STAFF REPORT

Agenda Item No.:	6
Work Plan:	State Forests Work Plan
Topic:	State Forests Management
Presentation Title:	Western Oregon State Forests Draft Forest Management Plan
Date of Presentation:	June 3, 2026
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CONTEXT

Forest Management Plans (FMP) provide the overarching management direction for State Forests. These plans are developed pursuant to Oregon Administrative Rule and are approved by the Board of Forestry to codify the Board's finding that management direction in the FMP meets Greatest Permanent Value (OAR 629-035-0020).

After the Board approves a Forest Management Plan, it is required to be adopted as Administrative Rule (OAR 629-035-0030(6)(a)), which requires formal rulemaking under the Administrative Procedures Act (ORS 183.310 – 183.410).

The draft Western Oregon State Forests Management Plan was presented to the Board at its January 2025 meeting to seek consent to initiate rulemaking. This FMP is proposed to replace the current FMPs for the State Forest lands under the Department of Forestry's management in western Oregon. The draft FMP is developed to provide policy direction consistent with the draft Western Oregon State Forests Habitat Conservation Plan (HCP).

Rulemaking

The State Forests Division initiated the formal rulemaking process on November 1, 2025. Prior to beginning rulemaking, the Division conducted outreach with the nine federally recognized Tribes in Oregon. The rulemaking process included all steps required by the Administrative Procedures Act, including required notifications to stakeholders and the legislature, a public comment period and public hearings. The Department provided the Board with a summary of the comments received in March and now presents the Board with the final proposed FMP, which includes recommended changes based on the comment received. This final draft version of the FMP will be sent out for a final round of public comment before a Board vote to approve the FMP to be adopted as rule. When the expected date of issuance for the Incidental Take Permits is better known, the Department will determine the desired effective date for the new FMP and finalize the rulemaking with the Secretary of State to promulgate the rule consistent with that timeline.

Summary of Forest Management Plan Revisions

Based on comments received, the Department has made recommended changes to the draft FMP. The most common type of edit was made to improve clarity and readability (e.g., simplifying word choice or sentence structure, eliminating redundancy, deleting extraneous detail) or to correct grammatical issues (e.g., tense, capitalization, punctuation). These types of edits were made throughout the document and do not reflect a change in policy or management approach for state forests. In some cases, paragraphs may have been rewritten, and in other cases, only a few words changed.

For example, the recreation strategy related to providing recreation, education, and interpretation opportunities was revised from the first paragraph below to the second. The intent of the strategy is unchanged.

> Original:
> *Reimagine and adapt recreation, education, and interpretation opportunities across state forest lands to provide a diversity of experiences, services and programs, improve delivery of services and increase access. Opportunities include interpretation and education services for forest visitors and communities to learn about and connect with Oregon's history, people, and forests.*
>
> Revised:
> *Assess, maintain, and improve recreation, education, and interpretation opportunities on state forest lands through existing trails, facilities and future development.*
>
> a. *Consider connecting to existing recreational infrastructure when planning new development in close proximity.*
> b. *Use BMPs, engineering standards, and planning principles suited for facility and trail development on public lands.*

A paragraph on the use of mineral resources was revised for clarity, and provides another example.

> Original:
> *However, ODF may use soil, clay, stone, sand, and gravel for constructing or repairing roads or other state facilities (ORS 530.050). State forest lands have provided high-quality rock for local road surfacing and ballast rock. This rock is an important resource for road construction and maintenance of roads.*
>
> Revised:
> *ODF may use soil, clay, stone, sand, and gravel for constructing or repairing roads or other state facilities (ORS 530.050). State forest lands can provide rock for local road surfacing, which is an important resource for road construction, road improvement, and road maintenance.*

Updates were made to Chapter 1 to provide context for the FMP and its implementation, with the following statements added:

> *The purpose of the FMP is to ensure ODF's management of these lands provides greatest permanent value (GPV) to all Oregonians. GPV means healthy, productive, and sustainable forest ecosystems that over time and across the landscape provide a full range of social, economic, and environmental benefits. While the FMP provides the guidance for forest management across western Oregon, mid-term implementation and*

annual project plans are written and released to the public on a 10-year and annual to biennial basis.

As a BOF-adopted plan, this FMP is designed to support the priorities and goals of other BOF plans, specifically the Vision for Oregon's Forests (VOF)2 and the Climate Change and Carbon Plan (CCCP), through goals and strategies that promote resilient forest ecosystems and communities in light of changing conditions exacerbated by climate change.

<u>Intent Statements</u>
Intent statements were also added for each forest resource strategy. Intent statements are meant to provide more detail about the outcomes the strategy seeks to accomplish when implemented.

