure and/or composition; can be caused by natural events or human activities.
Drainage basin	The large watersheds of major rivers. The Oregon Water Resources Department and the Oregon Department of Environmental Quality have delineated 18 major drainage basins in Oregon.
Earthflow	Movement of material, both sediment and vegetation, down a slope. Earthflows are typically large, but move only a few centimeters each year. See also “landslide.”
EPA	Environmental Protection Agency. This federal agency administers the Clean Air Act, among other responsibilities.
ESU	See “evolutionarily significant unit.”
Evolutionarily Significant Unit (ESU)	A group of stocks or populations that: 1) are substantially reproductively isolated from other population units of the same species, and 2) represent an important component in the evolutionary legacy of the species. (NMFS 1991). This term is used by the National Marine Fisheries Service as guidance for determining what constitutes a “distinct population segment” for the purposes of listing Pacific salmon species under the Endangered Species Act. For example, the “Oregon Coast chinook ESU” is a delineation that encompasses all populations of chinook salmon from the Necanicum River on the northern Oregon coast, to Cape Blanco on the south coast.
Fragmentation	The relationship of the landscape matrix to other types of patches; as fragmentation increases, the matrix becomes smaller and geometrically more complex. Maximum landscape fragmentation occurs when no dominant patch exists. Also defined as the spatial arrangement of successional stages across the landscape as the result of disturbance; often used to refer specifically to the process of reducing the size and connectivity of late successional or old growth forests.

Function	Activity or process that goes on in an ecosystem; some typical functions are plant growth, animal reproduction, decay of dead plants.
Geographic information system (GIS)	A computer system that stores and manipulates spatial data, and can produce a variety of maps and analyses.
Geotechnical	The study of soil stability in relation to engineering.
Geothermal	Of or relating to the internal heat of the earth.
GIS	See “geographic information system.”
Goals	In Oregon Department of Forestry forest management plans, goals are general, non-quantifiable statements of direction.
Grave	See “Burial.”
Groundwater	The subsurface water supply in the saturated zone below the water table.
Guiding principles	The overall rules, goals, and responsibilities that guide the planning process for the northwest Oregon state forests.
Headwall	The steep slope or rocky cliffs at the head of a valley.
Heterobasidion annosum	The fungus that causes annosum root disease.
Historic artifacts	Three-dimensional objects including furnishings, art objects and items of personal property which have historic significance. “Historic artifacts” does not include paper, electronic media or other media that are classified as public records. (ORS 358.635)
Historic property	Real property that is currently listed in the National Register of Historic Places, established and maintained under the National Historic Preservation Act of 1966, or approved for listing on an Oregon register of historic places.
Human remains	The physical remains of a human body, including, but not limited to, bones, teeth, hair, ashes or mummified or otherwise preserved soft tissues of an individual. (ORS 358.905)
Hydrocarbon	Any compound containing only hydrogen and carbon, such as natural gas.

Hydrological maturity	The degree to which hydrologic processes (e.g., interception, evapotranspiration, snow accumulation, snowmelt, infiltration, runoff) and outputs (e.g., water yield and peak discharge) in a particular forest stand approach those expected in an older forest stand under the same climatic and site conditions. In this document, for rain-on-snow runoff, a well-stocked conifer stand is defined as hydrologically mature when it is at least 25 years old.
Hydrology	Study of the properties, distribution, and effects of water on the landscape, under the surface, in the rocks, and in the atmosphere.
IHA	See “interior habitat area.”
Indian tribe	Any tribe of Indians recognized by the Secretary of the Interior or listed in the Klamath Termination Act, 25 U.S.C. 3564 et seq., or listed in the Western Oregon Indian Termination Act, 25 U.S.C. 3691 et seq., if the traditional cultural area of the tribe includes Oregon lands (ORS 97.740).
Induced landscape diversity	Aspects of the landscape that change as a result of disturbances such as fire, windstorms, human activities, and animals; for example, the successional stages of vegetation that occur after a wildfire.
Inherent landscape diversity	Aspects of the landscape that are relatively permanent (changing only slowly over long periods of time) in any particular landscape, but that vary among landscapes. Examples are climate, soils, topography, and aspect (such as south-facing aspect).
Inner gorge	An area next to a stream or river where the adjacent slope is significantly steeper than the gradient of the surrounding hillsides. In the absence of an on-site inspection and determination by a Department of Forestry geotechnical specialist or other qualified person, these areas are defined as having a slope gradient adjacent to the stream of 70 percent (35 degrees) or greater, and where the height of the slope break is at least 15 feet (measured vertically) above the elevation of the channel.
Interior habitat area	That portion of the older forest patch that remains effective when the negative effects of high contrast edge are removed.

Land Conservation and Development Commission (LCDC)	A seven-person commission that sets the standards for Oregon's statewide planning program. Members are volunteers appointed by the Governor and confirmed by the State Senate.
Land Use Board of Appeals (LUBA)	Established in 1979 essentially as a state court that rules on matters involving land use. Appeals from LUBA go to the State Court of Appeals and finally to the Supreme Court.
Landscape	An area of land containing a mosaic of habitat patches, often within which a particular "target" habitat patch is embedded. Also defined as a unit of land with separate plant communities or ecosystems forming ecological units with distinguishable structure, function, geomorphology, and disturbance regimes.
Landslide	The dislodging and fall of a mass of earth and rock. There are many types of landslides, including debris slides, earthflows, rock block slides, slumps, slump blocks, and slump earthflows. The different types of landslides vary tremendously in how they occur, how far they move, what type of materials move, etc.
Late successional habitat	A forest stand whose typical characteristics are a multi-layered, multi-species canopy dominated by large overstory trees; numerous large snags; and abundant large woody debris (such as fallen trees) on the ground. Other characteristics such as canopy closure may vary by the forest zone (lodgepole, ponderosa, mixed conifer, etc.).
Layered (LYR)	This stand type occurs as the process of understory reinitiation progresses where openings in the canopy persist. Shrub and herb communities are more diverse and vigorous, and two or more distinct layers of tree canopy appear.
Lithic scatter	A location where prehistoric stone tools were made, usually from obsidian. The tools and weapons were used locally or traded.
Loading	The quantity of a substance entering a body of water.
LYR	See "layered."
Management basin	An area used for forest planning. Management basins range from 5,000 to 8,000 acres. Their boundaries are based primarily on drainage and topographic patterns within the major drainage basins and watersheds, with some adjustments to follow roads or obvious topographic features.

Matrix	The dominant landscape element in which patches are embedded.
MBF	Thousand board feet.
MMBF	Million board feet.
Monitoring	The measurement of environmental characteristics and conditions over an extended period of time, in order to determine status or trends in some aspect of environmental quality. **Implementation monitoring —** Asks the question, “Did we do what we said we would do?” **Effectiveness monitoring —** Asks the question, “Are the management practices producing the desired results?” **Validation monitoring —** Asks the question, “Are the planning assumptions valid, or are there better ways to meet planning goals and objectives?”
NAAQS (National Ambient Air Quality Standards)	Under the federal Clean Air Act, the Environmental Protection Agency was responsible for setting air quality standards. They developed NAAQS, which establish the maximum concentration for various pollutants that may be present in the ambient (surrounding) air. Standards are measured on short-term (3, 8, or 24 hours) or annual basis.
National Environmental Policy Act	Commonly known as NEPA; became law in 1969. NEPA is the basic national charter for the protection of the environment. The Act requires all federal agencies to consider and analyze all significant environmental impacts of any action proposed by those agencies; to inform and involve the public in the agency’s decision-making process; and to consider the environmental impacts in the agency’s decision-making process.
Neotropical migrant birds	Birds that migrate annually to the biogeographic realm that includes South America, the Indies, Central America, and tropical Mexico.
NEPA	See “National Environmental Policy Act.”
Nonpoint source	Entry of a pollutant into a body of water from widespread or diffuse sources, with no identifiable point of entry. The source is not a distinct, identifiable source such as a discharge pipe. Erosion is one example of a nonpoint source.
Non-salmonid fish	Any fish species outside the family *Salmonidae*; may be resident or anadromous; examples are Pacific lamprey and sculpins.

Northwest Oregon state forests	Includes all state forest lands within the planning area.
Northwestern Oregon	In this document, the term "northwestern Oregon" is used to describe the planning area, as shown on the vicinity map.
OFS	See "older forest structure."
OHV	Off-highway vehicle.
Old growth	A forest stand whose typical characteristics are a patchy, multi-layered, multi-species canopy dominated by large overstory trees, some with broken tops and decaying wood; numerous large snags; and abundant large woody debris (such as fallen trees) on the ground. In western Oregon, old-growth characteristics begin to appear in unmanaged forests at 175 to 250 years of age. (See **Late successional habitat**.)
Older forest structure (OFS)	This stand type occurs when forest stands attain structural characteristics such as numerous large trees, multi-layered canopy, substantial number of large, down logs, and large snags. It is not the same as old growth, although some of its structures are similar to old growth.
OSCUR	This acronym refers to the Department of Forestry's current computerized forest inventory system. The acronym's letters stand for Ownership, Site, Cover, Use, and Recommendations. It includes 1:12,000 scale maps and overlays, data files by type and various sorts, and data summaries. OSCUR was developed by the Department of Forestry.
Owl circle	Area defined for the purpose of identifying the home range of a spotted owl pair or resident single owl; circle size varies by physiographic province. In the Oregon Coast Range, the radius of an owl circle is 1.5 miles, encompassing the area of 4,766 acres. Guidelines established by the U.S. Fish and Wildlife Service (later rescinded) required protecting 70 acres of owl habitat immediately around an owl activity center, 500 acres within 0.7 miles, and 1,906 acres within 1.5 miles.
Particulate	Small particles that are in smoke produced by burning wood and other forest debris. Two kinds of particulate are controlled under federal and/or state requirements: TSP and PM-10.
Patch	The landscape patch is an environmental unit between which "quality" differs, such as a habitat patch.
Phellinus weirii	A fungus that infects some species of trees, causing laminated root rot.
PM-10	Particles smaller than 10 microns in diameter, present in wood

smoke.

Point source	The release of a pollutant from a pipe or other distinct, identifiable point, directly into a body of water or into a water course leading to a body of water.
Pollutant	Any substance of such character and in such quantities that when it reaches a body of water (or the air or the soil), it degrades the resource by impairing its usefulness (including its ability to support living organisms).
Population	The organisms that make up a particular group of a species, or that live in a particular habitat or area. For fish: "A group of fish spawning in a particular area at a particular time which do not interbreed to any substantial degree with any other group spawning in a different area, or in the same area at a different time." [Oregon Administrative Rule, Division 7, 635-07-501(38)]. For example, "Nehalem River fall chinook salmon" are a population.
Prescribed burning	Controlled fire burning under specified conditions in order to accomplish planned objectives; also called slash burning, as a frequent objective is to reduce the amount of slash left after logging.
Recognized Indian tribe	A tribe of Indians with federally acknowledged treaty or statutory rights.
Recreation Opportunity Spectrum (ROS)	A framework for understanding and defining various settings of recreation environments, activities, and experiences. The settings are defined in terms of the opportunities to have different sorts of experiences, and range from primitive to urban. They are defined by setting indicators such as access, naturalness, facilities, and social encounters.
REG	See "regeneration."
Regeneration (REG)	This stand type occurs when a disturbance such as timber harvest, fire, or wind has killed or removed most or all of the larger trees, or when brush fields are cleared for planting.
Resident fish	Fish species that complete their entire life cycle in freshwater; non-anadromous fish; an example is a resident population of cutthroat trout.
Riparian area	Three-dimensional zone of direct influence and/or interaction between terrestrial and aquatic ecosystems. The boundaries of the riparian area extend outward from the stream bed or lakeshore.

Riparian management area (RMA)	A protected area with site-specific boundaries established by the Department of Forestry; the width varies according to the stream classification or special protection needs. The purpose of the RMA is to protect the stream, aquatic resources, and the riparian area. Aquatic resources include water quality, water temperature, fish, stream structure, and other resources.
RMA	See "riparian management area."
Rock block slide	Type of landslide in which the weakness and initial breaking is in the underlying rock, not the soil. See also "landslide."
ROS	See "Recreation Opportunity Spectrum."
Sacred object	An archaeological object that is demonstrably revered by any ethnic group, religious group or Indian tribe as holy; is used in connection with the religious or spiritual service or worship of a deity or spirit power; or was or is needed by traditional native Indian religious leaders for the practice of traditional native Indian religion. (ORS 358.905)
Salmonid	Fish species belonging to the family *Salmonidae*; includes trout, salmon, and whitefish species.
SBM	See "structure-based management."
Seral stages	Developmental stages that succeed each other as an ecosystem changes over time; specifically, the stages of ecological succession as a forest develops.
SHPO	See "State Historic Preservation Office."
SIP	State Implementation Plan. This plan implements the Clean Air Act and contains general provisions for protecting air quality in all areas of the state.
Site	A geographic locality in Oregon, including but not limited to submerged and submersible lands and the bed of the sea within the state's jurisdiction, that contains archaeological objects and the contextual associations of the archaeological objects with: each other; or biotic or geological remains or deposits. (ORS 358.905) See specific types of sites on next page, as defined in Oregon law. **(Continued on next page)**

Site **(Continued from previous page)**	**Pre-historic archaeological site —** Created and/or used by humans indigenous to the area before Euro-American inhabitance. **Historic archaeological site** — Created and/or used by humans since the time of Euro-American inhabitance; usually below and/or above-ground diminishing remains. **Historic site** — Created and/or used by humans since the time of Euro-American inhabitance; usually above-ground structural intact remains. **Site of archaeological significance —** Any archaeological site on, or eligible for inclusion on, the National Register of Historic Places as determined in writing by the State Historic Preservation Officer, or any archaeological site that has been determined significant in writing by an Indian tribe. (ORS 358.905)
Site class	Site class is a measure of an area's relative capacity for producing timber or other vegetation. It is measured through the site index. The site index is expressed as the height of the tallest trees in a stand at an index age (King 1966). In this document, an age of 50 years is used. The 5 site classes are defined below. Site class I — 135 feet and up Site class II — 115-134 feet Site class III — 95-114 feet Site class IV — 75-94 feet Site class V — Below 75 feet
Slope stability	The degree to which a slope resists the downward pull of gravity. The more resistant, the more stable.
Slump	Type of landslide; involves a failure in the soil, tends to be spoon-shaped, and the base often oozes out. See also "landslide."
Slump blocks, slump earthflows	Types of landslides. See "landslide", "slump", and "earthflow."
Source/sink relationships	"Source patches" are more productive areas in the landscape, which supply emigrants to less productive patches, termed "sinks."
Species	"…any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." [Section 3(15) of the Endangered Species Act]

Species of Concern	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)
State Agency Coordination Program	Required under law for each state agency, to establish procedures to assure compliance with statewide land use goals and acknowledged city and county comprehensive plans and land use regulations.
State Historic Preservation Office	Oregon's SHPO was created in 1966 by federal statute. It administers the Statewide Plan for Historic Preservation and submits Oregon's nominations for the National Register of Historic Places.
Statewide Planning Goals	Statewide Planning Goals are adopted by the Land Conservation and Development Commission to set standards for local land use planning. They have the force of law.
Stock	"For the purposes of fisheries management, a stock is an aggregation of fish populations which typically share common characteristics such as life histories, migration patterns, or habitats." [Oregon Administrative Rule, Division 7, 635-07-501(51)]. For example, "North-mid coast fall chinook salmon" can be defined as a stock. This stock includes a number of fall chinook "populations" from basins in this area such as the Siuslaw, Yaquina, and Tillamook Bay watersheds.
Stocking	A measure of the adequacy of tree cover on an area. Unless otherwise specified, stocking includes trees of all ages.
Strategy	In Oregon Department of Forestry forest management plans, strategies are specific actions that will be taken to achieve the management goals. (See also "goal.")
Stream	A channel that carries flowing surface water during some portion of the year, including associated beaver ponds, oxbows, side channels, and stream-associated wetlands if these features are connected to the stream by surface flow during any portion of the year. Ephemeral overland flow is not a stream since this type of flow does not have a defined channel.
Stream-associated wetland	A wetland that is immediately adjacent to a stream. This includes wetlands that are adjacent to beaver ponds, side channels, or oxbows that are hydrologically connected to the stream channel by surface flow at any time of the year.

Stream classification — Under the Department of Forestry's Forest Practices Act, streams are classified in two categories based on their beneficial use.

Type F — Fish-bearing stream.

Type N — Not a fish-bearing stream.

Perennial streams — Year-round surface flow. In the Forest Practices Act, defined as a stream that normally has summer surface flow after July 15.

Intermittent streams — Surface flow only part of the year. In the Forest Practices Act, defined as a stream that normally does not have summer surface flow after July 15. Ephemeral streams may run only during or shortly after periods of heavy rainfall or rapid snowmelt.

Stream reach — A section of stream that is geomorphically distinct, and that can be delineated from other adjacent sections based on channel gradient, form, or other physical parameters.

Structure — The physical parts of an ecosystem that we can see and touch; typical structures in a forest are tree sizes, standing dead trees (snags), fallen dead trees.

Structure-based management — A silvicultural approach that produces and maintains an array of forest stand structures across the landscape. The existing forest is gradually moved toward a desired range of stand structures through active management, using sound silvicultural practices.

Succession — A series of changes by which one group of organisms succeeds another group; a series of developmental stages in a plant community.

Threatened and endangered species — Federal and state agencies make formal classifications of wildlife species, according to standards set by federal and state Endangered Species Acts. The various classifications are defined below. Federal designations are made by the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS). State of Oregon designations are made by the Oregon Department of Fish and Wildlife (ODFW).

Federal Classifications

Candidate species — Those species for which the USFWS or NMFS has sufficient information on hand to support proposals to list as threatened or endangered.