For example, one of the FMP strategies relates to Tribal seed sources:

Collaborate with Tribal Partners on native seed source recommendations that consider appropriate habitat in planting regimes, climate resiliency, and legacy seed source information that contributes to a storied landscape understanding.

The intent statement paired with this strategy provides more detail with respect to ways the Department will implement this strategy:

Identify and cultivate partnership opportunities with established native nurseries, including but not limited to the Coastal Native seed partnership, ODA's seedbank, and Tribal seed nurseries. Continue to work with Tribal Partners in Implementation Plan (IP), Operations Plan (OP), and adaptive management planning processes to develop and implement climate adaptation strategies to support culturally significant plant and animal species.

<u>Connections to Other Policies</u>
Connections to other policy documents were also updated throughout to better tie the FMP to the Board adopted *Vision for Oregon's Forests* and *Climate Change and Carbon Plan*. For example, the Forest Resilience section in Chapter 3 now contains:

The forest will be actively managed to achieve objectives within stands and across the landscape to create a variety of forest conditions designed to improve resilience and capacity for adapting to climate change consistent with the Vision for Oregon's Forests and the ODF Climate Change and Carbon Plan (CCCP). Examples of management options that foster resilience and adaptation are provided in Table 1 below, adapted from Burton (2025).

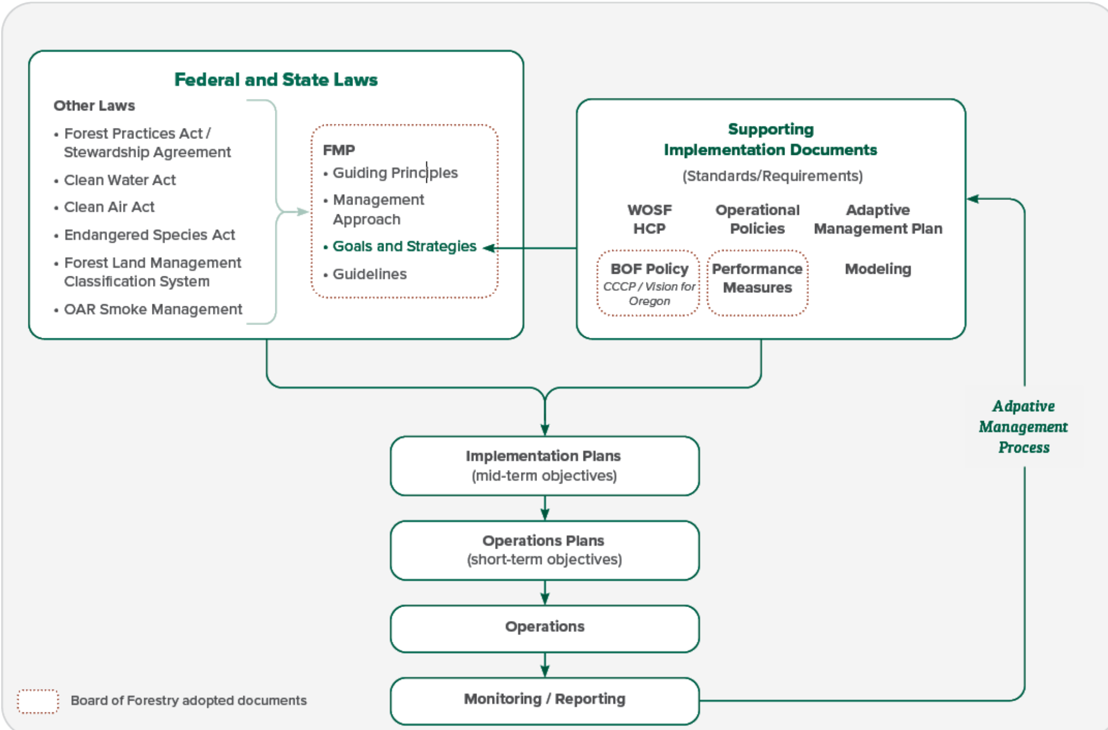
Table 1 - Examples of management options that foster resilience and adaptation

Management options to increase climate resilience	Examples
Sustain ecological functions	Maintain or restore hydrology and riparian areas
Reduce the impact of existing stressors	Reduce tree density to minimize water stress
Protect from severe disturbances	Alter forest structure to reduce fire or wind throw risk
Maintain refugia	Protect unique sites or habitat of species of conservation concern
Enhance species and structural diversity	Promote diverse age classes, diverse species, and biological legacies
Increase redundancy across the landscape	Manage forest and habitat types over a range of sites and environmental conditions
Promote landscape connectivity	Reduce fragmentation and expand reserve networks.
Enhance genetic diversity	Use seed sources adapted to future conditions, diversify nursery stock
Aid species transitions	Favor drought tolerant species, guide species composition during young stand management, consider assisted migration of species.
Plan for disturbances	Revegetate promptly and retain seed source to allow for natural regeneration.