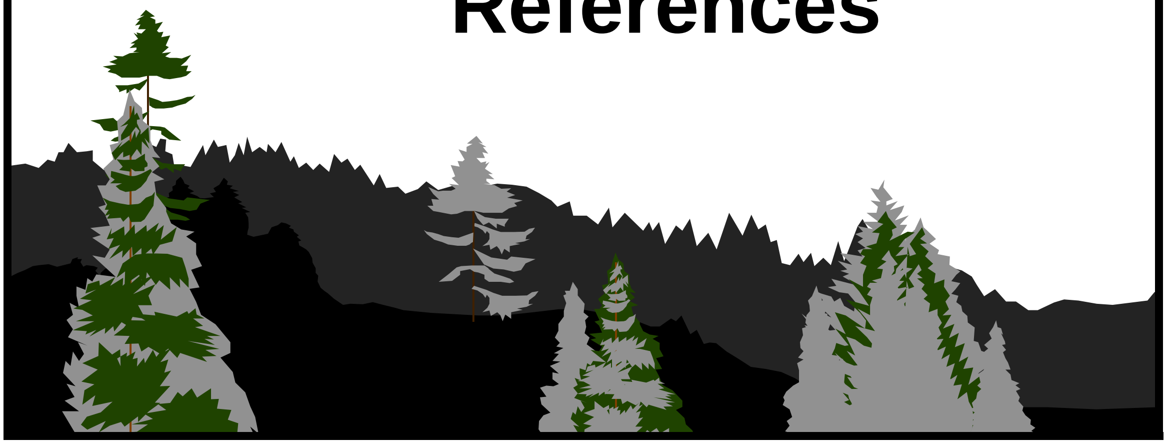
(Continued on next page)

Threatened and endangered species **(Continued from previous page)**	**Endangered species** — A species determined to be in danger of extinction throughout all or a significant portion of its range. **Federally listed species —** Species, including subspecies and distinct vertebrate populations, of fish, wildlife, or plants listed at 50 CFR 17.11 and 17.12 as either endangered or threatened. **Proposed threatened or endangered species —** Species proposed by the USFWS or NMFS for listing as threatened or endangered; not a final designation. **Threatened species —** Species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. **State Classifications** **Endangered species** — Any native wildlife species determined by the State Fish and Wildlife Commission to be in danger of extinction throughout any significant portion of its range within Oregon; or any native wildlife species listed as endangered by the federal ESA. **Sensitive species —** A watchlist, developed by the Oregon Department of Fish and Wildlife, of wildlife species that are likely to become threatened or endangered throughout all or a significant portion of their range in Oregon. Subdivided into four categories: critical, vulnerable, peripheral, and undetermined status. **Threatened species —** Any native wildlife species that the State Fish and Wildlife Commission determines is likely to become endangered within the foreseeable future throughout any significant portion of its range within Oregon.
Tillamook decline	A condition that has been observed in many Douglas-fir plantations in coastal northwest Oregon. Only Douglas-fir is affected; tree symptoms include chlorosis (yellowing), needle loss, and reduced growth (both height and diameter).
TMDLs	Total maximum daily loads; one measure of water quality.
TSP	Total suspended particulate in smoke; one measure of air quality.
UDS	See “understory.”
Understory (UDS)	This stand type occurs after the stem exclusion process has created small openings in the canopy, when enough light and nutrients become available to allow herbs, shrubs, and new trees to grow again in the understory.

Unrecognized Indian tribe	A tribe of Indians that has never been recognized by the federal government, or whose federal relations were terminated by the Klamath Termination Act or the Western Oregon Indian Termination Act.
Unsaturated zone	The layer of soil or rock between the aquifer and the surface of the ground. In this layer, some water is suspended in the spaces between soil or rocks, but the zone is not completely saturated.
Watershed	In general, a watershed is defined as an area within which all water that falls as rain or snow drains to the same stream or river. There are different levels of watersheds, from the watershed of a small stream to the watershed of the Willamette River. In this document, the large watersheds of major rivers are called “drainage basins.”. The term “watershed” is used to describe the drainages of mid-sized rivers, such as the Nehalem, Siuslaw, and North Santiam.
Water table	The top of the groundwater. The water table is generally subsurface; marshes and lakes form where the water table meets the land surface.
Wetland	As defined in Oregon’s Forest Practice Rules OAR 629-24-101 (77), wetlands are “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” The process to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989). Common examples are marshes, swamps, and bogs, although these are not the only types of wetlands.

Appendix B

References



This appendix lists the books, reports, and other publications referred to in the plan. Listings are alphabetical. The following format is used.

Author's name in bold. Year published. Title of publication. Publisher, publisher's location.

The following abbreviations are used in this appendix. Standard two-letter postal abbreviations are used for the names of states.

GTR	General Technical Report
PNW	Pacific Northwest Research Station (part of USDA Forest Service)
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior

The references begin on the next page.

Agee, J. K. 1991. Fire History of Douglas-Fir Forests in the Pacific Northwest. In: Ruggiero, L. R., and K. B. Aubry, A. B. Carey, and M. H. Huff, technical coordinators, 1991, Wildlife and Vegetation of Unmanaged Douglas-Fir Forests. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. General technical report PNW-GTR-285, pp. 25-33.

Agee, J. K. 1993. Fire Ecology of Pacific Northwest Forests. Island Press, Washington, D.C.

Atzet, T., and D.L. Wheeler. 1982. Historical and Ecological Perspectives on Fire Activity in the Klamath Geological Province of the Rogue River and Siskiyou National Forests. USDA Forest Service, Pacific Northwest Region, Portland, OR. Publication R-6-Range-102.

Atzet, T., and R.E. Martin. 1991. Natural Disturbance Regimes in the Klamath Province. *In:* Proceedings of the Symposium on Biodiversity of Northwestern California, October 28-30, 1991, Santa Rosa, CA.

Atzet, T., et al. 1992. Chapter 5, Vegetation. *In:* Reforestation Practices in Southwestern Oregon and Northern California. Oregon State University Forest Research Laboratory, Corvallis, OR.

Beckham, S.D. 1986. Land of the Umpqua: A History of Douglas County, Oregon. Douglas County Commissioners, Roseburg, OR.

Boyd, R. 1986. Strategies of Indian Burning in the Willamette Valley. Can. J. Anthropology 5:65-86.

Campbell, S., and L. Leigel, technical coordinators. 1996. Disturbance and Forest Health in Oregon and Washington. USDA Forest Service, Pacific Northwest Research Station, Portland, OR; and Oregon Department of Forestry; Washington Department of Natural Resources. General Technical Report PNW-GTR-381. 105 pp.

Campbell, S., and V. Hokkanen, J. Johnson, K. Sprengel. 1997. Disturbance and Forest Health in Oregon and Washington 1996 Update. USDA Forest Service, Pacific Northwest Region, Portland, OR. Prevention Report R6-FID-PR-001-98. 60 pp.

Carey, A. B., and C. E. Elliott, B. R. Lippke, J. Sessions, C. J. Chambers, C. D. Oliver, J. F. Franklin, M. G. Raphael. 1996. Washington Forest Landscape Management Project – A Pragmatic, Ecological Approach to Small Landscape Management. Report No. 2. Washington State Department of Natural Resources, Olympia, WA.

Carey, A. B., and M. L. Johnson. 1995. Small Mammals in Managed, Naturally Young, and Old-Growth Forests. Ecological Applications 5:336-352.

Chen, J., and J. F. Franklin, T. A. Spies. 1992. Vegetation Responses to Edge Environments in Old-Growth Douglas-Fir Forests. Ecological Applications 2(4): 387-396.

Crookham, C.S. 1992. 46 Op. Atty. Gen. 468 (1992), Opinion No. 8223, July 24, 1992. Opinion of Oregon Attorney General Charles S. Crookham on legal mandates for managing Common School Forest Lands.

Curtis, R.O. 1995. Extended Rotations and Culmination Age of Coast Douglas-Fir: Old Studies Speak to Current Issues. Research Paper PNW-RP-485. USDA Forest Service, Portland, OR

Dunning, J. B., and B. J. Danielson, H. R. Pulliam. 1992. Ecological Processes that Affect Populations in Complex Landscapes. Oikos 65:169-175.

Folliard, L. 2000. Personal Communication to M. Wilson from L. Folliard, USDI Fish and Wildlife Service, Oregon State Office, Portland, OR. Oregon Department of Forestry, Salem, OR.

Franklin, J.F., and C.T. Dyrness. 1988. Natural Vegetation of Oregon and Washington. USDA Forest Service, Oregon State University Press, Corvallis, OR.

Franklin, J. F., and R. T. Forman. 1987. Creating Landscape Patterns by Forest Cutting: Ecological Consequences and Principles. Landscape Ecology 1:5-18.

Goheen, D. J., and E. M. Hansen. 1978. Black Stain Root Disease in Oregon and Washington. Plant Disease Reporter. Issue 62:1098-1102.

Governor's Natural Resources Office. 1999. Oregon Plan for Salmon and Healthy Watersheds. Earlier drafts published in 1998, 1997. Office of the Governor, Salem, OR.

Hagar, J. C. 1992. Bird Communities in Commercially Thinned and Unthinned Douglas-Fir Stands of Western Oregon. M.S. Thesis. Oregon State University, Corvallis, OR.

Hansen, E. M. 1978. Incidence of *Verticicladiella wageneri* and *Phellius weirii* in Douglas-fir Adjacent to and Away from Roads in Western Oregon. Plant Disease Reporter. Issue 62:179-181.

Hansen, A.J., and T.A. Spies, F.J. Swanson, J.L. Ohman. 1991. Conserving Biodiversity in Managed Forests – Lessons from Natural Forests. BioScience 41(6): 382-392.

Harris, L. D, editor. 1984. The Fragmented Forest: Island Biogeographic Theory and the Preservation of Biotic Diversity. University of Chicago Press, Chicago, IL. 211 pp.

Hayes, J. P. 1998. An Independent Scientific Review of Oregon Department of Forestry's Proposed Western Oregon State Forests Habitat Conservation Plan. Department of Forest Science, College of Forestry, Oregon State University, Corvallis, OR. July 1998.

Hilborn, R. 1987. Living with Uncertainty in Resource Management. North American Journal of Fisheries Management 7: 1-5.

Holling, C. S., editor. 1978. Adaptive Environmental Assessment and Management. International Series on Applied Systems Analysis 3. John Wiley and Sons, London. 377 pp.

Hunter Jr., M. L. 1990. Wildlife, Forests, and Forestry —Principles of Managing Forests for Biological Diversity. Prentiss Hall Career & Technology, Englewood Cliffs, NJ.

Independent Multidisciplinary Science Team (IMST). 1999. Recovery of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds. Technical Report 1999-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, OR.

King, J. E. 1966. Site Index Curves for Douglas-fir in the Pacific Northwest. Weyerhaeuser Forestry Paper No. 8.

Kotliar, N. B., and J. A. Wiens. 1990. Multiple Scales of Patchiness and Patch Structure: A Hierarchical Framework for the Study of Heterogeneity. Oikos 59:253-260.

Krebs, C. J. 1972. Ecology — The Experimental Analysis of Distribution and Abundance. Harper & Row, New York, NY. 694 pp.

LaLande, J. 1991. The Indians of Southwestern Oregon: An Ethnohistorical Review. Department of Anthropology, Oregon State University, Corvallis, OR

Lee, K. N. 1993. Compass and Gyroscope: Integrating Science and Politics for the Environment. Island Press, Washington, DC. 243 pp.

Lettman, G. J., et al. 1996. Northwest Oregon State Forest Management Plan: Connection to State and Local Economies. Oregon Department of Forestry, Salem, OR.

McAllister, D. C. 1997. Landscape Management to Meet Wildlife Diversity Objectives. Unpublished paper. Oregon Department of Fish and Wildlife, Salem, OR.

McAllister, D. C., and R. W. Holloway, M. W. Schnee. 1998. Using Landscape Design Principles to Promote Biodiversity in a Managed Forest. Manuscript in review. Presented at: Forest Fragmentation: Wildlife and Management Implications, November 18-19, 1998, Portland, OR.

McComb, W.C., and W. Emmingham, J. Tappeiner, and T. Spies. 1991. Comprehensive Approaches for Managing Diversity: Silvicultural Perspectives. *In:* Coastal Oregon Productivity Enhancement: Managing Forest Biodiversity: A Coastal Northwest Perspective. Oregon State University, Corvallis, OR.

Michael, D. 1997. Landslides from Forest Lands in Oregon: A Proposal of Risk Based Management. Unpublished paper presented at AEG annual meeting, Portland, OR.

Noss, R. F. 1999. Assessing and Monitoring Forest Biodiversity: A Suggested Framework and Indicators. Forest Ecology and Management 115: 135-146.

Nyberg, B. 1998. Adaptive Management: When Should Monitoring Results Matter to Managers? Presented at: Monitoring for Forest Land Managers: Managing the Process. December 1-2, 1998, Corvallis, OR. Western Forestry and Conservation Association, Portland, OR.

O'Donnell, T. 1988. That Balance So Rare: The Story of Oregon. Oregon Historical Society Press, Portland, OR.

O'Donnell, T. 1996. Oregon History. *In:* Oregon Blue Book, Oregon Secretary of State, Portland, OR.

Oliver, C. D. 1992. A Landscape Approach — Achieving and Maintaining Biodiversity and Economic Productivity. Journal of Forestry. Vol. 90, No. 9.

Oliver, C. D. 1994. A Portfolio Approach to Landscape Management: An Economically, Ecologically, and Socially Sustainable Approach to Forestry. In: C. R. Bamsey, editor, Proceedings: Innovative Silviculture Systems in Boreal Forests. Clear Lake Ltd, Edmonton, Alberta, Canada.

Oliver, C. D., and B. C. Larson. 1996. Forest Stand Dynamics. John Wiley and Sons, New York, NY.

Oregon Board of Forestry. 1995. FPFO: Forestry Program for Oregon. 1995 edition. Oregon Board of Forestry and Oregon Department of Forestry, Salem, OR.

Oregon Department of Agriculture. Undated. Recommended Procedures for Dealing with Inventories and Biological Evaluations for Rare, Threatened, and Endangered Plant Species. Unpublished report by Oregon Department of Agriculture, Salem, OR.

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

Oregon Department of Forestry. 1987. Long Range Timber Management Plan, Southern Oregon Region State Forests. Salem, OR.

Oregon Department of Forestry. 1993a. Elliott State Forest Draft Management Plan. Oregon Department of Forestry, Salem, OR. December 1993.

Oregon Department of Forestry. 1994. Forest Practice Technical Note FP1 — Water Classification. April 1994. Oregon Department of Forestry, Salem, OR.

Oregon Department of Forestry. 1995a. Elliott State Forest Habitat Conservation Plan. Oregon Department of Forestry, Salem, OR. May 1995.

Oregon Department of Forestry. 1995b. Eastern Region Long-Range Forest Management Plan. Oregon Department of Forestry, Salem, OR. May 1995.

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

Oregon Department of Forestry. 2000a. Forest Roads Manual. Oregon Department of Forestry, Salem, OR.

Oregon Department of Forestry. 2000b. Draft Public Involvement Guidance. Oregon Department of Forestry, Salem, OR.

Oregon Department of Forestry. 2000c. Decadal Analysis of Alternatives. Oregon Department of Forestry, Salem, OR.

Oregon Department of Forestry. 2000d. Final Draft Northwest Oregon State Forests Management Plan. Oregon Department of Forestry, Salem, OR. September, 2000.

Oregon Department of Land Conservation and Development. 1995. Oregon's Statewide Planning Goals & Guidelines. 1995 Edition, Including 1996 Goal 5 and 1998 Goal 11 Updates. Oregon Department of Land Conservation and Development, Salem, OR.

Oregon Natural Heritage Program. 1995. Rare, Threatened and Endangered Plants and Animals of Oregon. Oregon Natural Heritage Program, Portland, OR.

Prellwitz, R. W. 1985. A Complete Three-Level Approach for Analyzing Landslides on Forest Lands. In: Proceedings of a workshop on slope stability: Problems and solutions in forest management. USDA Forest Service Pacific Northwest Research Station, Portland, OR. General Technical Report PNW-180, pp. 94-98.

Prellwitz, R. W., and T. E. Koler. 1994. Introduction to the Three-Level Stability Analysis Concept. In: Hall, D. E., and M. T. Long, M. D. Remboldt, editors; Slope Stability Reference Guide for National Forests in the United States. USDA Forest Service Engineering Staff Publication EM-7170-13, Washington, DC, pp. 9-12.

Pyne, S. J. 1982. Fire in America: A Cultural History of Wildland and Rural Fire. Princeton University Press, Princeton, NJ.

Rosenberg, K. V., and M. G. Raphael. 1984. Effects of Forest Fragmentation on Vertebrates in Douglas-Fir Forests. Pages 263-272. In: Verner, J., and M. L. Morrison, C. J. Ralph, editors; Wildlife 2000: Modeling Habitat Relationships of Terrestrial Vertebrates. University of Wisconsin Press.

Schroeder, J.E. 1974. Forest, People and Oregon: A History of Forestry in Oregon. Oregon Department of Forestry, Salem, OR.

Senge, P. M. 1990, 1994. The Fifth Discipline: The Art and Practice of the Learning Organization. Currency Doubleday, New York, NY. 423 pp.

Tappeiner, J., et al. 1992. Managing Stands for Northern Spotted Owl Habitat. In USDI 1992a. Pp. 481-525.

Thomas, J. W., et al. 1990. A Conservation Strategy for the Northern Spotted Owl: A Report of the Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. USDA Forest Service; USDI Bureau of Land Management, Fish and Wildlife Service, National Park Service, Portland, OR.

Underwood, A. J. 1995. Ecological Research and (and Research into) Environmental Management. Ecol. Appl. 5(1): 232-247.

USDI Bureau of Land Management. 1993, revised 1995. Riparian Area Management: Process for Assessing Proper Functioning Condition. USDI Bureau of Land Management, Denver, CO. Technical Reference 1737-9.

USDI Fish and Wildlife Service. 1997. Recovery Plan for the Marbled Murrelet (Washington, Oregon and California Populations). Region 1, Portland, OR.