Source: Burton 2025

The effectiveness of novel silviculture prescriptions under a changing climate is evaluated during the planning and adaptive management processes described in Chapter 4, Guidelines.

A figure depicting how various laws, policies, supporting documents, and research and monitoring are linked to the FMP was simplified for improved understanding.



Additional information was added to Chapter 4 to clarify decision-making authorities and responsibilities for implementation.

> *ODF implements the FMP and WOSF HCP through IPs and OPs. The State Forests Division Chief, Area Directors, and District Foresters review IPs, which are approved and signed by the State Forester. District Foresters implement the FMP and WOSF HCP within their districts through the approval and oversight of OPs. Table 4-2 describes the tasks and responsibilities for IP and OP approval and implementation.*

Table 4-2. Roles and Responsibilities of Decision-Makers in the Implementation, Operations, and Revision Approval Process

Task	Responsible Party
Approves FMP and performance measures and requests and approve FMP/performance measure revisions	Board of Forestry
Approves IPs and major revisions to FLMCS	State Forester
Approves Operational Policies specific to the State Forests Division	State Forests Division Chief
Approves minor revisions to FLMCS	Area Director
Approves and implements OPs	District Forester

Guiding Principles

The Guiding Principles in Chapter 1 were not changed from the Board-approved versions, excepting minor grammatical edits to Principles 6 and 9; however, the explanatory sections were updated for some to provide additional clarity regarding the context for FMP development. An explanation was also added to clarify the difference between the actual guiding principle and the expanded text that follows each.

> *The text that follows the principle explains the policy guidance and in some cases clarifies how the plan meets the principle.*

As a reminder, the Guiding Principles are defined by the Planning Rule (OAR 629-035-0030(2)(a)) as principles that guide development of the management plan. Some of the comments received confused the purpose of the Guiding Principles, suggesting that they guide management under the plan. For example, Guiding Principle 3 states:

> *The FMP will provide sufficient revenue to ensure ODF's ability to manage, conserve, and invest in the forest in order to provide GPV.*

This means during FMP development, the Department sought to formulate strategies that provide sufficient revenue, not that management under the FMP will guarantee any particular outcome related to revenue.

Adaptive Management

The Adaptive Management Guidelines in Chapter 4 were streamlined to match the level of detail provided in rule: Adaptive management is "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 (OAR 629-035-0000(2))." For example, the description of decision analysis and structured decision-making was removed. In its place, a new section Decision Authority and Revision Guidelines describes how plans or policies can be amended and who makes those decisions in response to monitoring. The Board responds to new information to change the FMP or its implementation in the following manner:

> *The BOF reviews the FMP no less than every 10 years in light of current social, economic, scientific, and silvicultural considerations (OAR 629-035-0020). The BOF evaluates new information in the context of the guiding principles, goals, and strategies of the FMP. If implementation of the FMP is not achieving the BOF's desired results (e.g., indicated from monitoring and reporting of performance measures), the BOF may respond by directing the State Forester to change implementation of the FMP through revising operational policies or BMPs or adjusting implementation focus. The BOF may initiate an FMP revision if outcomes cannot be improved by implementation changes alone. The BOF and the State Forester engage county partners, Tribes, other federal and state agencies, stakeholders and the public to gather input on the proposed revision.*

Forest Management Plan Implementation

The Forest Management Plan is developed following the requirements of the Forest Management Planning Rule (OAR 629-035-0030). The Forest Management Plan is to be developed by the State Forester to "*establis*h the general management framework for the planning area of forest land." The State Forester is also required to "*develop implementation and operations plans that describe smaller-scale, more specific management activities within the planning area.*" The draft FMP contains the required elements (e.g., guiding principles, goals, strategies, and guidelines); however, some details used for implementation are found in other policy documents, such as the draft WOSF HCP, operational policy, or the Forest Practices Act (for the State Forests Division, compliance with much of the FPA is codified through a Stewardship Agreement).

During operations planning and implementation, State Forests staff specialists and foresters collaborate to ensure all resource goals are met. The outcome of this integrated forest management approach can be visualized through maps demonstrating how goals are emphasized in specific areas and how harvest operations are modified to achieve desired outcomes.

Figure 1 shows, for a portion of the Astoria District, a variety of emphasis areas. Habitats for native fish and wildlife are the focus within HCAs and RCAs. Several recreation trails are shown, where the emphasis is public use. Operationally limited areas, where terrain characteristics preclude harvest operations, and visual emphasis areas, where the focus is on aesthetics, are also shown.