USDI Fish and Wildlife Service, et al. 1989. Federal Manual for Identifying and Delineating Jurisdictional Wetlands. USDI Fish and Wildlife Service, Washington, DC.

Walstad, J.D., and S.R. Radosevich, D.V. Sandberg, editors. 1990. Natural and Prescribed Fire in Pacific Northwest Forests. Oregon State University Press, Corvallis, OR.

Walters, C. J. 1986. Adaptive Management of Renewable Resources. McGraw-Hill, New York, NY. 374 pp.

Webb, L. 2000. Personal Communication from L. Webb, Siskiyou National Forest, USDA Forest Service, to M. Wilson. Oregon Department of Forestry, Salem, OR.

Wiens, J. A. 1976. Population Response to Patchy Environments. Ann. Rev. Ecol. Syst. 7:81-129.

Zybach, R. 1993. Native Forests of the Northwest: 1788-1856 American Indians, Cultural Fire, and Wildlife Habitat. Northwest Woodlands 9(2): 14-15, 30-31.

Appendix C

Management Standards for Aquatic and Riparian Areas

The *Southwest Oregon State Forests Management Plan* uses a blended approach for the aquatic and riparian strategies. The first component is the landscape management strategies described in Chapter 4 of the plan. Over time, these strategies will create properly functioning riparian and aquatic conditions and processes. The second component a set of more site-specific strategies for aquatic and riparian areas, is discussed in detail in this appendix.

The second component of the 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.

In Chapter 4, Aquatic and Riparian Strategy 2 states:

Apply management standards for aquatic and riparian areas. Establish and maintain riparian management areas adjacent to all streams, in accordance with Appendix C of this plan, and species of concern strategies where they apply.

The site-specific, prescriptive standards in this appendix will guide forest management activities to achieve properly functioning aquatic and riparian habitat conditions over time. Management actions will be consistent with these standards, except where specific exceptions are documented and authorized by the District Forester. As information from monitoring efforts, watershed assessment and analysis, and other sources becomes available, specific standards may be changed or modified as necessary to meet the overall goal of maintaining and restoring properly functioning aquatic habitats.

Riparian Management Areas (RMAs)

Riparian management areas will be established immediately adjacent to waterways for the purpose of protecting aquatic and riparian resources, and maintaining the functions and ecological processes of the waterways. Within these areas, special management considerations and operational restrictions will be applied, and the protection of aquatic resources will be a high priority.

The width of riparian management areas will vary by the type and classification of the water body. These widths were developed by considering the functions and processes to be achieved or maintained by management activities. The width of a riparian management area (RMA) is measured horizontally beginning at the average high water level of the water body, or the edge of stream-associated wetland, side channel, or channel migration zone (whichever is farthest from the waterway), and extending toward the uplands. The width of these areas will be expanded, if necessary, to fully encompass certain sensitive sites such as inner gorge areas, or other special sites noted in the management prescriptions. See the “Key Terms” box on the next page for definitions.

Riparian management area widths are intended to be averages applied over the length of a management site. The actual extent of a specific RMA can be varied to tailor vegetation retention to site-specific conditions, or to address special resource considerations. For example, an RMA boundary will be expanded where a potentially unstable slope adjacent to a stream could deliver materials to the stream. The intent of this action is to increase the potential for large wood delivery should a disturbance event occur. Variations in RMA design will always be completed in a manner consistent with the management objectives for the specific aquatic or riparian area.

On the next several pages, guidelines are given for defining the four zones of a riparian management area and classifying streams. See “Basic Concepts for Aquatic and Riparian Conservation” in Chapter 4 for discussion of the functions and processes of healthy aquatic systems and the desired future condition for streams.

Key Terms

Active channel width — The average width of the stream channel at the normal high water level. The normal high water level is the stage reached during average annual high flow. This high water level mark often corresponds with the edge of streamside terraces; a change in vegetation, soil or litter characteristics; or the uppermost scour limit (bankfull stage) of a channel.

Average high water level — The stage reached during the average annual high flow period. This level often corresponds with the edge of streamside terraces, marked changes in vegetation, or changes in soil or litter characteristics.

Bog — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

Channel migration zone (CMZ) — An area adjacent to an unconfined stream channel where channel migration is likely to occur during high flow events. The presence of side channels or oxbows, stream-associated wetlands, and low terraces are indicators of these zones. The extent of these areas will be determined through site inspections using professional judgment.

Inner gorge — An area next to a stream or river where the adjacent slope is significantly steeper than the gradient of the surrounding hillsides. In the absence of an on-site inspection and determination by a Department of Forestry geotechnical specialist or other qualified person, these areas are defined as having a slope gradient adjacent to the stream of 70 percent (35 degrees) or greater, and where the height of the slope break is at least 15 feet (measured vertically) above the elevation of the channel.

Guidelines: The Four Zones of a Stream Riparian Management Area

Riparian management areas established along streams will contain four zones. The purposes and differences between these four zones are defined below and on the next page.

Aquatic zone — The aquatic zone is the area that includes the stream channel(s) and associated aquatic habitat features. This zone includes beaver ponds, stream-associated wetlands, side channels, and the channel migration zone. The other zones of a riparian management area are established upslope from the outer edge of these features.

Stream bank zone — The stream bank zone is the land closest to the stream, including the stream banks. Most riparian functions are supported to some extent by vegetation in this zone, including providing aquatic shade, the delivery of down wood and organic inputs (leaves and tree litter) to the stream and riparian area, stabilizing the stream bank, contributing to floodplain functions, and influencing sediment routing processes.

- The stream bank zone is defined as the area within 25 feet of the outer edge of the aquatic zone for all streams. This zone exists on both sides of a stream.

Inner RMA zone — The inner RMA zone is the next area away from the stream, adjacent to the stream bank zone. Vegetation within this zone contributes substantially to desired riparian functions, including providing aquatic shade, delivering a high proportion of the potential large wood available, and contributing organic inputs to the stream. Vegetation within this area also provides some protection to certain aspects of riparian micro-climate. Because vegetation in this zone has a relatively greater role in supporting riparian functions and processes, a high priority is being placed on management actions in this area.

- The inner RMA zone extends from 25 feet (the outer edge of the stream bank zone) to 100 feet from the stream. This zone exists on both sides of a stream.

Outer RMA zone — The outer RMA zone is the portion of the riparian management area farthest away from the stream. Vegetation within this zone may still contribute to certain riparian functions and processes, but to a lesser extent than the two zones closest to the stream. The primary functions provided by vegetation in this area include additional contributions of large wood to the riparian zone and stream channel, and the protection of riparian micro-climate. In some cases, the outer zone may also partially buffer the two inner zones from certain disturbance events such as windthrow.

- The outer RMA zone extends from the edge of the inner zone at 100 feet out to 170 feet from the stream. This zone exists on both sides of a stream.

Guidelines: Stream Classification

Determination of the applicable management standards for riparian areas is based on a stream classification system. Streams are grouped into two major categories based on the primary beneficial uses of the stream. Streams are further classified according to size, based on average annual flow. Flow pattern (perennial and seasonal) is also considered for small non-fish-bearing waters. This classification system is generally consistent with the method used for administration of the Oregon Forest Practices Act, as described in the Department of Forestry’s Forest Practice Technical Note FP1 — Water Classification (Oregon Department of Forestry 1994).

Beneficial Use Classifications

Streams, and other aquatic habitats, are classified into two major groups based on the presence or absence of certain fish species. The following definitions will be applied in classifying streams.

Fish-bearing (Type F) — Waters that are inhabited at any time of the year by anadromous or game fish species, or by fish species that are listed as threatened or endangered under either federal or state Endangered Species Acts.

Non-fish-bearing (Type N) — Waters that are not fish-bearing (see previous definition).

Stream Size Classifications

Streams are further classified by size, based on estimated average annual flow. The following definitions apply to these size categories.

- **Small —** Average annual flow of 2 cfs (cubic feet per second) or less.
- **Medium —** Average annual flow greater than 2 cfs, but less than 10 cfs.
- **Large —** Average annual flow of 10 cfs or greater.

Flow Pattern Classifications

Small non-fish-bearing (Type N) streams are also classified according to the flow pattern exhibited in normal water years. For the purposes of this plan, the following definitions will be used.

- **Perennial Type N streams —** streams that are expected to have summer surface flow after July 15.
- **Seasonal Type N streams —** streams that only flow during portions of the year; these streams are not expected to have summer surface flow after July 15.

Some seasonal non-fish-bearing streams are further classified as:

- **Seasonal high energy streams —** Seasonal streams with physical conditions that favor the periodic transport of coarse sediments and woody materials during high flow events. For the purposes of this plan, and in the absence of specific geomorphologic identification, stream reaches with an average gradient exceeding 15 percent, and an active channel width of five (5) feet or more will be defined as seasonal high energy streams.
- **Potential debris flow track reaches —** Potential debris flow track reaches are reaches on seasonal Type N streams that have been determined to have a high probability of delivering woody debris to a Type F stream.

Oregon Department of Forestry field staff will make the determination of the probability that a reach will deliver woody debris to a Type F stream, using the following criteria:

1. The seasonal stream reach must terminate at or below a high risk site. High risk sites include:
   a. Active landslides (slopes with tension cracks, unvegetated soil scarps, or jackstrawed trees caused by slope movement).
   b. Slopes steeper than 80 percent, excluding competent rock outcrops.
   c. Headwalls or draws steeper than 70 percent.
   d. Abrupt slope breaks, where the lower slope is the steeper and exceeds 70 percent, except where the steeper slope is a competent rock outcrop.
   e. Incised channels (hill slopes adjacent to the channel and steeper than the upland slope) with slopes steeper than 60 percent.
   f. Any other site determined to be of marginal stability by a Department of Forestry geotechnical specialist.

1. The path of a potential debris flow and the likelihood that a debris flow will reach a Type F stream. If any one of the following three conditions is present along the path from the high risk site to the Type F stream, then a debris flow is likely to stop and the stream reach would be determined to have a low probability of woody debris delivery:
   a. The presence of a channel junction that is 70 degrees or more, provided the channel downstream of the junction is less than 35 percent gradient.
   b. The presence of a stream reach which is less than 6 percent gradient for at least 300 feet.
   c. An average slope from the high risk site along the potential landslide path to the stream that is less than 20 percent.

Management Standards for RMAs

The following standards will guide management activities so that properly functioning riparian and aquatic conditions will be created over time. These standards will apply until alternative standards are identified through the adaptive management process. As new information and a better understanding of the watershed functions and processes become available, this knowledge will be integrated into the management of riparian and aquatic habitat through the adaptive management process. The management standards are presented in Tables C-1 and C-2.

Table C-1. Management Standards for Type F Stream RMAs

All Stream Sizes: Large, Medium, and Small	
Stream bank zone 0-25 ft.	• No harvest. • Less than 10% vegetative disturbance. • Full suspension required during cable yarding. • No ground-based equipment operation. • Leave any trees damaged or felled from yarding activities.
Inner RMA zone 25 to 100 ft.	• Manage for mature forest condition.[1] • No management activity where mature forest condition (MFC) exists, or where conditions are suitable for development of MFC in a reasonable time frame without further treatment. • Actively manage where necessary to achieve the desired future condition in a timely manner. • Minimum 15-year interval between harvest entries, and minimum number of entries necessary to achieve the desired future condition. • Partial cutting will maintain a conifer density of at least SDI 25%, and will retain at least 50 TPA. • No more than 10% vegetative disturbance allowed from cable yarding. • Full suspension wherever possible, or one-end suspension on all cable-yarded material. • Ground-based equipment operation limited to area more than 50 ft. from aquatic zone and slopes less than 35%, and allowed on no more than 10% of area. • Leave any trees damaged or felled from yarding activities and additional felled, girdled or topped trees to contribute toward down wood targets.[2] • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100 to 170 ft.	• Retain at least 10 to 45 [3] conifer trees and snags per acre (15 to 70 trees per 1,000 ft. of RMA). [4] • Retain all snags as safety permits. • Less than 10% ground disturbance from yarding activities. • Retain all dead and down material that was present prior to the operation.

1. Desired mature forest condition consists of a stand dominated by large conifer trees, or where hardwood-dominated conditions are expected to be the natural plant community, a mature hardwood/shrub community. For conifer stands, this equates to a basal area of 220 square feet or more per acre, inclusive of all conifers over 11 inches DBH. At a mature age (80-100 years or greater), this equals 40-45 conifer trees 32 inches in DBH per acre.
2. Up to 10 trees per acre will be retained as felled, girdled, or topped trees during partial cutting, to reach a target of 600-900 cubic feet per acre of hard down wood.
3. Outer zone tree retention target will be increased when less than the target number of conifers is present in the inner zone. The process for calculating the outer zone retention target is described in the section following the RMA prescription tables.
4. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

Table C-2. Management Standards for Type N Stream RMAs

	Large and Medium Type N Streams
Stream bank zone 0-25 ft.	• No harvest. • Less than 10% vegetative disturbance from cable yarding. • Full suspension required. • No ground-based equipment operation. • Leave any trees damaged or felled from yarding activities.
Inner RMA zone 25-100 ft.	• Manage for mature forest condition.[1] • No management activity where mature forest condition target already exists. • Actively manage where beneficial to achieve desired future condition. • Minimum 15-year interval between harvest entries entries, and minimum number of entries necessary to achieve the desired future condition. • Partial cutting will maintain a conifer density of at least SDI 25%, and will retain at least 50 TPA. • No more than 10% vegetative disturbance allowed from cable yarding. • Full suspension wherever possible, or one-end suspension on all cable-yarded material. • Ground-based equipment operation limited to area more than 50 ft. from aquatic zone and slopes less than 35%, and allowed on no more than 10% of area. • Leave any trees damaged or felled from yarding activities and additional felled, girdled or topped trees to contribute to down wood targets.[2] • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100-170 ft.	• Manage to retain at least 10 conifer trees and snags per acre (15 trees per 1,000 ft. of RMA).[3] • Retain all snags as safety permits.

1. Desired mature forest condition consists of a stand dominated by large conifer trees, or where hardwood-dominated conditions are expected to be the natural plant community, a mature hardwood/shrub community. For conifer stands, this equates to a basal area of 220 square feet or more per acre, inclusive of all conifers over 11 inches DBH. At a mature age (80-100 years or greater), this equals 40-45 conifer trees 32 inches in DBH per acre.
2. Up to 10 trees per acre will be retained as felled, girdled, or topped trees during partial cutting, to reach a target of 600-900 cubic feet per acre of hard down wood.
3. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

Table C-2 continued. Management Standards for Type N Stream RMAs

Small Perennial Type N Streams (applied to at least 75% of reach)[1]	
Stream bank zone 0-25 ft.	• No harvest. • No ground-based equipment operation.
Inner RMA zone 25-100 ft.	• Manage to retain at least 15-25 conifer trees and snags per acre (25-40 trees per 1,000 ft. of RMA).[2,3] • Retain all other snags as safety permits. • Within 500 ft. of a confluence with a Type F stream, retain all hardwoods, non-merchantable trees, and other conifers as necessary, to achieve 80% shade over aquatic zone. • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100-170 ft.	• Manage to retain 0-10 conifer trees and snags per acre (0-15 trees per 1,000 ft. of RMA).[2,3] • Retain all snags as safety permits.

1. Prescription to be applied to at least 75% of perennial stream reach, including the first 500 ft. above the confluence with a Type F, and areas that meet the definition of a Special Emphasis Area (SEA) according to the definitions in the section following these tables.
2. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.
3. In meeting the tree retention target for the inner and outer zones, preference will be given to retaining trees within the inner zone. Where there are sufficient trees within the inner zone to meet the combined target for the two zones (40 trees per 1,000 ft.), then no additional leave trees are required in the outer zone.

Table C-2 continued. Management Standards for Type N Stream RMAs

Small Seasonal Type N Streams: High Energy Reaches (applied to at least 75% of reach)[1]	
Stream bank zone 0-25 ft.	• No harvest. • No ground-based equipment operation.
Inner RMA zone 25-100 ft.	• Manage to retain at least 15-25 conifer trees and snags per acre (25-40 trees per 1,000 ft. of RMA).[2,3] • Retain all other snags as safety permits. • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100-170 ft.	• Manage to retain 0-10 conifer trees and snags per acre (0-15 trees per 1,000 ft. of RMA).[2,3] • Retain all snags as safety permits.
Small Seasonal Type N Streams: Potential Debris Flow Track Reaches (applied to at least 75% of reach)[1]	
Stream bank zone 0-25 ft.	• No harvest. • No ground-based equipment operation.
Inner RMA zone 25-100 ft.	• Manage to retain at least 10 conifer trees and snags per acre (15 trees per 1,000 ft. of RMA).[2,4] • Retain all other snags as safety permits. • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100-170 ft.	• Retain trees and snags sufficient to meet landscape management strategy targets.
Other Small Seasonal Type N Streams (applied to at least 75% of reach)	
Stream bank zone 0-25 ft.	• Maintain integrity of stream channel. • No ground-based equipment operation.
Inner RMA zone 25-100 ft.	• Manage to retain at least 10 conifer trees and snags per acre where operationally feasible (16 trees per 1,000 ft. of RMA).[2] • Retain all other snags as safety permits. • Retain all dead and down material that was present prior to the operation.
Outer RMA zone 100-170 ft.	• Retain trees and snags sufficient to meet landscape management strategy targets.

1. Prescription to be applied to at least 75% of stream reach, including the first 500 ft. above the confluence with a Type F stream.
2. All trees retained will be dominant or co-dominant conifer trees (if available). In order to balance the need for short-term and long-term recruitment of large wood to the aquatic zone, preference will be given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.
3. In meeting the tree retention target for the inner and outer zones, preference will be given to retaining trees within the inner zone. Where there are sufficient trees within the inner zone to meet the combined target for the two zones (40 trees per 1,000 ft.), then no additional leave trees are required in the outer zone.
4. To maximize the influence of retained trees on debris flow processes, preference will be given to retaining these trees as close to the stream channel as operationally feasible, or on adjacent slope features that exhibit a high potential for failure and delivery to the stream.

Increasing Outer Zone Conifer Retention on Type F Streams

On Type F streams, in situations where the number of conifers available for retention within the inner zone is not adequate to achieve the large wood delivery potential of a mature forest condition, additional conifers will be retained in the outer zone to provide additional large wood recruitment potential.

This additional outer zone target will apply when the number of conifers of suitable size (11 inches or greater DBH) in the inner zone is less than the mature forest condition target of 45 TPA (100 trees per 1,000 lineal feet of stream for a 100-foot inner zone).

The number of additional conifers to be retained in the outer zone will be equal to the deficit from the inner zone target, adjusted to account for the different widths of the zones. For example, if the inner zone has an average of 70 suitable conifers per 1,000 feet of stream, then the additional retention level for the outer zone would equal 30 times 0.7, or an additional 21 conifers per 1,000 feet of outer zone.

In no case shall the number of conifers required to be retained in the outer zone exceed the inner zone target for mature forest condition. This means no more than 70 conifers per 1,000 feet of outer zone or 45 TPA are required. In addition, no trees shall be required to be retained in the outer zone in locations where, due to topography, they would have no opportunity to reach the area within the channel migration zone and thus potentially function as large wood in the stream channel. All conifers retained under this strategy shall meet the conifer retention criteria as described in footnotes to Tables C-1 and C-2: dominant or co-dominant trees, with preference given to retaining trees on adjacent slopes, trees leaning toward the aquatic zone, and trees closest to the channel.

Perennial Type N Stream Special Emphasis Areas

On small Type N streams, the required riparian management areas will be located to provide protection to the following special emphasis areas. These special emphasis areas may be especially important to certain species (such as amphibians), or to the functions and processes within a watershed.

Seeps and Springs in Inner RMA Zone, Connected to Aquatic Zone

The 25-foot stream bank zone of the stream, which is the no-harvest zone, will be extended around the outer perimeter of side slope seeps and springs that are within 100 feet of the aquatic zone and connected to the channel via overland flow. The inner zone will follow that boundary.

Source Areas of Perennial Streams

The 25-foot stream bank zone, which is the no-harvest zone, will be extended for a distance of 100 feet above the initiation point of perennial flow.

Stream-Associated Wetlands

The 25-foot stream bank zone, which is the no-harvest zone, will be extended around the outer perimeter of the wetland area.

Inner Gorge Areas

- A no-harvest zone will be extended to the top of the slope break that defines the inner gorge.
- If the slope break is less than 100 feet from the edge of the CMZ, then the applicable inner zone standard will be applied for the remaining distance (out to a maximum of 100 feet), and the applicable outer zone standard will be applied out to 170 feet.
- If the slope break is greater than 100 feet from the edge of the CMZ, then the outer zone standard will be applied from the slope break out to 170 feet.

Stream Junctions

The 25-foot stream bank zone (no harvest) will be extended for a minimum of 100 feet upstream and downstream, on each stream, where two or more small Type N perennial streams intersect.

Significant Waterfalls

- A significant waterfall is one that has an identifiable splash zone. The splash zone is the area immediately adjacent to the stream channel that is occupied by vegetation commonly associated with wet areas, i.e., mosses, maidenhair or licorice fern, and other hydric species.
- For these sites, the stream bank zone (no harvest) will be extended around the outer perimeter of the splash zone of the waterfall.

Landscape Green Tree Retention and RMA Conifer Retention Targets

It is recognized that conifer trees retained on the landscape during regeneration harvests provide benefits to both upland and riparian species, as well as contributing to aquatic habitats. Although any given tree or group of trees retained may provide multiple benefits, it is assumed that it would be undesirable for all leave trees to be concentrated in riparian management areas, with few or none in upslope areas, or vice-versa. Therefore, the following standards and guidelines will be used in accounting for the required RMA and landscape-level live tree retention targets.

Management Standards

- Conifers retained to meet the requirements in the inner zone of streams managed for mature forest condition (Type F, and large or medium Type N) will not be counted towards achieving the landscape-level live tree retention standard.
- Conifer trees retained to meet the requirements on all other RMA zones may be counted towards achieving the landscape-level leave tree retention standard.

Management Guidelines

- On regeneration harvest units, leave trees should be arranged to meet the intent and functional objectives for both riparian and upslope habitat values.
- On average, at least 25 percent of the leave trees required to meet the landscape standard should be located in riparian areas that extend well into upslope areas, or in upslope areas that are outside of riparian areas.

Other Aquatic Habitats

The northwest Oregon state forests contain other aquatic habitats besides streams, such as wetlands, lakes, ponds, 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 following strategies apply to these other aquatic habitats.

Prescriptions

The prescriptions for other aquatic habitats are presented in the following two tables.

Key Terms

Wetland — An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The process used to determine the presence of wetlands will be consistent with the method described in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (USDI Fish and Wildlife Service et al. 1989).

Bog — A wetland that is characterized by the formation of peat soils and that supports specialized plant communities. A bog is a hydrologically closed system without flowing water. It is usually saturated, relatively acidic, and is dominated by ground mosses, especially sphagnum. Bogs are distinguished from other wetlands by the dominance of mosses and the presence of extensive peat deposits.

Table C-3. Management Prescriptions for Lakes, Ponds, and Wetlands

Greater Than 1 Acre
• Establish a 25-foot no harvest zone, starting from the high water line, or wetland boundary (whichever is greater). • Establish a riparian management area (RMA) of 100 feet from the high water line, or wetland boundary (whichever is greater). • Manage vegetation to achieve and maintain mature forest conditions. • The site-specific prescription will classify the wetland.
From 1/4 Acre to 1 Acre
• Establish a 25-foot no harvest zone, starting from the high water line, or wetland boundary (whichever is greater). • Establish a riparian management area (RMA) of 50 feet from the high water line, or wetland boundary (whichever is greater). • Within the RMA, harvest activities will retain at least 50% of the existing live tree basal area, or 110 square feet of basal area per acre (whichever is greater). Retained trees will generally be representative of the existing diameter classes and species distribution, with a preference for retaining trees greater than 20 inches DBH. • If the waterway is inhabited by fish, or is identified as an important area for temperature-sensitive amphibian species, at least 80% shade will be maintained over the aquatic area. • The site-specific prescription will classify the wetland.
Less Than 1/4 Acre
• Establish an RMA of 50 feet for waters containing fish (Type F), or 25 feet for non-fish-bearing (Type N) waters. These areas will be measured from the high water line, or wetland boundary (whichever is greater). • For Type F waters, harvest within the RMA will retain at least 50% of the existing live tree basal area, or 110 square feet of basal area per acre (whichever is greater). Retained trees will generally be representative of the existing diameter classes and species distribution, with a preference for retaining trees greater than 20 inches DBH. • For Type N waters, hardwood trees and brush will be retained to protect the hydrologic functions and wildlife habitat values of the site. • If the waterway is inhabited by fish, or is identified as an important area for temperature-sensitive amphibian species, at least 80% shade will be maintained over the aquatic area.
Stream-Associated Wetlands
• Stream-associated wetlands are considered to be components of the aquatic habitat of streams, and will be managed according to the objectives and prescriptions specified for the associated stream.

Table C-4. Management Prescriptions for Estuaries, Bogs, Seeps, and Springs

Estuaries

- Establish a 25-foot no harvest zone, starting from the high water line or estuarine wetland boundary (whichever is greater).
- Establish a riparian management area (RMA) of 200 feet from the high water line, or estuarine wetland boundary (whichever is greater).
- Manage vegetation within the RMA to achieve and maintain mature forest conditions.

Bogs

- Establish a 25-foot no harvest zone, starting from the high water line or wetland boundary (whichever is greater).
- Establish an RMA of 100 feet from the high water line or wetland boundary (whichever is greater).
- Manage vegetation within the RMA to achieve and maintain mature forest conditions.

Seeps and Springs

Where possible, these aquatic areas should be incorporated into the RMAs of adjacent streams, and vegetation retention provided according to the stream prescription. In practice, this may simply require adjusting the boundary of a stream's RMA to fully encompass the spring or seep.

Other management considerations for some of these areas were described earlier in the section titled "Perennial Type N Stream Special Emphasis Areas."

Appendix D

Legal and Policy Mandates

This section describes in detail the main legal and policy mandates that affect state land management. It is divided into the five sections listed below.

- **Board of Forestry Land —** This section discusses the history, legal mandates, policy mandates, and funding mechanisms for these lands.
- **Common School Forest Land —** This section discusses the history, legal mandates, policy mandates, and funding mechanisms for these lands.
- **Comparison of state and federal legal mandates —** The legal mandates for state forests are very different from the legal mandates for national forests. This section discusses the key differences.
- **Other legal mandates —** This section discusses other legal mandates that affect the management of state forests, including a 1992 Attorney General’s opinion on the objective of Common School Forest Land management; federal and state Endangered Species Act requirements; Oregon Forest Practices Act requirements; and Oregon land use laws.
- **Legal and policy mandates for specific resources —** This section discusses mandates that apply to specific resources.

Board of Forestry Land

History

Board of Forestry (BOF) lands were acquired by the Board of Forestry in two ways: 1) through direct purchase; and 2) through transfer of ownership from counties in exchange for a portion of the future revenue produced by these lands.

Under the Board of Forestry's supervision, the Department of Forestry manages BOF lands to provide 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.

Legal Mandates

Forest Management Planning

The Oregon Revised Statutes refer to forest management planning in ORS 526.255, which calls for "long-range management plans based on current resource descriptions and technical assumptions, including sustained yield calculations for the purpose of maintaining economic stability in each management region." Oregon Administrative Rule 629-035-0030 provides more specific direction on what information these forest management plans must contain and the mechanisms for Board of Forestry approval.

Other Key Statutes and Rules

Oregon Revised Statutes 530.010 through 530.170 guide the acquisition, management, and development of state forests that are under the jurisdiction of the Board of Forestry. The statutes are discussed below and on the next page.

1. ORS 530.010 authorizes the Board of Forestry, in the name of the State of Oregon, to acquire lands which are chiefly valuable for forest crop production, watershed protection and development, erosion control, grazing, recreation, or forest administrative purposes.

   The lands may be acquired by purchase, donation, devise, or exchange from any public, quasi-public, or private landowner. All land acquisitions are subject to the prior approval of the county commissioners of the county in which the lands are located. The lands so acquired are designated as "state forests."

2. ORS 530.030 deals with the conveyance of county forest lands to the state. This statute recognizes that BOF lands are managed to produce income for the counties.

   Most of these lands were originally acquired by the counties through foreclosure of tax liens. Under county ownership, the lands provided revenue to the counties. The statute maintains this revenue source by allowing ownership to be conveyed to the state “in consideration of the payment to such county of the percentage of revenue derived from such lands.” The percentage distribution of revenue between counties and the state is addressed in ORS 530.110.

3. ORS 530.050 directs that BOF lands shall be managed so as “to secure the greatest permanent value of such lands to the state.” To this end, the State Forester, under the authority and direction of the State Board of Forestry, is given the latitude to:
   - Sell forest products.
   - Reforest and protect from fire.
   - Execute mining leases and contracts.
   - Sell rock, sand, gravel, pumice, etc.
   - Produce minor forest products.
   - Grant easements, and charge fees for road use.
   - Permit the lands to be used for other purposes (e.g. fish and wildlife environment, landscape effect, flood and erosion protection, recreation, domestic livestock, and water supplies), provided such uses are “not detrimental to the best interest of the state” in the opinion of the Board of Forestry.
   - Do all things and make all rules necessary for the “management, protection, utilization, and conservation of the lands.”

4. Oregon Administrative Rules 629-035-0000 through 629-035-0110 provide direction for state forest management policy and planning, and further define how the lands are to be managed to achieve “greatest permanent value” to the citizens of Oregon.

   The rules provide the following direction:
   - As provided in the statutes, “greatest permanent value” means 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.
   - To secure the greatest permanent value, the lands are to be maintained as forest lands and actively managed in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context.
   - Forest management plans are to be developed and implemented that will secure the greatest permanent value.

Analysis of Legal Mandates

The Board of Forestry's legal mandates for managing BOF lands include the dual obligations of sharing income with the counties (ORS 530.030) and conserving, protecting, and using a variety of natural resources (ORS 530.050). The administrative rules governing state forest management policy and planning provide direction on how to balance these dual obligations. The rules' primary findings and directions are summarized below and on the next page.

1. These lands must be managed to achieve the greatest permanent value to the state.
2. The counties in which these forest lands are located have a protected and recognizable interest in receiving revenues from these forest lands; however, the Board and the State Forester are not required to manage these forest lands to maximize revenues, exclude all non-revenue producing uses on these forest lands, or to produce revenue from every acre of these forest lands.
3. Based on existing Board principles and policies and current scientific and silvicultural information, the uses set forth in the rules are compatible over time and across the landscape when the lands are actively managed in an environmentally and silviculturally exemplary manner.
4. Based on existing Board principles and policies and current scientific and silvicultural information, forest lands that are actively managed as provided for in the rules can produce economic value over the long term and promote healthy, sustainable forest ecosystems.
5. Actively managing forest lands for the purposes described in the rules is in the best interest of the state.

Policy Mandates

The Forestry Program for Oregon

The Forestry Program for Oregon (FPFO) is a broad policy statement that outlines the Board of Forestry's role in serving the citizens of Oregon. The Board performs three primary functions.

1. Promoting certain forestry objectives by serving as an advocate of good stewardship in forest resource management.
2. Encouraging certain objectives by providing a climate to meet these needs through proposed legislation, incentives, and services.
3. Directing that certain actions take place where the Board has a specific regulatory or managerial responsibility.

The FPFO's Timber Growth and Harvest Objective is to "promote healthy and productive forests to provide a maximum, sustainable, supply of timber." Under this objective there is an explicit reference to state-owned timberlands: "The department will intensively manage state forest lands (Board of Forestry and Common School Lands) in an exemplary fashion for the sustained production of timber in a cost-effective and an environmentally sound manner. Such intensive management is designed to generate revenue for the beneficiaries of the land, including county government, local taxing districts and the Common School Fund."

Fish and Wildlife Policy

OAR 629-035-0020 provides policy direction for the management of fish and wildlife resources on Board of Forestry Lands. This rule specifies that the lands will be managed to provide 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. Specifically, these benefits include properly functioning aquatic habitats for salmonids and other native fish and aquatic life; and habitats for native wildlife. The rule further requires that forest management plans comply with all applicable provisions of the State and Federal Endangered Species Acts concerning state and federally listed threatened and endangered species.

Funding

Out of the revenues derived from BOF lands, 36¼ percent is used by the Department of Forestry to pay for the management and protection of the land. The department’s budget request is subject to the approval of the Board of Forestry and the Governor. Final authorization of the budget is determined by vote of the state legislature. The BOF and CSF budgets are considered as a whole, and are categorized as “other funds” that are separate from the state’s general fund. The Board of Forestry Lands and Common School Forest Lands budgets and expenditures are accounted for separately within the Department of Forestry.

Common School Forest Land

History

Only a minor portion of the western Oregon state forests is classified as Common School Forest (CSF) Land. The history of these lands can be traced to the Land Ordinance of 1785, the creation of the Territory of Oregon in 1848, and the Admission Act of 1859. The federal government’s policy at the time Oregon gained statehood was to grant sections 16 and 36 of every township to the new state for the use of schools. Oregon’s grant included 3.5 million acres of grazing and forest lands. Eventually, all but 130,000 acres of the forest lands was either sold for the benefit of schools or lost through fraudulent land deals.

By the time Oregon gained statehood, Congress had taken steps to define the trust nature of the CSF grants. This was in response to early abuses of the land grant system as states disposed of their school lands without restraint. As a result, Congress stipulated that the grant lands be managed for the use of schools and not for other public needs. Permanent investment trusts were established to protect the financial principal derived when grant lands were disposed. Lands that were retained were to be managed by the states in accordance with the beneficiary trust interest. These obligations are spelled out in the Oregon Constitution and the Admission Act of 1859.

Legal Mandates

The Oregon Constitution

The Oregon Constitution (Article VIII, Section 5) authorizes the State Land Board to manage CSF lands. The Land Board is directed to "manage lands under its jurisdiction with the object of obtaining the greatest benefit for the people of this state, consistent with the conservation of this resource under sound techniques of land management." This responsibility has been clarified through the 1992 opinion of state Attorney General Charles S. Crookham, which is discussed below.

The Oregon Constitution provides for revenues derived from CSF lands and other specified sources to be deposited into the Common School Fund. It also authorizes the State Land Board to withdraw money from the Common School Fund to carry out its powers and duties to manage the lands. The State Land Board has implemented its authority through a contract with the Department of Forestry to manage CSF lands.

Oregon Revised Statutes

Statutes concerning CSF lands are found in ORS 530.450 through 530.520.

ORS 530.450 gives the name "Elliott State Forest" to any lands in the national forests on February 25, 1913 that were patented to the State of Oregon for the purpose of establishing a state forest. Besides the Elliott, there are other lands under the jurisdiction of the Division of State Lands that are suitable for use as state forests. These include some lands in the western Oregon state forests plan area. ORS 530.460 and 530.470 describe the process by which the Division of State Lands and the State Board of Forestry may "designate" these lands for the primary purpose of "growing timber and other forest products." Lands so designated are named "Common School Forest Lands." Through a similar process, CSF lands may be reverted to their original status.

Under ORS 530.490, the State Forester is directed to manage Common School Forest Lands so as to "secure the greatest permanent value of the lands to the whole people of the State of Oregon." Although the statutes again refer to timber production as the dedicated use of the land, much of the statutory language has been found to be inconsistent with constitutional mandates. Oregon's Attorney General has opined that the land's various other natural resources must also be considered as long-term sources of revenue. The Attorney General's opinion is discussed on the next page.