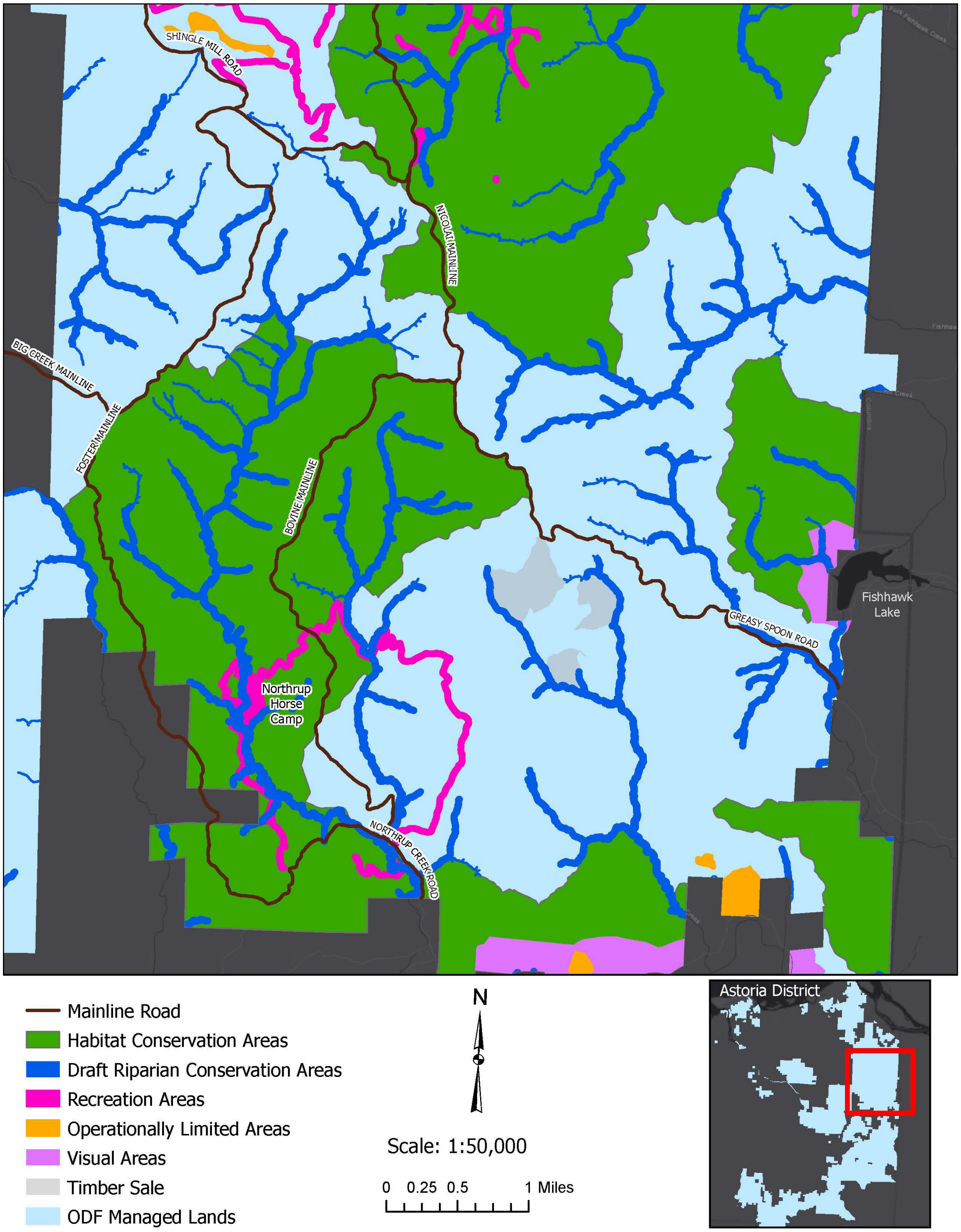


Figure 1. A portion of the Astoria District. A variety of emphasis areas are shown, including HCAs and RCAs, recreation areas, and visual emphasis areas. A timber sale operation is also shown.