The statutes refer to forest management planning in ORS 526.255, which calls for "long-range management plans based on current resource descriptions and technical assumptions, including sustained yield calculations for the purpose of maintaining economic stability in each management region."

Attorney General's Opinion

Currently, the fullest description of the Oregon Constitution's mandates for managing Common School Forest Lands is found in a July 24, 1992 opinion of Oregon Attorney General Charles S. Crookham. (46 Op. Atty. Gen. 468 (1992), Opinion No. 8223, July 24, 1992) (Crookham 1992). This opinion addresses the lawful uses of Admission Act lands and the effect of federal or state regulations on such uses. The issue at hand was the State Land Board's compliance with the federal and state Endangered Species Acts.

Admission Act lands are those lands offered by the federal government to the State of Oregon for the use of schools upon Oregon's admission to the United States in 1859. The Attorney General's opinion discussed the restrictions that Congress intended to impose on Oregon's use of these lands.

According to Crookham, a binding obligation was imposed on Oregon when it accepted the Admission Act lands "for the use of the schools." The Oregon Constitution dedicates the proceeds of Admission Act lands to the Common School Fund and gives the State Land Board responsibility to manage these lands in trust for the benefit of the schools. The State Land Board has a further constitutional obligation to manage lands under its jurisdiction "with the object of obtaining the greatest benefit for the people of this state, consistent with the conservation of this resource under sound techniques of land management." Crookham noted that the "greatest benefit for the people" standard requires the State Land Board to use the lands for schools and the production of income for the Common School Fund.

It was Crookham's opinion that the resources of Admission Act lands are not limited to those, such as timber, that are currently recognized as revenue generators for the Common School Fund, but include all of the features of the land that may be of use to schools. Other resources, such as minerals, water, and plant materials that may offer revenue for the fund should be considered.

The State Land Board may incur present expenses or take management actions that reduce present income if these actions are intended to maximize income over the long run. Lands may be temporarily set aside for the purpose of "banking" an asset while its economic value appreciates if the Land Board has a rational, non-speculative basis for concluding that such action will maximize economic return to the Common School Fund over the long term.

Neither the Oregon Admission Act nor the Oregon Constitution exempts the State Land Board from complying with the federal and state Endangered Species Acts (ESA), in the opinion of the Attorney General.

Crookham felt it is unlikely that the courts would exempt the State Land Board from complying with the federal ESA. Even if the grant of Admission Act lands were viewed as a contract or trust arrangement between the state and the federal government, Congress retains the authority to alter the terms of the arrangement by virtue of its sovereign power to legislate.

Because the state ESA does not explicitly require or prohibit any particular action with respect to the management of Admission Act lands, Crookham felt that the state ESA does not restrict the State Land Board's exercise of its constitutional powers over the disposition and management of Admission Act lands. The State Land Board must comply with the state ESA unless it unduly burdens the State Land Board's constitutional responsibility to manage the Admission Act lands. Only if the state ESA fundamentally impaired the Board's ability to maximize revenue over the long term from the Admission Act lands would there be an undue burden on the State Land Board's management and powers.

Finally, the Attorney General said it is not possible to predict whether the application of the federal ESA to Admission Act lands could result in a claim against the federal government for a taking of property. However, the state ESA definitely could not result in a taking because the State Land Board would not be required to comply with a law that prevented it from its constitutional responsibility to maximize revenue from Admission Act lands over the long term.

Policy Mandates

Further management direction for Common School Forest Lands is given in the Forestry Program for Oregon, and the Policies for Fish and Wildlife Management on State Forest Land. These policies are discussed under the section on Board of Forestry Lands.

Funding

Receipts from the CSF Lands enter the Common School Fund. The Department of Forestry is reimbursed on a quarterly basis for management expenses incurred on these lands. The Department's biennial budget request is subject to the approval of the State Land Board and the Governor. Final authorization of the budget is determined by vote of the state legislature. The Common School Forest Lands and Board of Forestry Lands budgets are considered as a whole, and are categorized as "other funds" that are separate from the state's general fund. The Common School Forest Lands and Board of Forestry Lands budgets are accounted for separately within the Department of Forestry.

Comparison of State and Federal Management Mandates

Many people are already familiar with the laws that guide the planning and management of the national forests. State forests operate under a completely different set of mandates. This section outlines the fundamental differences between the state and federal requirements.

National Forests (U.S. Forest Service)

National forests must be managed in accordance with multiple use and sustained yield principles. The Multiple-Use Sustained-Yield Act of 1960 calls for renewable surface resources (e.g. outdoor recreation, range, timber, watershed, wildlife, and fish) to be managed in the combination that will best meet the needs of the American people. These resources are to be managed to achieve a perpetually high level of output.

The requirement to develop management plans for national forests comes from the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA). This was later amended through the National Forest Management Act of 1976 (NFMA) and pursuant regulations.

National forest management plans are considered to be major federal actions that significantly affect the quality of the human environment. Therefore, each plan must be accompanied by an environmental impact statement (EIS) in accordance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) regulations that implement NEPA.

The Resources Planning Act and National Forest Management Act provide for public participation in national forest planning processes. CEQ regulations provide for public involvement in the NEPA processes. Federal actions that require an EIS have a greater level of public involvement than those that require an environmental assessment (EA).

State Forests

State law (ORS 526.255) calls for a biennial report to the Governor and legislature that contains "The long range management plans based on current resource descriptions and technical assumptions, including sustained yield calculations for the purpose of maintaining economic stability in each management region."

ORS 530.050 directs that BOF lands shall be managed so as “to secure the greatest permanent value of such lands to the state.” OAR 629-035-0000 through 629-035-0110 provide direction on how forest management plans are to secure “greatest permanent value.”

Unlike the Forest Service, “multiple use” management is not a legal mandate for either Board of Forestry Lands or Common School Forest Lands. However, the conservation and use of renewable and non-renewable resources must necessarily be balanced using the direction provided in the administrative rules referenced above. These rules specify that state forest lands be managed to provide 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. Common School Forest Lands are managed under the Oregon Constitution with the object of “obtaining the greatest benefit for the people of this state, consistent with the conservation of this resource under sound techniques of land management.”

Environmental impact statements and environmental assessments are not required for state forest planning, unless there is a federal action involved. In the course of its planning process, the Department of Forestry may decide to apply to the U.S. Fish and Wildlife Service for an incidental take permit, in order to meet requirements of the federal ESA. Granting an incidental take permit is a federal action because the U.S. Fish and Wildlife Service must approve the application for the permit. **If** the Department of Forestry requests an incidental take permit, then the Department of Forestry will prepare a habitat conservation plan to accompany the permit application. Then the U.S. Fish and Wildlife Service would complete the NEPA-required analysis of the permit application and habitat conservation plan. The U.S. Fish and Wildlife Service would complete environmental analysis only on the federal action, which is the decision on the permit application. They would not have any legal jurisdiction to analyze state forest management planning.

Public involvement in the state forests planning reflects the requirements of OAR 629-035-0080 and the Department of Forestry’s desire to use public comments as a planning resource. Specific goals and methods for public involvement in state forest planning processes are provided by the rule and state forest policy (Oregon Department of Forestry 2000b). Public involvement also furthers understanding, acceptance, and support of the plan. If the process involves an incidental take permit and habitat conservation plan, as described above, the U.S. Fish and Wildlife Service also includes public participation in their NEPA process.

Other Legal Mandates

Federal Endangered Species Act

The federal Endangered Species Act (ESA) was enacted in 1973 to preserve species that are at risk of becoming extinct. The ESA has been modified several times since 1973. Administration of the ESA falls under the authority of the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service.

The ESA protects species that have been designated as “threatened” or “endangered” (T&E) through a listing process. The federal ESA defines an “endangered” species as one which is in danger of extinction throughout all or a portion of its range. A “threatened” species is likely to become an endangered species within the foreseeable future.

The USFWS maintains two categories of “candidate” species that are not protected under the law. These species remain in candidate status because there is not sufficient information to list them or because the listing process has not been completed.

As explained below, various provisions of the ESA may distinguish between federal and non-federal lands, plant and animal species, and species listed as threatened or endangered.

The ESA directs federal agencies to carry out programs for the conservation of T&E species. Also, agencies of the federal government are prohibited from jeopardizing the existence of any T&E species and from destroying or adversely modifying “critical habitat.” Neither of these provisions distinguishes between plant and animal species.

The designation of critical habitat occurs at the time a species is listed. Only federal lands are directly subject to the restrictions pertaining to critical habitat. However, critical habitat designations on non-federal lands could have indirect effects on management of those lands, if an incidental take permit is requested.

Critical habitat is defined in section 3(5)(A) of the federal ESA as “(i) the specific areas within the geographical area occupied by the species *** on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management or protection ...” Note that the actual presence of a listed species is not required for critical habitat designation, only presence of features that the species would use if it were present. Critical habitat designations are not necessarily limited to federal lands.

"Critical habitat receives consideration under section 7 of the Act with regard to actions carried out, authorized, or funded by a federal agency. Federal agencies must ensure that their actions do not result in destruction or adverse modification of critical habitat." (Federal Register / Vol. 59, No. 18 / page 3816). Issuance of an incidental take permit is a federal action. As such, USFWS is required to do a section 7 consultation (within agency) prior to issuing the permit. This combination of legal requirements would likely lead to USFWS being unable to grant an incidental take permit that would involve timber harvest on lands designated as critical habitat.

The ESA's prohibition against "take" applies equally to non-federal and federal lands, and specifically to fish and wildlife species. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The USFWS has further defined harm as "... an act which actually kills or injures wildlife. Such acts may include significant habitat modifications or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering" (50 CFR & 17.3).

A significant revision of the ESA occurred in 1982, when provisions allowing for "incidental take" were added. Such taking must be incidental to, and not the main purpose of, the carrying out of an otherwise lawful activity. In order to obtain an incidental take permit, an applicant must submit a conservation plan, sometimes known as a "habitat conservation plan" or HCP. An incidental take permit may be granted if the following conditions are satisfied: 1) the taking will be incidental; 2) the applicant will minimize and mitigate the impacts of taking; 3) there will be adequate funding to implement the conservation plan; and 4) the likelihood of the survival and recovery of the species will not be reduced.

The ESA does not merely protect surviving populations; it directs the Secretary of Interior to develop a "recovery plan" for each T&E species. The objective is to enable each species to recover to the point that protection under the ESA is no longer necessary and it can be taken off the list.

The term "take" does not apply to plant species. Instead, for endangered plants, the ESA prohibits the removal, damage, or destruction of plants on federal lands; and certain other activities on non-federal lands. Prohibited activities on non-federal lands include to remove, cut, dig up, damage, or destroy any endangered plant species in knowing violation of any law or regulation of any state, or in the course of any violation of a state criminal trespass law. The activities prohibited for endangered plants are not automatically prohibited for threatened plants. However, according to the federal ESA, such prohibitions may be established for threatened plants through regulation, if they are found to be "necessary and advisable for the conservation of such species."

State Endangered Species Act

The Oregon laws covering threatened and endangered species of plants and animals are found in Oregon Revised Statutes 496.172 through 496.192 (for wildlife) and ORS 564.010 through 564.994 (for plants). Further legal requirements are given in the Oregon Administrative Rules.

Wildlife Species

The state Endangered Species Act was originally passed in 1987 and revised in 1995. Under the 1995 state ESA, the Oregon Fish and Wildlife Commission retains the authority for listing wildlife species as threatened or endangered. The statute recognizes cooperative state or federal programs protecting and recovering threatened or endangered species (such as a habitat conservation plan).

When a species is listed as threatened or endangered, the Oregon Fish and Wildlife Commission must establish, by rule, measurable guidelines to ensure the survival of individual members of the species. These guidelines may include take avoidance and protection for specific resource sites. Under state law, “take” means to kill or obtain possession or control of any wildlife.

For threatened species, if a state agency determines that a proposed action has the potential to violate the guidelines established by the Oregon Fish and Wildlife Commission, it shall notify the Oregon Department of Fish and Wildlife. That department will then recommend reasonable and prudent alternatives, if any, to the proposed action, which are consistent with the guidelines.

For endangered species, agencies managing state lands, such as the Department of Forestry, are responsible for developing endangered species management plans. The Oregon Fish and Wildlife Commission, in consultation with the land management agency, shall determine if state land can play a role in the conservation of the endangered species. Endangered species management plans will be reviewed and approved by the Oregon Fish and Wildlife Commission.

Plant Species

Oregon’s threatened and endangered plant species are managed under the authority of the Director of Agriculture, with administrative responsibilities delegated to the Oregon Department of Agriculture (ODA).

The statutes pertaining to listing and conserving T&E plant species are nearly identical to those described above for wildlife. One difference is that, with respect to plant conservation programs, state agencies must consult not only with the Department of Agriculture, but with any other state agency that has established programs to conserve or protect threatened or endangered species.

By administrative rule, state agencies are directed to ascertain the occurrence, or likely occurrence, of any listed species before taking any action on state-owned land. This may be done by conducting field surveys, consulting with ODA, or consulting with the Oregon Natural Heritage Program. If the determination should be positive, a process that is detailed in the administrative rules must be followed to conserve the species.

The term "action" has been defined by administrative rule to include activities that disturb the ground or vegetation or suppress plant growth. A sale or exchange of state-owned land, such that a listed species would be removed from state jurisdiction, would also be considered an action.

Oregon Forest Practices Act

Activities on lands managed by the Department of Forestry are subject to the Forest Practices Act (FPA), which is found in Chapter 527 of the Oregon Revised Statutes, and the Oregon Administrative Rules pursuant to these statutes.

The FPA declares it public policy to encourage economically efficient forest practices that assure the continuous growing and harvesting of forest tree species consistent with sound management of soil, air, water, fish, and wildlife resources as well as scenic resources within visually sensitive corridors. The Board of Forestry is granted the exclusive authority to develop and enforce rules protecting forest resources and to coordinate with other agencies concerned with the forest environment.

The Forest Practices Act has developed in an evolutionary manner since the original act was passed in 1971. The 1971 law established minimum standards for reforestation, road construction and maintenance, timber harvesting, application of chemicals, and disposal of slash. Subsequently, administrative rules were written to define the "waters of the state" and to protect streams and riparian areas. Rules were adopted to prevent soil damage resulting from logging and to prevent mass soil movement.

The Forest Practices Act was strengthened in 1987 with the passage of House Bill 3396. The concept of sensitive resource sites was introduced, along with the requirement that written plans be approved prior to operating near those sites. Provisions were added that allow interested citizens to review and comment on notifications of operations and written plans.

The 1991 enactment of Senate Bill 1125 added new standards for reforestation, wildlife habitat, and scenic considerations. The new requirements included timeframes and trees per acre standards for reforestation, limits on the size and proximity of clearcuts, visual standards for logging in visually sensitive highway corridors, and specifications for wildlife trees and downed woody debris retained after logging. The Board of Forestry was directed to reclassify and develop appropriate protection levels for the waters of the state. In 1994, revised waters of the state rules were adopted by the Board of Forestry and assigned to Division 57 of the Oregon Administrative Rules.

In 1999, following Governor Kitzhaber's Executive Order on salmon and healthy watersheds, the Board of Forestry formed an advisory committee to study forest practices in light of restoring native fish and their habitat to productive and sustainable levels. The Forest Practices Advisory Committee on Salmon and Watersheds is preparing a final report for fall 2000. Implementation, including any changes to the forest practice rules, is expected to last through 2002.

The following is a summary of key recent changes to the Forest Practices Act.

Definition of "clearcut" — The following definition has been added. In western Oregon, a **clearcut** is defined as "any harvest unit that leaves fewer than 50 trees per acre that are well distributed over the unit and that measure at least 11 inches at DBH [diameter breast height] or that measure less than 40 square feet of basal area per acre." To be counted as a tree, the top one-third of the bole must support a green, live crown. Trees larger than 20 inches are considered 20-inch trees for the purpose of computing basal area.

Timber harvesting — Changes are summarized in the following bullet list.

- **Clearcut size —** Clearcuts are now limited to 120 acres. The area occupied by riparian management areas or other resource sites within a clearcut boundary does not count as clearcut acreage. The 120 acre limit has no relationship to harvesting on adjacent ownerships.
- **Clearcut spacing and greenup requirement —** Clearcuts must be separated by at least 300 feet if their combined area exceeds 120 acres. A reforested area is considered a clearcut for this purpose until it has at least 200 trees per acre which are four feet tall or four years of age.
- **Snag and green tree retention —** In all clearcuts over 10 acres in size, a minimum of two snags or two green trees per acre must be reserved after harvesting. These must be at least 30 feet in height, 11 inches DBH or larger, and at least 50 percent must be conifer. A uniform distribution across the clearcut is not required. The selection of snags and green trees is left to the discretion of the operator or landowner.
- **Downed woody debris —** In all clearcuts over 10 acres, a minimum of two downed logs or downed trees per acre must remain after harvesting. These must be at least 12 inches in diameter at the widest point, 16 feet long, and at least 50 percent must be conifer.

Reforestation — Site preparation and reforestation of clearcut units must commence within 12 months and be completed by the end of the second planting season after the completion of harvesting. By the end of the fifth growing season after planting or seeding, at least 200 healthy conifer or suitable hardwood seedlings must be established per acre. These must be well distributed over the area and "free to grow." Previously, the Forest Practices Act called for 100 conifer seedlings to be established per acre after 4 years. Hardwood seedlings were not an option.

Scenic highways — Special rules now apply to timber harvesting within "visually sensitive corridors" along designated highways. These corridors are defined as "forestland located within the area extending 150 feet measured on the slope from the outermost right of way boundary of a scenic highway." Harvesting within the corridor must retain at least 50 healthy trees per acre of at least 11 inches DBH, which total at least 40 square feet of basal area per acre. These trees may be removed (a) when the reproduction understory reaches an average of 10 feet in height and has at least 250 trees per acre; or (b) when the timber stand 150 to 300 feet from the corridor has attained 10 feet in height and has at least 200 trees per acre or contains at least 40 square feet of basal area.