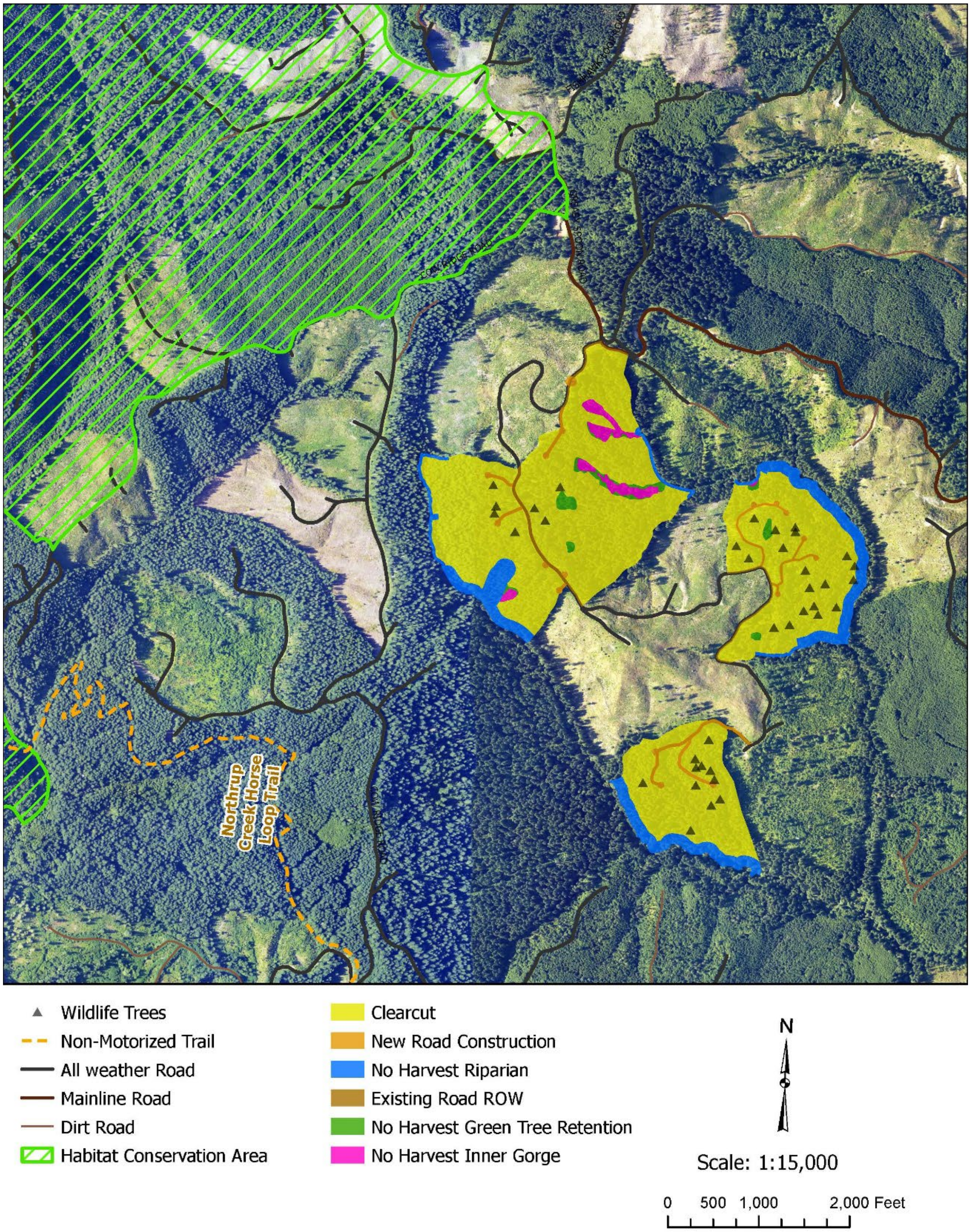


Figure 2. A timber sale operation in the Astoria District shows how active management is modified to account for other goals. Buffers for streams, green tree retention areas, and wildlife trees are shown, along with roads and trails, and the adjacent Habitat Conservation Area.

Figure 2 depicts a closer view of the operation shown in Figure 1, overlaid on an orthoimage. Operational policies regarding the management of recreation trails, roads, legacy structures and terrestrial and aquatic habitats, along with the direction provided by the FMP and Forest Practices Act combine to prescribe the outcome of a timber sale operation.

Additional details and clarity with respect to the outcomes associated with the management of State Forests lands for the first decade (e.g., Performance Measures, HCP monitoring) will be provided with the development of the initial Implementation Plans.

RECOMMENDATION
Information only.

NEXT STEPS

The State Forests Division will:
(1) Return to the Board in July 2026 to obtain final approval of the draft FMP.
(2) Complete the process with the Secretary of State to adopt the FMP as rule with an effective date that aligns with the issuance of Incidental Take Permits.
(3) Return to the Board at its January 2027 meeting to provide the Board with modeling results and to adopt the Performance Measures.

ATTACHMENTS

(1) Final Draft Western Oregon State Forests Management Plan (May 2026)
(2) Redline version of the Final Draft Western Oregon State Forests Management Plan depicting changes from the May draft and the previous draft.