This provision will apply to any portions of the western Oregon state forests that are adjacent to State Highways 6, 18, 20, 22, 26, 30, 34, 36, 58, 101, and 126, which are designated “scenic highways” in ORS 527.755.

Streams and riparian areas — New comprehensive riparian protection rules were adopted by the Board of Forestry on September 1, 1994. The new rules focus on improving stream habitat by addressing the following critical elements.

- Maintaining live trees and vegetation along streams and other waters to provide biodiversity, cover, shade, sediment reduction, adequate stream temperature levels, snags, downed wood, nutrients and bank protection.
- Development of woody debris to provide stream structure resulting in increased fish habitat. This happens over time as trees mature and fall into streams.
- Maintaining adequate fish passage up and down the length of a stream. Ensuring that fish have opportunities to move along the length of streams is important for spawning, feeding, and avoiding reaches of streams with high temperature or low flows.
- Stream and landscape variation. The new classification system creates nine different stream classifications and additional lake and wetland classifications, providing the most appropriate protection to a variety of streams and waters.

All fish-bearing streams will have a riparian management area (RMA) between 50 and 100 feet, that includes vegetative and conifer retention. Within these riparian management areas, all fish-bearing or domestic use streams, and all other medium and large streams, will require a 20-foot no-harvest buffer on each side of the stream unless stand restoration is needed.

The new classification system contains nine classes compared to two under the old rules. The new system identifies seven geographic regions, distinguishes between streams with fish or domestic use, and classifies streams as large, medium, or small based on water volume.

Rules related to harvest practices, road construction, stream crossings, and fish passage have been strengthened considerably.

The volume of conifer trees retained along fish-bearing streams will substantially increase over the old rules to ensure that they provide future opportunities for conifer trees to fall naturally into streams, creating stream structure and fish habitat. The new rules will also provide additional shade to maintain stream temperatures.

The Department of Forestry (with the help of the Department of Fish and Wildlife) is conducting a comprehensive fish use survey of forest streams.

Oregon Land Use Laws

Since 1973, with the passing of The Oregon Land Use Act, Oregon's land use has been guided by local comprehensive planning under a number of Statewide Planning Goals (ORS 195, 196 and 197; OAR Chapter 660). State forest land management complies with this law by following the Department of Forestry's current State Agency Coordination Program, described in OAR Chapter 629, Division 20.

To date, nineteen Statewide Planning Goals have been adopted by the Land Conservation and Development Commission (LCDC). These include goals on citizen involvement, the planning process, farm lands, forest lands, natural resources, development and coastal resources (Oregon Department of Land Conservation and Development 1994). These goals are quite detailed and have the force of law. As part of the 1973 law, the Department of Land Conservation and Development (DLCD) was established to implement the policies and goals of the Commission. Later, in 1979, the legislature created the Land Use Board of Appeals (LUBA) to rule on matters involving land use.

Key Terms

Acknowledgment — Approval by the Land Conservation and Development Commission (LCDC) of a city or county's comprehensive plan; acknowledgment of compliance with the Statewide Planning Goals.

Certification — Approval by LCDC of a state agency program found to be consistent with the Statewide Planning Goals.

Department of Land Conservation and Development (DLCD) — State agency that administers Oregon's statewide planning program and provides professional support to the LCDC.

Land Conservation and Development Commission (LCDC) — A seven-person commission that sets the standards for Oregon's statewide planning program. Members are volunteers appointed by the Governor and confirmed by the State Senate.

Land Use Board of Appeals (LUBA) — Established in 1979 essentially as a state court that rules on matters involving land use. Appeals from LUBA go to the State Court of Appeals and finally to the Supreme Court.

State Agency Coordination Program — Required under law for each state agency, to establish procedures to assure compliance with statewide land use goals and acknowledged city and county comprehensive plans and land use regulations.

Statewide Planning Goals — Statewide Planning Goals are adopted by the Land Conservation and Development Commission to set standards for local land use planning. They have the force of law.

State law requires each city, county, and special district to have a comprehensive plan, as well as the zoning and ordinances needed to put the plan into effect (ORS 197.175). Locally adopted land use plans are reviewed by LCDC to make sure they are consistent with the state-wide goals. After LCDC has officially approved a local government's plan, the plan is said to be "acknowledged." An acknowledged local comprehensive plan is the controlling document for land use in the area covered by the plan. Thus, management of state lands must be compatible with local comprehensive plans and land use regulations (ORS 197.180).

In 1978, LCDC approved the Oregon Department of Forestry's State Agency Coordinating Agreement. This agreement, required of all state agencies, describes the department's rules and programs that affect land use, and spells out how the agency will coordinate its functions with local governments, other state agencies, and federal agencies.

In 1987, the Oregon Legislature passed House Bill 3396, which resolved issues between the Forest Practices Act and the land use programs. Specifically, the Statewide Planning Goals do not apply to programs, rules, procedures, decisions, determinations, or activities carried out under the Forest Practices Act (ORS 197.180 and 197.277). The FPA prohibits local governments from regulating, prohibiting, or limiting forest practices in any way on forest lands outside an urban growth boundary unless an acknowledged exception has been taken to a forest land goal (ORS 527.722). In 1991 LCDC certified that the Department of Forestry's new State Agency Coordination Program (OAR 629-20) was compatible with the Statewide Planning Goals.

Goal 4 of the Statewide Planning Goals, "Forest Lands," is "To conserve forest lands by maintaining the forest land base and to protect the state's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest tree species as the leading use on forest land consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture." (Oregon Department of Land Conservation and Development 1995)

Goal 4 allows the following land uses on forest land: "(1) uses related to and in support of forest operations; (2) uses to conserve soil, water and air quality, and to provide for fish and wildlife resources, agriculture and recreational opportunities appropriate in a forest environment; (3) locationally dependent uses; (4) dwellings authorized by law." In addition, "Forest operations, practices and auxiliary uses shall be allowed on forest lands subject only to such regulation of uses as are found in ORS 527.722" [the Forest Practices Act]. (Oregon Department of Land Conservation and Development 1995)

Two other Statewide Planning Goals are of particular interest. Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources) is "To conserve open space and protect natural and scenic resources." Goal 6 (Air, Water and Land Resources Quality) is "To maintain and improve the quality of the air, water and land resources of the state."

The Department of Forestry has established procedures under OAR 629-20, its State Agency Coordination Program, to assure that land use programs comply with Statewide Land Use Planning Goals and are compatible with acknowledged city and county comprehensive plans and land use regulations. In the case of a state forest plan, the District Forester will notify local governments when a forest plan is being developed, and will request their review and comment on the compatibility of the draft forest plan with the local governments' comprehensive plans. If a conflict is found between the Department's statutory obligations and land use compatibility, OAR 629-20-050 describes the dispute resolution process to be followed. OAR-629-20 also describes procedures to be followed if land use classifications are updated; land is acquired, sold or exchanged; non-forest uses must be approved; or when block plans, annual operations plans, and transportation plans are developed. OAR 629-20-000 states that "it is not the intent of these rules to prevent either the Board of Forestry or the Department of Forestry from carrying out their statutory responsibilities."

Mandates for Specific Resources

Legal and policy mandates apply specifically to some resources. These resources are listed below in alphabetical order, with relevant information under each heading.

Agriculture and Grazing

Agricultural activities are permitted under ORS 530.050(4) and ORS 530.490(2). These laws authorize the State Forester to grant easements on Board of Forestry Lands and Common School Forest Lands. Board of Forestry Policy No. 3-1-4-002 allows non-exclusive permits to be granted for special uses. Agriculture is considered a special use, and is allowed when it doesn't interfere with forest management activities. Any revenue from agriculture permits is shared with the county where the activity takes place.

Grazing on Board of Forestry Lands is permitted by ORS 530.010, 530.030, and 530.050. These statutes allow the State Forester to permit domestic livestock grazing in order to secure the greatest permanent value to the state, as long as this use is not detrimental to the best interest of the state. There are no administrative rules to regulate livestock grazing on Board of Forestry Lands. The Department of Forestry manages any grazing that occurs on Board of Forestry Lands, and shares any income from grazing leases with the county where the land is located.

The Department of Forestry manages Common School Forest Lands under a contract with the State Land Board. The December 20, 1993 contract describes the roles of the Oregon Department of Forestry and the Division of State Lands for these lands. Under this contract, grazing and mineral leases on Common School Forest Lands are managed by the Division of State Lands.

Air Quality

The federal Clean Air Act, as amended in 1977 and 1990 (42 U.S.C. 7401, et seq.), is the main law regulating air quality. The law's goal is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." Under the law, the Environmental Protection Agency (EPA), a federal agency, sets air quality standards (National Ambient Air Quality Standards).

The authority to implement the law is delegated to the states. In Oregon, the Department of Environmental Quality (DEQ), a state agency, develops and carries out programs to meet the national air quality standards, through the State Implementation Plan (SIP). The goal of the SIP is to attain and maintain the national air quality standards, known as NAAQS. Sub-plans have been developed by other state agencies to address specific air quality concerns. Two air quality plans affect forest management directly: the Oregon Smoke Management Plan and the Oregon Visibility Protection Plan.

The Oregon Smoke Management Plan — Oregon Department of Forestry districts issue site-specific and time-specific burning permits under conditions adjusted daily to the weather. The conditions are designed to avoid smoke contamination of certain population centers (designated areas) and popular recreation areas (smoke-sensitive areas). These burning instructions specify geographic locations and fuel to be consumed. Permits may also specify fire protection and mop-up criteria. During burning, smoke behavior is monitored from the ground and at times from the air, and results are compiled on an annual basis by Department of Forestry smoke management staff. The Smoke Management Plan has established special protection zones for some cities.

The Oregon Visibility Protection Plan — Prescribed burning strategies to protect visibility are implemented under the Smoke Management Plan. Visibility is a consideration for wilderness areas, such as the Mount Hood, Mount Jefferson, Mount Washington, and Three Sisters wilderness areas. Due to fire season restrictions and department policy, no prescribed burning takes place from May-June until rains begin, about November.

Cultural Resources

Several state laws and one state-wide land use planning goal regulate cultural resource management on state forest lands. Goal 5, Open Spaces, Scenic and Historic Areas, Natural Resources, and Cultural Resources, requires counties and local governments to inventory cultural resources and manage them to preserve their original character if there are no conflicting uses or consequences. Oregon statutes do not mandate archaeological surveys or mitigation of impacts by state agencies as part of conducting land management activities. However, artifacts and sites found on public lands must be protected from harm or removal. If a sacred object is found, the State Historic Preservation Office (SHPO) and appropriate group or tribe must be notified. Anywhere in Oregon, state law protects Native American cairns and graves.

Information relating to the location of archaeological sites and objects is usually not released to the public unless the public interest requires the disclosure or if the governing body of a Native American tribe requests the information.

The State Historic Preservation Office (SHPO), which is part of the Oregon Parks and Recreation Department, administers the Statewide Plan for Historic Preservation and submits Oregon's nominations for the National Register of Historic Places.

Energy and Mineral Resources

Several state laws regulate energy and mineral resources on state forests, including ORS 273.551, 273.780, and 273.785. The Division of State Lands (DSL) has jurisdiction for the leasing of oil, gas, and minerals on state-owned lands. Before a lease is issued, the law directs DSL to consult with the State Department of Geology and Mineral Industries (DOGAMI) and to get concurrence of the state agency responsible for the surface rights of the land involved. Leases are auctioned when more than forty acres are involved. On less than forty acres, leases are handled through negotiations. DSL also administers a prospecting permit system that could eventually lead to applications for leases.

The Department of Forestry does have the right to use gravel, sand, stone, and soil from state forest lands to repair or construct roads or other state facilities without going through DSL.

Fish and Wildlife

The primary laws specific to fish and wildlife are the state and federal Endangered Species Acts. These were discussed earlier in this appendix. The Bald and Golden Eagle Protection Act (50 CFR 22.24) protects bald eagles, and many birds are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-711).

Land Base and Access

Land Base

The following laws and policies provide direction for the acquisition, exchange, and management of state forest lands.

ORS 530.010 — ORS 530.040 Acquisition, Management and Development of State Forests — These statutes give the Board of Forestry authority and means through the Department of Forestry to acquire forest land by "purchase, donation, devise or exchange." Any acquisition of forest land must be approved by the board of county commissioners in the county where the lands are located. An administrative rule is now being developed for land acquisitions and exchanges, and is expected to be adopted in 2001.

Board of Forestry Policies

Land Acquisition and Exchange Policy For State Forests — Through this policy the Board of Forestry has reaffirmed that the Department of Forestry will actively pursue acquisitions and exchanges as a means to consolidate state forest lands for management efficiencies, economic values, or enhanced stewardship practices.

Forestry Program for Oregon (FPFO) — The Forestry Program for Oregon is the strategic planning document for the Oregon Board of Forestry (Oregon Board of Forestry 1995). The policies and programs of the FPFO support the land acquisition and exchange policy above.

Two objectives in the FPFO are particularly important for the state forest land base.

- **Objective 1: Forest Land Base —** Under this objective, the Board of Forestry promotes preserving and expanding the forest land base in Oregon.
- **Objective 4: Timber Growth and Harvest —** Under this objective, the Board of Forestry directs that the management of state forest land will be done in an efficient and cost-effective manner, which supports the reasoning for most land exchanges.

The purpose of acquiring and exchanging land is to increase the amount of state forest land and/or to block up state forest ownership (consolidate state forest lands in contiguous blocks, instead of in scattered parcels). The consolidation of state forest lands will increase management efficiencies and long-term economic values, and enhance stewardship practices and other forest resource values. The Department of Forestry has worked to block up state forest lands for many years. The land exchange and acquisition program operates from statutory authority and requirements (ORS 530.010 - ORS 530.040) and Board of Forestry policies described above. Each district has its own land exchange plan, with parcels identified for acquisition and divestment.

Access

The following laws and policies provide direction for access to and roads on state forest lands.

Forest Practices Administrative Rules, Chapter 629, Division 24 — State forest land is subject to all the Oregon Forest Practices administrative rules. Rules 629-24-520 through 629-24-524 specifically address road location, road design, road construction, and road maintenance. These rules recognize the necessity of roads for forest management and protection, and set minimum construction and maintenance standards intended to protect water quality, forest productivity, and fish and wildlife habitat.

Motorized Recreation Administrative Rules, Chapter 629, Division 26, 629-26-005 through 629-26-025 — These rules govern the use of recreational ORVs (off-road vehicles) on state forest land and give the State Forester authority to designate off-road riding areas, to close riding areas, and to permit organized recreation events. As of summer 1995, these rules are in the process of being repealed, amended, and incorporated into a new set of comprehensive rules, Chapter 629, Division 25, Recreational Use of State Forest Land.

Oregon Vehicle Code, Off-Road Vehicles, ORS 821.010 through 821.320 — These statutes govern the use of recreational ORVs on all lands in Oregon, including state forest lands. They set standards for registration, equipment, and operation, and also set penalties for violations, including penalties for ORV-caused damage to trees, vegetation, or soil.

Forestry Program For Oregon, Objective 5: Stewardship Through Regulation of Forest Practices — Through the FPFO, the Board of Forestry directs the Department of Forestry to promote the management of forest roads to minimize the number and width of roads, and the disturbance of soil.

Department of Forestry, Forest Roads Manual, Forest Roads Policy — The Forest Road Policy states that roads will be developed and maintained to provide access for the sale of timber and other forest products, for timber management activities, for protection from fire, and for public access. It further states that forest roads will be designed, constructed, and maintained to meet or exceed rules of the Forest Practices Act. The road manual sets road standards and design guidelines (Oregon Department of Forestry 2000a)

Plants

State Endangered Species Act

The Oregon laws covering threatened and endangered species are found in Oregon Revised Statutes 496.172 through 496.192 (for wildlife) and ORS 564.010 through 564.994 (for plants). Further legal requirements are given in the Oregon Administrative Rules.

The state Endangered Species Act was first passed in 1987. Oregon's threatened and endangered plant species are managed under the authority of the Director of Agriculture, with administrative responsibilities delegated to the Oregon Department of Agriculture (ODA). Protection and conservation programs are established through administrative rules. State agencies such as the Department of Forestry are directed to cooperate in furthering conservation programs for T&E species.

If the Department of Forestry determines that a conflict exists, then the conservation requirements of OAR 603-73-090 (5)(b) through (5)(h) apply. ODF's procedures further outline the steps for compliance with these rules.

Recreation

Public use rules for state lands (Recreational Use of State Forest Land, Chapter 629, Division 25) establish standards for recreational use. The rules regulate off-road vehicle use, camping, firearm use, disposal of garbage and human waste, and other activities associated with recreational activity.

Tillamook State Forest — In 1991, the Oregon Legislature passed House Bill 2501, which called on the Oregon Department of Parks and Recreation and the Oregon Department of Forestry to prepare a comprehensive recreation plan for the Tillamook State Forest, to interpret the forest's history, and to provide for diverse outdoor recreation on the forest. The bill required that the plan be consistent with the primary purpose of timber production and of state forests as described in ORS 530.050. The *Tillamook State Forest Comprehensive Recreation Management Plan* was published in January 1993, and provides direction for recreation management on the Tillamook State Forest (Oregon Department of Forestry and Oregon Department of Parks and Recreation, 1993). This plan is now being updated.

Scenic Resources

Generally, most state forest land adjacent to visually sensitive highway corridors is considered to be of high scenic quality. Along major highways, the immediate visual foreground is protected either by Department of Transportation-owned scenic buffers or by scenic statutes and Oregon Forest Practices Act rules. For areas farther back from highways but still visible from the road, which are considered mid-ground and background scenic areas, many acres are designated as scenic, allowing management activities for these areas to be adjusted for visual considerations.

The following highways in northwest Oregon are designated as scenic for the purpose of visual corridor management, and are adjacent to state forest lands in the districts indicated. The visually sensitive corridor is defined as the area within 150 feet of the outermost right-of-way boundary along both sides of the highway. Special rules apply to timber harvest in this corridor.

Highway 6	—	Forest Grove and Tillamook Districts
Highway 20	—	West Oregon District
Highway 22	—	Clackamas-Marion District
Highway 26	—	Forest Grove and Astoria Districts
Highway 30	—	Astoria District
Highway 34	—	West Oregon District
Highway 36	—	Western Lane District
Highway 101	—	Tillamook District
Highway 126	—	Western Lane District

State Scenic Waterways Program

The state scenic waterways program applies only to the Nestucca River Scenic Waterway in Forest Grove and Tillamook districts. The program is designed to protect and enhance the special attributes and natural values of designated scenic waterways. These values include recreation, fish, wildlife, water quality, geology, historical and botanical resources, aesthetics, and the freeflowing character of the rivers. Dams, reservoirs, impoundments, and placer mining are prohibited. The Oregon Department of Parks and Recreation has general administrative rules for scenic waterways, and has developed specific administrative rules for some individual scenic waterways. Administrative rules for the Nestucca Scenic Waterway were published in July 1994 (OAR 736-40).

There is a review and approval process for land uses that may noticeably alter or modify property within the scenic waterway corridor. Land uses that require review and approval include timber harvest and road construction, among others. The Department of Parks and Recreation must be notified one year in advance of activities requiring review and approval. Approval is based on criteria established in the administrative rules.

Soils

The Department of Forestry manages state forest lands in accordance with the Oregon Forest Practices Act rules (Division 24) for soil protection. These rules define Best Management Practices for protecting soil and forest productivity when conducting timber harvest, prescribed burning, or road construction activities. The department uses the professional expertise of foresters, geotechnical specialists, soil scientists, and forest engineers to evaluate proposed activities.

Water Resources

In 1909, the Oregon Legislature declared that all water in the state belongs to the public. In the years since then, many state agencies have been given the job of helping manage the public's water.

The Water Resources Commission (WRC) is responsible for the development of an integrated, coordinated state program for managing Oregon's water (ORS 536.300). Other state agencies and public corporations are directed to conform to statements of water resources policy (ORS 536.360). Oregon Revised Statutes Chapters 536 through 543 guide the WRC on water management policies.

Oregon Administrative Rules (OAR), Chapter 690, contain rules developed by the WRC that address water management. In addition, the Water Resources Department is in the process of proposing new rules for the protection of instream flows for certain fish species. These rules could limit the issuance of new water permits in some areas.

Oregon Revised Statutes Chapter 527, known as the Forest Practices Act, regulates forest operations. For protecting water resources, the primary focus of the regulations is on controlling activities around all types of water bodies and stream channels.

Water Resources Department Programs

Basin management programs — Basin programs establish water management policies and objectives that govern the appropriation and use of surface and ground water within each drainage basin. These programs are in Chapter 690, Division 500, of the Oregon Administrative Rules, and are found in the publication, Oregon Water Management Programs (Oregon Water Resources Department, date unknown). The Water Resources Department is currently developing a new basin planning process that will address future water supply concerns by focusing on existing water availability, improved integration with the water right application process, and development of basin programs. OAR, Division 410, establishes state-wide policies and principles pertaining to a wide range of existing water rights for instream use. The Water Resources Commission has recently adopted amendments to OAR, Division 77, that set up a process for leasing existing water rights for instream use.

The North Coast Basin Program, Mid Coast Basin Program, and Draft Willamette Basin Plan cover the three basins in the planning area. These programs specify the allowable uses of the waters within the basins. Applications for new water rights will only be approved for the uses specified under the conditions of adequate water supply.

Water Quality

Water quality protection is mandated by federal and state laws. The goal of the federal Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters to protect beneficial uses such as public water supply, recreation in and on water, and propagation of fish and wildlife. The state of Oregon has adopted statutes and rules to achieve these goals.

Oregon forest practices rules are approved as sufficient to implement water quality standards under the federal Clean Water Act of 1972. Section 303(d) of the Clean Water Act requires states to identify and list threatened and impaired waterbodies. Rules describing beneficial uses, policies, standards and treatment criteria (OAR Chapter 340, Division 4) are enforced by the Oregon Department of Environmental Quality. ORS 468B contains the state laws pertaining to water pollution control. OAR Chapters 40-55 contain water quality regulations.

The Department of Environmental Quality's water quality program for forest lands is administered by the Board of Forestry through the Forest Practices Act's administrative rules. These rules specify Best Management Practices (BMPs) for forest operations, which ensure that water quality will meet DEQ standards. Any forest operation that complies with the rules is deemed to comply with the state's water quality standards. ORS 527.710, 527.765, and 527.770 contain the Forest Practices Act rules to achieve these water quality standards.

Wetlands

Federal laws and policies — At the federal level, the U.S. Army Corps of Engineers regulates the discharge of materials into waters of the United States, which includes wetlands. This authority is derived from Section 404 of the Clean Water Act. Key exemptions exist under federal law for obtaining individual dredge and fill permits for: 1) normal farming, ranching, and forestry activities, such as plowing, minor draining, and harvesting; 2) constructing or maintaining stock ponds or irrigation ditches; and 3) constructing or maintaining farm, forest, or mining roads. Essentially, all normal silvicultural activities are exempt as long as they do not convert a wetland to an upland.

State laws and policies — The Division of State Lands administers several aspects of regulation and management of wetlands, that are relevant to state forest lands. These statutes include the state's Removal-Fill Law, Senate Bill 3, and the Mitigation Bank Act.

- The Removal-Fill Law (ORS 196.800-196.990) requires permits from the Division of State Lands for removal, fill, or alteration involving 50 cubic yards or more of material in any water of the state, including wetlands.
- Senate Bill 3, passed in 1989, is primarily intended to promote protection and conservation of wetlands and is in many ways an adjunct to the Removal-Fill Law.

- The Mitigation Bank Act of 1987 is a state statute that provides for the acquisition and protection of wetlands, and for the establishment of wetlands mitigation banks by the Division of State Lands.

The Oregon Department of Forestry's Forest Practices Act identifies three major types of wetlands: significant wetlands, stream-associated wetlands, and other wetlands. The Forest Practices Act also regulates activities that affect these areas. The Water Protection Rules (ORS 629-645 and 629-655) in the Forest Protection Rules identify the protection measures required for riparian areas and wetlands.

Appendix E

Management of State Forest Lands

The Oregon Administrative Rules contain OARs filed through January 15, 2009

DEPARTMENT OF FORESTRY

DIVISION 35

MANAGEMENT OF STATE FOREST LANDS

629-035-0000

Definitions

(1) "Active management" means applying practices, over time and across the landscape, to achieve site-specific forest resource goals using an integrated and science-based approach that promotes the compatibility of most forest uses and resources over time and across the landscape.

(2) "Adaptive management" means the process of implementing plans in a scientifically based, systematically structured approach that tests and monitors assumptions and predictions in management plans and uses the resulting information to improve the plans or management practices used to implement them.

(3) "Biological diversity" means the genetic variation and the abundance and variety of microbial, plant, and animal life, the range of ecological functions, and the physical processes at any local or landscape scale.

(4) "Board" means the Oregon Board of Forestry.

(5) "Compatible" or "compatibility" means capable of existing or operating together in harmony.

(6) "District" means a defined geographic area that is an administrative unit of the Department, within which a District Forester manages the Department's programs.

(7) "Forest conditions" means stand types, structures, and landscape patterns.

(8) "Forest lands" means lands acquired under ORS 530.010 to 530.040.

(9) "Forest resources" includes, but is not limited to:

(a) Timber production and harvest;

(b) Salmonid, and other native fish and wildlife habitats;

(c) Soil, air, and water;

(d) Forage and browse for domestic livestock;

(e) Landscape effect;

(f) Protection against flood and erosion;

(g) Recreation;

(h) Mining;

(i) Use of water resources; and

(j) Administrative sites.

(10) "Forest tree species" means trees ecologically suited to the site.

(11) "Integrated Management" means bringing together knowledge of various disciplines (forestry, fisheries, wildlife, water) to understand and promote land management actions that consider effects and benefits to all.

(12) "Landscape" means a broad geographic area that may cover many acres and more than one ownership, and may include a watershed, or sub-watershed areas.

(13) "Native" means indigenous to Oregon, not introduced.

(14) "Planning area" means the appropriate management district, or districts, or other specified geographic area determined by the State Forester.

(15) "Wildlife" means fish, wild birds, amphibians, reptiles, wild mammals, and other indigenous animal organisms.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0010

Findings and Principles Concerning Lands Acquired under ORS Chapter 530

(1) ORS Chapter 530 authorizes the Board of Forestry to acquire forest lands which by reason of their location, topographical, geological, or physical characteristics are chiefly valuable for:

(a) Production of forest crops;

(b) Watershed protection and development;

(c) Erosion control;

(d) Grazing;

(e) Recreation;

(f) Forest administrative purposes.

(2) These lands must be managed to achieve the greatest permanent value to the state.

(3) For purposes of achieving the greatest permanent value of these forest lands to the state, the Board may direct the State Forester to:

(a) Protect these forest lands from fire, disease, and insect pests, sell forest products from these forest lands, and execute mining leases and contracts as provided for in ORS 273.551; and

(b) Permit the use of these forest lands for other purposes, when such uses are not detrimental to the best interest of the state. These other purposes include, but are not limited to:

(A) Forage and browse for domestic livestock;

(B) Fish and wildlife environment;

(C) Landscape effect;

(D) Protection against floods and erosion;

(E) Recreation;

(F) Protection of water supplies.

(4) The counties in which these forest lands are located have a protected and recognizable interest in receiving revenues from these forest lands; however, the Board and the State Forester are not required to manage these forest lands to maximize revenues, exclude all non-revenue producing uses on these forest lands, or to produce revenue from every acre of these forest lands.

(5) Based on existing Board principles and policies and current scientific and silvicultural information, the Board finds that uses for purposes set forth in subsections (3)(a) and (b) of this section are compatible over time and across the landscape when the lands are actively managed in an environmentally and silviculturally exemplary manner, as set forth in OAR 629-035-0030, using management practices that:

(a) Pursue compatibility of forest uses over time;

(b) Integrate and achieve a variety of forest resource management goals;

(c) Achieve, over time, site-specific goals for forest resources, using the process as set forth in OAR 629-035-0030 through 629-035-0070;

(d) Consider landscape context;

(e) Are based on the best science available; and

(f) Incorporate an adaptive management approach that applies new management practices and techniques as new scientific information and results of monitoring become available.

(6) Based on existing Board principles and policies and current scientific and silvicultural information, the Board finds that forest lands that are actively managed as provided in subsection (5) of this section can produce economic value over the long term and promote healthy, sustainable forest ecosystems that:

(a) Produce timber and revenues for the state, counties, and local taxing districts;

(b) Result in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;

(c) Protect, maintain, and enhance native wildlife habitats;

(d) Protect soil, air, and water; and

(e) Provide outdoor recreational opportunities.

(7) Based on subsections (5) and (6) of this section, the Board finds that actively managing forest lands for the purposes described in subsections (3)(a) and (b) of this section is in the best interest of the state.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0020

Greatest Permanent Value

(1) As provided in ORS 530.050, "greatest permanent value" means 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. These benefits include, but are not limited to:

(a) Sustainable and predictable production of forest products that generate revenues for the benefit of the state, counties, and local taxing districts;

(b) Properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;

(c) Habitats for native wildlife;

(d) Productive soil, and clean air and water;

(e) Protection against floods and erosion; and

(f) Recreation.

(2) To secure the greatest permanent value of these lands to the state, the State Forester shall maintain these lands as forest lands and actively manage them in a sound environmental manner to provide sustainable timber harvest and revenues to the state, counties, and local taxing districts. This management focus is not exclusive of other forest resources, but must be pursued within a broader management context that:

(a) Results in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life;

(b) Protects, maintains, and enhances native wildlife habitats;

(c) Protects soil, air, and water; and

(d) Provides outdoor recreation opportunities.

(3) Management practices must:

(a) Pursue compatibility of forest uses over time;

(b) Integrate and achieve a variety of forest resource management goals;

(c) Achieve, over time, site-specific goals for forest resources, using the process as set forth in OAR 629-035-0030 through 629-035-0070;

(d) Consider the landscape context;

(e) Be based on the best science available; and

(f) Incorporate an adaptive management approach that applies new management practices and techniques as new scientific information and results of monitoring become available.

(4) The State Forester shall manage forest lands as provided in this section by developing and implementing management plans for a given planning area as provided in OAR 629-035-0030 to 629-035-0100.

(5) The Board shall review 629-035-0020(2) (management focus) no less than every ten years in light of current social, economic, scientific, and silvicultural considerations.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0030

Forest Management Planning

(1) In managing forest lands as provided in OAR 629-035-0020, the State Forester shall develop Forest Management Plans, based on the best available science, that establish the general management framework for the planning area of forest land. The Board may review, modify, or terminate a plan at any time; however the Board shall review the plans no less than every ten years. The State Forester shall

develop implementation and operations plans for forest management plans that describe smaller-scale, more specific management activities within the planning area.

(2) Forest Management Plans must contain the following elements:

(a) Guiding principles, that include legal mandates and Board of Forestry policies. Taken together, these principles shall guide development of the management plan.

(b) Description and assessment of the resources on state forest lands within the planning area and consideration of the surrounding ownership in order to provide a landscape context. The description and assessment includes general statements of the current conditions of each of the resources, and the laws, policies, and programs that affect the resources and their management.

(c) Forest resource management goals, which are statements of what the State Forester intends to achieve for each forest resource within the planning area consistent with OAR 629-035-0020.

(d) Management strategies, which describe how the State Forester will manage the forest resources in the planning area to achieve the goals articulated in the plan. The strategies shall identify management techniques the State Forester may use to achieve the goals of the plan during the implementation phase of the plan.

(e) General guidelines for asset management, which provide overall direction on investments, marketing, and expenses.

(f) General guidelines for implementation, monitoring, research, and adaptive management. The guidelines shall describe:

(A) The process for implementing Forest Management Plans;

(B) The approach for determining whether the strategies are meeting the goals of the Forest Management Plans; and

(C) The process for determining the validity of the assumptions used in developing the strategies.

(3) The State Forester shall be guided by the following stewardship principles in developing and implementing Forest Management Plans:

(a) The plans shall include strategies that provide for actively managing forest land in the planning area.

(b) The plans shall include strategies that:

(A) Contribute to biological diversity of forest stand types and structures at the landscape level and over time:

(i) through application of silvicultural techniques that provide a variety of forest conditions and resources; and

(ii) through conserving and maintaining genetic diversity of forest tree species.

(B) Manage forest conditions to result in a high probability of maintaining and restoring properly functioning aquatic habitats for salmonids, and other native fish and aquatic life, and protecting, maintaining, and enhancing native wildlife habitats, recognizing that forests are dynamic and that the quantity and quality of habitats for species will change geographically and over time.

(C) Provide for healthy forests by:

(i) managing forest insects and diseases through an integrated pest management approach; and

(ii) utilizing appropriate genetic sources of forest tree seed and tree species in regeneration programs.

(D) Maintain or enhance long-term forest soil productivity.

(E) Comply with all applicable provisions of ORS 496.171 to 496.192 and 16 USC § 1531 to 1543 (1982 & supp 1997) concerning state and federally listed threatened and endangered species.

(c) The plans shall include strategies that maintain and enhance forest productivity by:

(A) Producing sustainable levels of timber consistent with protecting, maintaining, and enhancing other forest resources.

(B) Applying management practices to enhance timber yield and value, while contributing to the development of a diversity of habitats for maintaining salmonids and other native fish and wildlife species.

(d) The plans shall include strategies that utilize the best scientific information available to guide forest resource management actions and decisions by:

(A) Using monitoring and research to generate and utilize new information as it becomes available.

(B) Employing an adaptive management approach to ensure that the best available knowledge is acquired and used efficiently and effectively in forest resource management programs.

(4) The Board shall review and may revise the forest management plan developed by the State Forester to ensure that it is consistent with OAR 629-035-0020.

(5) The Board's approval of the plan represents its determination that activities carried out or allowed by the State Forester under subsection (6) of this section meet the obligation to secure the greatest permanent value to the state as defined in OAR 629-035-0020.

(6) Once the management plan is approved by the Board as provided in subsection (5) of this section:

(a) The Board shall adopt the plan as an administrative rule.

(b) The State Forester shall implement the plan through more specific, small scale or time limited plans that are consistent with the Forest Management Plan.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0040

Forest Land Base Designation

(1) Following the process described in subsection (2) of this section, all forest land shall be designated either as:

(a) Silviculturally capable of growing forest tree species, as defined by the Forest Practices Reforestation Suitability Standards as established by the Oregon Forest Practices Act (Silviculturally Capable); or

(b) Not capable of such growth (Non-Silviculturally Capable).

(2) Each district with forest land management responsibility shall identify Silviculturally Capable and Non-Silviculturally Capable lands in the district and display the designations on a map. The district shall forward the designations and map to the State Forester for approval. If approved by the State Forester, the State Forester shall forward the recommended designations to the Board for approval or modification. The Board shall adopt forest land base designations as an administrative rule.

(3) Designations of forest land under this section shall be reviewed by the appropriate district and, if necessary, updated prior to the completion of management plans for any planning area.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0045

Forest Land Base Designation Maps

The forest land designation maps required by OAR 629-035-0040 are a set of maps entitled "Land Base Designation Map (OAR 629-035-0040)" consisting of nine consecutively numbered sheets and bearing the date of adoption by the Board. The maps are maintained by the State Forester at the Oregon Department of Forestry's headquarters in Salem, Oregon.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.050
Hist.: DOF 1-1999, f. & cert. ef. 5-13-99

629-035-0050

Forest Land Management Classifications

(1) For purposes of implementing the plan's forest resource management strategies, the State Forester shall classify all forest lands within the planning area. The classifications must describe:

(a) The types of management that the Department will apply to particular areas of the land base;

(b) The appropriate range of management activities for these areas; and

(c) The forest resource or resources the classification is intended to address.