Western Oregon State Forests Management Plan

DRAFT FINAL • MAY 2026

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Land Acknowledgement[1]

Indigenous tribes and bands have been with the lands that we inhabit today throughout Oregon and the Northwest since time immemorial and continue to be a vibrant part of Oregon today. We would like to express our respect to the First Peoples of this land, the nine federally recognized Tribes of Oregon: Burns Paiute Tribe, Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians, Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Coquille Indian Tribe, Cow Creek Band of the Umpqua Tribe of Indians, and The Klamath Tribes. It is important that we recognize and honor the ongoing legal and spiritual relationship between the land, plants, animals, and people indigenous to this place we now call Oregon. The interconnectedness of the people, the land, and the natural environment cannot be overstated; the health of one is necessary for the health of all. We recognize the pre-existing and continued sovereignty of the nine federally recognized Tribes who have ties to this place and thank them for continuing to share their traditional ecological knowledge and perspective on how we might care for one another and the land, so it can take care of us. We commit to engaging in a respectful and successful partnership as stewards of these lands, and as we are obliged by state law and policy, we will uphold government-to-government relations to advance strong governance outcomes supportive of Tribal self-determination and sovereignty.

[1] Land acknowledgement provided by Legislative Commission on Indian Services

CHAPTER 1
Introduction

1.1 Purpose and Scope of the Forest Management Plan

The *Western Oregon State Forests Management Plan* (FMP) provides management direction for all *Board of Forestry Lands*[1] (BOFL) and *Common School Forest Lands* (CSFL) managed by the Oregon Department of Forestry (ODF) west of the crest of the Cascade Range. The purpose of the FMP is to ensure ODF's management of these lands provides *greatest permanent value* (GPV) to all Oregonians. GPV means healthy, productive, and sustainable forest *ecosystems* that over time and across the *landscape* provide a full range of social, economic, and environmental benefits. While the FMP provides the guidance for forest management across western Oregon, mid-term implementation and annual project plans are written and released to the public on a 10-year and annual to biennial basis.

This plan supersedes and replaces the *2010 Northwest Oregon State Forests Management Plan*, the *2011 Elliott State Forest Management Plan*, and the *2010 Southwest Oregon State Forest Management Plan*. The *Board of Forestry* (the BOF) may review, modify, or terminate the FMP at any time; however, the BOF will review the FMP no less than every 10 years (Oregon Administrative Rules [OAR] 629-035-0030).

As a BOF-adopted plan, this FMP is designed to support the priorities and *goals* of other BOF plans, specifically the *Vision for Oregon's Forests* (VOF)[2] and the *Climate Change and Carbon Plan* (CCCP), through goals and strategies that promote *resilient* forest ecosystems and communities in light of changing conditions exacerbated by *climate change*.

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

[2] All references are to direct the reader to another document that provides further information and are not intended nor should be construed as incorporating the cited or referred to document into the FMP.

The public and various organizations were involved in developing the FMP. For more information, see Appendix A, *Engagement*.

This chapter describes or provides the following.

- The BOF's *guiding principles* for the FMP, ownership and location of the lands governed by the FMP, and history of the FMP.
- Plan themes: GPV, considering and engaging all Oregonians, resilience to climate change*, sustainability,* and *adaptive management*.
- How the FMP relates to other plans and processes.
- An outline of the FMP chapters.

1.1.1 Guiding Principles

The Forest Management Planning rule for state forests (OAR 629-035-0030) identifies required elements for FMPs. Among these are "guiding principles that include legal mandates and Board of Forestry policies." In addition to the VOF and CCCP, the BOF provided the following guiding principles, shown in italics, to direct the development of this FMP. The text that follows the principle explains the *policy* guidance and in some cases clarifies how the plan meets the principle.

Principle 1 – Greatest Permanent Value

The FMP will be grounded in the management mandates for BOFL as expressed in the GPV and Forest Management Planning OARs.

OAR 629-035-0020, Greatest Permanent Value, and OAR 629-035-0030, Forest Management Planning, provide the foundation for the development of the FMP.[3] The Forest Management Planning rule requires the State Forester to create plans to manage state forests for GPV—balancing environmental, social, and economic benefits. GPV benefits include but are not limited to the following.

- Sustainable and predictable production of *forest products* that generate *revenues* for the benefit of the state, counties, and local taxing districts.
- Properly functioning *aquatic* habitats for salmonids, and other native fish and aquatic life.
- Habitats for native wildlife.
- Productive soil, and clean air and water.
- Protection against floods and *erosion*.
- Recreation.

The Forest Management Planning rule directs the FMP to include strategies that accomplish the following.

[3] Division 35 includes definitions, findings, and principles associated with acquired lands, language defining GPV, and direction for the development of FMPs.