(2) The District Forester shall recommend to the State Forester land management classifications determined under subsection (1) of this section for each district. The recommended classifications shall be shown on maps.

(3) In classifying lands under this section:

(a) The State Forester may harvest forest tree species at some level on any Silviculturally Capable lands, regardless of classification, unless a legal or contractual obligation on the land prevents such management or unless the district determines under subsection (4) of this section that other management is more consistent with the direction of OAR 629-035-0020.

(b) No land designated as Silviculturally Capable land shall be managed for a single use unless required by law or contract or the District Forester determines under subsection (4) of this section that a single use for a particular parcel or parcels of Silviculturally Capable land is more consistent with the direction of OAR 629-035-0020.

(4) In determining whether to restrict or prohibit timber harvest on Silviculturally Capable lands or to allow a single use on Silviculturally Capable lands, the District Forester shall consider:

(a) Effects on other forest resources. In making this determination, the district shall consider, but is not limited to, the following:

(A) Risk to other forest resources;

(B) Sensitivity of forest resources;

(C) Duration and intensity of impact;

(D) Ability of forest resources to recover;

(E) Contribution to meeting planning goals;

(F) Intensity of the management practice;

(G) Type of forest resources involved.

(b) Public safety or other potential liability to the state;

(c) Specific desired uses;

(d) Legal constraints.

(5) Before sending the recommended classifications to the State Forester, the District Forester shall offer a 90-day public comment period on the recommendations. All public comments shall be forwarded to the State Forester, along with the District Forester's classification recommendations.

(6) The State Forester shall approve, modify, or deny the District Forester's recommendations. If the State Forester modifies the recommendations, the State Forester or District Forester shall prepare a new

map showing the modified land management classifications for the district. If the State Forester denies the recommendations, the District Forester shall prepare new recommendations according to the provisions of subsections (1) to (5) of this section.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0055

Forest Land Management Classification System

(1) The State Forester's classification of forest lands, required by OAR 629-035-0050, shall be accomplished pursuant to this section.

(2) Land Classifications. All forest lands subject to this rule shall be classified into one of the following three classifications: General Stewardship, Focused Stewardship, or Special Stewardship. These classifications apply to lands designated as Silviculturally Capable and Non-Silviculturally Capable.

(3) Distinguishing Characteristics. All forest lands will be classified according to the following distinguishing characteristics. In addition, forest lands will be further classified into subclasses when they are classified as Focused Stewardship or Special Stewardship.

(a) General Stewardship lands include all those whose forest resources are managed using integrated management practices in a manner which is intended to accomplish forest management planning goals, and are compatible over time and across the landscape when actively managed.

(b) Focused Stewardship lands include all those whose forest resources are managed using integrated management practices in a manner which is intended to accomplish forest management planning goals, and are compatible over time and across the landscape when actively managed, but for which a forest management plan, habitat conservation plan, or other legal requirement identifies a requirement for one or more of the following for a specific resource: supplemental planning, before conducting management practices, that helps to achieve identified goals for the specific resource; modified management practices that help achieve the identified goals for the specific resource; or, compliance with legal or contractual requirements above those required on lands classified as General Stewardship.

(A) In addition, other lands may be classified as Focused Stewardship where more specific, small scale, or time-limited plans developed by the State Forester to implement forest management plans call for supplemental planning and/or modified management practices to help achieve the identified goals for a specific resource.

(B) These lands will be further classified into one of the following subclasses:

(i) Agriculture, Grazing or Wildlife Forage -- lands where agricultural crops, domestic livestock grazing values, or wildlife forage values exist and are the focus of the supplemental planning, modified management practices, or legal requirements described above.

(ii) Aquatic and Riparian Habitat -- lands where aquatic and riparian habitat exists and where the habitat is the focus of the supplemental planning, modified management practices, or legal requirements described above.

(iii) Cultural Resources -- lands where cultural resources exist and where those resources are the focus of the supplemental planning, modified management practices, or legal requirements described above.

(iv) Deeds -- lands where deed requirements are a focus of the integrated management of a variety of forest resources.

(v) Domestic Water Use -- lands where individuals or communities have water rights, where surface water is being used for domestic water use and where the State Forester determines water quality and/or quantity is a focus of the integrated management of a variety of forest resources. For the purposes of this section, "domestic water use" means the use of water for human consumption and other household human use.

(vi) Easements -- lands where contractual obligations are a focus of the integrated management of a variety of forest resources.

(vii) Energy and Minerals -- lands where commercial quantities of energy or minerals exist, commercial extraction is occurring or likely to occur, and where those resources are the focus of the supplemental planning, modified management practices, or legal requirements described above.

(viii) Plants -- lands where a specific plant species or a community of plants exist and where those resources are the focus of the supplemental planning, modified management practices, or legal requirements described above.

(ix) Recreation -- lands that receive moderate or high levels of dispersed recreational use and where recreation management is the focus of the supplemental planning, modified management practices, or legal requirements described above.

(x) Research/Monitoring -- lands that are part of a research or monitoring project and where the design of the project requires supplemental planning or modified management practices.

(xi) Transmission -- lands used for the transmission of energy, materials, data, video, and/or voice and where the transmission is a focus of the integrated management of a variety of forest resources.

(xii) Visual -- lands which have been identified as having high or moderate visual sensitivity according to criteria in a forest management plan and where those visual resources are the focus of the supplemental planning, modified management practices, or legal requirements described above.

(xiii) Wildlife Habitat -- lands where wildlife habitat for a specific species or group of species exists and where that habitat is the focus of the supplemental planning, modified management practices, or legal requirements described above.

(c) Special Stewardship lands are those for which a forest management plan, habitat conservation plan, or other legal requirement identifies one or more of the following: a legal or contractual constraint dominates the management of the lands and precludes the integrated management of all forest resources; one or more forest resources are present which require a level of protection that precludes the integrated management of all forest resources; lands are committed to a specific use and management activities are limited to those that are compatible with the specific use.

(A) In addition, other lands may be classified as Special Stewardship, where more specific, small-scale, or time-limited plans developed by the State Forester to implement forest management plans call for a level of protection or a specific use that precludes the integrated management of all forest resources.

(B) These lands will be further classified into the following subclasses:

(i) Administrative Sites -- lands where administrative requirements restrict the integrated management of forest resources. These lands include but are not limited to building sites, rock stockpile sites, log storage/sorting sites, and demonstration areas.

(ii) Agriculture, Grazing, or Wildlife Forage -- lands where agricultural crops, domestic stock grazing, or wildlife forage values exist in a quantity or quality that restricts the integrated management of forest resources.

(iii) Aquatic and Riparian Habitat -- lands where aquatic or riparian habitat exists and where a legal requirement or the need to protect the habitat restricts the integrated management of forest resources.

(iv) County or Local Comprehensive Plans -- lands identified in county or local comprehensive plans where the integrated management of forest resources is restricted. Counties or local governments must take an exception to statewide land use planning Goal 4 for these lands.

(v) Cultural Resources -- lands where cultural resources exist in a quantity or quality that restricts the integrated management of forest resources.

(vi) Deeds -- lands where deed requirements restrict the integrated management of forest resources.

(vii) Domestic Water Use -- lands where individuals or communities have water rights, where surface water is being used for domestic water use and where the State Forester determines the need to protect water quality or quantity dominates the management of the land and the integrated management of forest resources is not possible. For the purposes of this section, "domestic water use" means the use of water for human consumption and other household human use.

(viii) Easements -- lands where contractual obligations restrict the integrated management of forest resources.

(ix) Energy and Minerals -- lands where commercial quantities of energy or minerals exist, extraction is occurring or likely to occur, and where the extraction restricts the integrated management of forest resources.

(x) Operationally Limited -- lands where current technology or engineering techniques are considered by the State Forester to be inadequate to reasonably ensure that integrated management practices would not cause significant long-term adverse effects. The State Forester may limit, restrict, or prohibit management activities in these areas as needed to protect forest resources or to accomplish the management goals for surrounding areas.

(xi) Plants -- lands where a specific plant species or a community of plants exist and where the need to protect the plant(s) restricts the integrated management of forest resources.

(xii) Recreation -- lands devoted to concentrated, formal recreation, or public education and where integrated management of forest resources is restricted. These lands include but are not limited to campgrounds, forest parks, waysides, rest areas, and interpretive centers.

(xiii) Research/Monitoring -- lands that are part of a research or monitoring project and the design of the project restricts the integrated management of forest resources.

(xiv) Transmission -- lands dedicated to the transmission of energy, materials, data, video and/or voice and where integrated management of forest resources is restricted. These lands include but are not limited to power lines, pipelines, and communication sites.

(xv) Visual -- lands subject to laws or regulations related to visual qualities or lands where the management practices needed to meet visual management objectives dominate over the integrated management of forest resources.

(xvi) Wildlife Habitat -- lands where a legal requirement or the need to maintain, protect, or enhance a wildlife habitat restricts the integrated management of forest resources.

(4) Types of Management.

(a) General Stewardship lands shall be actively managed, in compliance with OAR 629-035-0020, to provide 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. Lands within this classification which are designated as Silviculturally Capable will be actively managed to meet the requirements of OAR 629-035-0020(2). Lands within this classification which are designated as Non-Silviculturally Capable are not managed for sustainable timber harvest and revenues, but are managed to be consistent with the remaining management direction provided by OAR 629-035-0020(2). All management practices shall be consistent with the direction provided by OAR 629-035-0020(3).

(b) Focused Stewardship lands shall be managed in the manner provided for General Stewardship lands in the preceding subparagraph. However, because one or more specific forest resources on these lands require a heightened or focused awareness, supplemental planning and/or modified management practices may be required to achieve the goals of forest management plans, habitat conservation plans or legal requirements. Management practices may be modified to emphasize the protection and management of identified forest resources, but the practices will be consistent with the direction provided by OAR 629-035-0020(3) and will avoid long-term adverse impacts to the specified resources.

(c) Special Stewardship lands shall be managed for a specific forest resource. Integrated management of all resources is not conducted on these lands. Other resources are managed to the extent possible without interfering with the management of the specific forest resource or with applicable legal requirements.

(5) Range of Management Activities.

(a) On lands classified for General Stewardship, all management activities that meet or exceed the requirements of applicable state and federal laws, habitat conservation plans and forest management plans are allowed.

(b) On lands classified for Focused Stewardship, all management activities that meet or exceed the requirements of applicable state and federal laws, habitat conservation plans and forest management plans are allowed. However, management activities may require supplemental planning and/or modified practices to achieve the goals identified in the forest management plans for the specific forest resources. Management of the specific forest resources may have minor effects on the management of other forest resources, but will not preclude the integrated management of forest resources.

(c) On lands classified for Special Stewardship, management activities that protect, maintain, or enhance the specific forest resources, or are necessary to comply with the legal requirements, are allowed. Management of other forest resources on these lands must have no significant long-term adverse effect on the specific forest resources which required the classification.

(6) Resources Addressed.

(a) The General Stewardship classification will provide for management of all resources included in Forest Management Plans. All resources may not be treated equally on every acre, but across the landscape the resources will be managed to meet the goals identified in the Forest Management Plans.

(b) The Focused Stewardship classification will provide for management of all resources included in Forest Management Plans. Lands having forest resources described in a subclass designation will be assigned to that subclass. The subclass designation will be used to identify the specific forest resources that, with supplemental planning and/or modified management practices, can be managed in an integrated approach with other forest resources. All resources may not be treated equally on every acre, but across the landscape the resources are managed to meet the goals identified in the Forest Management Plans.

(c) The Special Stewardship classification addresses all forest resources included in the Forest Management Plan that meet the distinguishing characteristics of this classification. Lands having forest resources described in a subclass designation will be assigned to that subclass. The subclass designation will be used to identify the specific forest resources that are the emphasis of the management of these lands.

(7) Forest Land Management Classification Considerations. The following considerations apply to Forest Land Management Classifications:

(a) Prescriptions are not part of Forest Land Management Classifications. Prescriptions will be based upon goals and strategies in a forest management plan, statutory, or contractual requirements, and site-specific conditions.

(b) The identification and mapping of streams, wetlands, and the associated Aquatic and Riparian Habitat subclasses will be based upon criteria in Forest Management Plans and habitat conservation plans and will be accomplished using existing information or map-based estimates. The information will be updated through watershed assessments, planning for site-specific management activities or site-specific field visits conducted over time. The updated information will be used to determine any changes that may be needed to the classification of aquatic and riparian habitat.

(c) Land management classifications will be applied to broad geographic areas. Normally, areas smaller than five acres will not be classified, but will be included as part of an adjacent classification. Areas smaller than five acres will only be classified where specific information exists and the classification will be meaningful for making decisions on management activities.

(d) The boundary lines shown on maps for forest land management classifications are approximate locations. Exact locations of boundary lines will be determined on the site and will depend upon the conditions that exist on the site. Management activities will be conducted based upon boundaries determined on site rather than boundaries shown on maps.

(e) More than one classification or subclass may be assigned to a parcel of land. Where this occurs, the resource requiring the highest level of protection will determine the management approach. For example, if a Focused Stewardship resource and a Special Stewardship resource exist on the same parcel, then the Special Stewardship resource will be given the emphasis in the management of the resources. If multiple resources exist on a parcel and they are all within the same classification i.e. Focused Stewardship or Special Stewardship, the management approach will seek to achieve the goals for all of the identified resources to the maximum extent practicable.

(f) For the purposes of protecting threatened and endangered species and certain specific sites used by threatened and endangered species, locations of specific sites, such as nest trees and roosting trees, will not be displayed on classification maps. Broader geographic areas within which the sites exist will be displayed. The appropriate size of the area to be displayed may vary with the specific site.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.050
Hist.: DOF 1-1999, f. & cert. ef. 5-13-99

629-035-0060

Changes to Forest Land Management Classifications

The State Forester may make changes to the district land management classification maps as follows:

(1) Minor changes. The District Forester may recommend minor changes to the Area Director for approval. The District Forester may offer a 30-day public comment period prior to making any recommendations and shall forward any public comments with the recommendations to the Area Director for approval.

(2) Major changes. The District Forester may recommend major changes to the Area Director for review and the State Forester for approval. Prior to seeking approval, the district shall offer a 30-day public comment period on the proposed changes. Any public comments received shall be submitted to the State Forester with the request for approval.

(3) As used in this section:

(a) "Minor change" means:

(A) Any change in Land Management Classification that affects 160 acres or less, and involves land classification within, but not across, the Land Base Designation classes of Silviculturally Capable or Non-Silviculturally Capable; or

(B) Any change that affects ten acres or less involving land classification changes across the Land Base Designation classes of Silviculturally Capable or Non-Silviculturally Capable, and the District Forester determines this change is not likely to substantially affect the management of forest resources.

(b) "Major change" means any change not defined as minor. Minor changes within a district that cumulatively exceed 500 acres within one year shall be deemed a major change.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0070

Forest Land Exchanges and Acquisitions

(1) The District Forester shall recommend an amendment to the district land designations and management classifications of state-owned forest lands under OAR 629-035-0040 to 629-035-0050 when lands are added to or removed from the district land base.

(2) The District Forester shall provide a 30-day public comment period on the proposed amendments.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0080

Public Involvement

(1) The goals for public involvement in forest land planning are:

(a) To seek insight, opinions, and data on planned management actions on state-owned forest lands.

(b) To build understanding, acceptance, and support for the forest resource management planning processes and decisions.

(c) To offer information to the public about forest systems and forest stewardship.

(d) To provide the public with meaningful opportunities to comment and affect planning decisions at a time when public involvement can contribute positively to the planning decisions under consideration.

(2) Opportunities for public involvement shall be appropriate to the planning decision under consideration and shall include one or more of the following: general public access to decisions, a public comment period, a Board meeting, public meeting, public hearing, or focused technical review.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0090

Consultation with Forest Trust Land Advisory Committee

As provided in ORS 526.156(3), the Forest Trust Land Advisory Committee shall advise the Board and the State Forester on the management of lands subject to the provisions of ORS 530.010 to 530.170, and on other matters in which counties may have a responsibility pertaining to forest land. The Board and the State Forester shall consult with the committee with regard to such matters.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 526.156(3)
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98

629-035-0100

Existing Long Range Plans

(1) The Board considers long range plans approved by the Board prior to the effective date of these rules to be consistent with OAR 629-035-0010 to 629-035-0090 and directs the State Forester to manage the forest lands covered by the plans according to those plans until the plan is modified or a new plan is adopted. Any modification of existing plans or any new plan shall be adopted in accordance with the provisions of OAR 629-035-0010 to 629-035-0090.

(2) Initial forest land base designations and management classifications developed pursuant to OAR 629-035-0040 through 629-035-0055 must be submitted to the State Forester for approval within one year of the adoption of an amended or new Forest Management Plan.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.010 - ORS 530.050
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98; DOF 1-2001(Temp), f. & cert. ef. 1-12-01 thru 7-10-01; DOF 4-2001, f. 4-26-01, cert. ef. 7-11-01

629-035-0105

Adopted Forest Management Plan Documents

(1) The following forest management plan documents have been adopted and incorporated by reference into this division:

(a) Northwest Oregon State Forests Management Plan, Final Plan, January 2001;

(b) Southwest Oregon State Forest Management Plan, Final Plan, January 2001.

(2) The forest management plan documents which have been incorporated by reference into this division are maintained by the State Forester at the Oregon Department of Forestry's headquarters in Salem, Oregon.

Stat. Auth.: ORS 526.016(4) and ORS 526.041

Stats Implemented: ORS 530.050
Hist.: DOF 2-2001, f. & cert. ef. 1-19-01

629-035-0110

Management of Common School Fund Lands

Common School Fund Lands managed by the State Forester under an agreement with the State Land Board shall be managed consistent with OAR 629-035-0030 through 629-035-0100 if the Agreement or the State Land Board so directs.

Stat. Auth.: ORS 526.016(4)
Stats. Implemented: ORS 530.490 - ORS 530.500
Hist.: DOF 2-1998; f. 1-15-98, cert. ef. 3-1-98