- Contribute to *biological diversity* of forest stand types and *structures* at the landscape level and over time.
- Apply *silvicultural* techniques that provide a variety of forest conditions and resources.
- Conserve and maintain genetic diversity of forest tree *species*.
- Manage forest conditions to result in a high probability of maintaining and restoring properly functioning aquatic habitats.
- Protect, maintain, and enhance native wildlife habitats.
- Recognize that forests are dynamic.
- Provide for healthy forests by using an *integrated pest management* approach and appropriate genetic sources of seed.
- Maintain or enhance forest soil productivity.
- Produce sustainable levels of timber consistent with protecting, maintaining, and enhancing other *forest resources*.
- Apply management strategies that enhance timber yield and value while contributing to the diversity of habitats for native fish and wildlife.

The GPV and the Forest Management Planning rule OARs require the State Forester to actively manage lands and include strategies for actively managing forest lands in the FMP. *Active management* involves application of silvicultural prescriptions, such as thinning and *regeneration* harvest, reforestation, and *young stand management*. However, certain forest resource goals are best achieved through deliberate *passive management* such as allowing stands to develop without silvicultural intervention, or regenerate after natural *disturbances* without active reforestation. Site-specific management decisions are made considering the future *objectives* for, as well as current characteristics of, forest stands. Chapter 2, *Management Approach*, and Chapter 3, *Forest Resources, Goals, and Strategies*, describe passive management and active management techniques and considerations for their application, which are consistent with the OAR definition of active management: "applying practices over time and across the landscape to achieve site-specific forest resource goals using an integrated, science-based approach that promotes the compatibility of most forest uses and resources over time and across the landscape."

The GPV and Forest Management Planning rule OARs also direct that landscape context be considered. *Landscape* is defined as "a broad geographic area that may cover many acres and more than one ownership and may include a *watershed* or sub-watershed areas" (OAR 629-035-0000). Plans must contain "a description and assessment of the resources within the planning area and consideration of surrounding ownership in order to provide a landscape context" (OAR 629-035-0030).

Key to GPV, the State Forester is required to manage state forest lands in a manner to provide sustainable timber harvest within a broader management context through integrating and achieving a variety of forest resource management goals. Although the counties have a recognizable interest in revenue generated on state forests, OAR 629-035-0010 includes the following BOF finding, which is consistent with GPV.

> 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 [of Forestry] 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 forests lands (OAR 629-035-0010).

GPV and the Forest Management Planning rule also directs that the FMP be based on the best science available, use *monitoring* and research to generate new information, and use an adaptive management approach. Additional information on adaptive management is found in Chapter 4, *Guidelines*.

Principle 2 - Biological Diversity

State forest lands will be managed, conserved, and restored to provide overall biological diversity of state forest lands, including the variety of habitats for native fish and wildlife and accompanying ecological processes. The GPV and Forest Management Planning rules are the BOF's expression of providing conservation.

Biological diversity is the cornerstone for fostering resilient forest ecosystems. The GPV and Forest Management Planning rules include references to attributes that are directly tied to providing a multitude of environmental, social, and economic co-benefits associated with *biodiversity* on BOFL. These references include, but are not limited to, providing and restoring properly functioning aquatic systems; protecting, maintaining, and enhancing native wildlife habitats; contributing to diversity of forest stand types and structures at the landscape level and over time; and conserving and maintaining genetic diversity of forest tree species.

Principle 3 - Revenue

The FMP will provide sufficient revenue to ensure ODF's ability to manage, conserve, and invest in the forest in order to provide GPV.

The FMP strives to provide sufficient revenue to support the stewardship of these forest lands and produce economic, social, and environmental benefits. *Financial viability* is achieved over the long term through continued protection and management of the forest *asset*, and it is achieved over the short term with operational tools that ensure cash flow is available to ODF for sound management of state forest lands.

In the current business model, 98% of revenue used to support ODF's management of state forests is derived from timber. Revenues derived from the management of BOFL are shared with the counties and local taxing districts in which the management activities take place: 63.75% of revenues are distributed to local counties and taxing districts and 36.25% of revenue is retained by ODF to fund the management of BOFL. Revenues from CSFL is transferred to the Oregon Department of State Lands (DSL) to be deposited in the state *Common School Fund*, and DSL reimburses ODF for expenses associated with management of CSFL.

Expanding and diversifying revenue sources to support public benefits may increase long-term financial stability. Revenues are cyclical and subject to market forces beyond ODF's control, and the balance of social, economic and environmental co-benefits produced will vary over time in alignment with available operating funds (Chapter 4, Section 4.3, *Asset Management Guidelines*). Several tools are used to ensure ongoing management of state forests under different revenue outlooks ensuring fiscally responsible management into the future.

Principle 4 – Social Benefits

The FMP will provide for a range of social benefits for all Oregonians, including direct and indirect financial contributions to local and state governments, opportunities for public access and recreational use, support for diverse local employment opportunities, and the inclusion of Oregonians and their broad range of perspectives.

State forest lands support multiple social benefits on a variety of scales and contribute to community well-being for all Oregonians. These benefits include clean air, clean water, shade, hunting, fishing, foraging, and recreational opportunities, like birding and hiking, that draw in visitors, contribute to local and statewide tourism economies, and enhance the quality of life for all Oregonians. Other social benefits include various health factors such as improved mental and physical wellness, mitigation of the negative impact of climate change, and enhance community cohesion around shared natural spaces. ODF provides opportunities for lasting and diverse outdoor recreation, education, and interpretive experiences that inspire visitors to enjoy, respect, and connect with Oregon's state forest lands. Active forest management provides revenue for counties, social services, and public education. It supports communities by creating living-wage jobs and contributing to local, regional, and state economies.

Principle 5 – Forest and Watershed Restoration

The FMP will recognize that investments in forest and watershed restoration are necessary to achieve desired outcomes that align with the GPV policy direction for the BOF.

Restoration efforts are essential to rehabilitate *degraded forest lands* and *degraded watersheds*. Degraded conditions may exist because of past management practices, changing climatic conditions, or natural *disturbances* such as fires, windstorms, floods, and outbreaks of insects or disease. Much of Oregon's state forest lands experienced significant degradation from repeated, large-scale wildfires and extensive logging in the first half of the 20th century prior to ODF management, and although most are they are now reforested, additional challenges remain where forests are underproductive or aquatic systems need to be rehabilitated. Restoration efforts are carried out with the goal of restoring properly functioning ecological conditions and resilient forests that continue to produce the benefits of GPV.

Forest Restoration

Sole reliance on natural regeneration, as opposed to proactively planting trees, in the wake of large-scale disturbance events (e.g., ice storms, wind events, floods, and fires) can extend periods of underproductive forest conditions and susceptibility to insects and disease. More immediate action, such as salvage of dead and downed trees followed by reforestation may be required to mitigate additional fire or disease risks, improve *resilience*, and return the forest to a productive state in a reasonable timeframe.

The FMP recognizes these restoration needs and seeks creative funding mechanisms to implement them. Restoration efforts contribute to diverse and *healthy forest landscapes* that allow for natural disturbance at different scales. This helps create working forests that are more resilient in the face of climate change, fire, or other disturbance events and stressors. Monitoring and adaptive management are key components of restoration efforts.

Watershed Health

For over 20 years, ODF has made a concerted effort to conserve and improve rivers and watersheds throughout the state, with the direct involvement of local *Watershed Councils* and *Soil and Water Conservation Districts*. ODF's management plans and activities have been an important part of those efforts. The FMP supports the Oregon Watershed Enhancement Board's mission to "help protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies" and emphasizes a continuing commitment to restoration activities. This commitment recognizes the vital contribution that these forests can make to the success of large-scale regional efforts like the *Oregon Plan for Salmon and Watersheds* (Oregon Watershed Enhancement Board 2006).

Principle 6 – Pace and Scale

The FMP will be developed and implemented on a scale and at a pace that provides a geographic and temporal range of economic, social, and environmental benefits.

Not all benefits can be optimized at every spatial scale for every time period. Therefore, ODF shall strive to achieve a range of benefits across the landscape and over time. Chapter 2, *Management Approach*, of this FMP describes how state forests are managed at different spatial and temporal scales to achieve a range of benefits. ODF allocates state forest lands according to stewardship classes that translate into a specific emphasis on different areas. The layout of these *emphasis areas* is intentionally designed to provide benefits at the larger landscape scale, like clean water, timber revenue across counties, recreational and tribal access, and habitat *connectivity* for diverse species, including fish and game. At smaller scales, such as individual forest stands within emphasis areas, site-specific conditions guide prescriptive management elements. Management across these spatial scales, from emphasis areas to stand conditions, produces a range of benefits over time.

Principle 7 – Varying Levels of Outcomes

The FMP will provide varying levels of social, economic, and environmental outcomes over time as fiscal conditions change. While this approach will result in short-term trade-offs among specific goals, over the long term, GPV will be achieved.

Different GPV outcomes may be emphasized at different time periods, depending on *fiscal conditions*. For example, when fiscal conditions are favorable, increased investments may be made in aquatic and watershed restoration efforts and to conduct forest management activities to increase resiliency that are cost prohibitive under poor market conditions. Fluctuating timber market conditions (rising markets versus recessions) may favor more or less active management during specific time periods. However, over the long term, the FMP provides a predictable and sustainable flow of timber and other management activities. Protection of native fish and wildlife habitats is maintained consistent with the strategies established in this FMP and the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP).

Principle 8 – Legal and Regulatory Compliance

The FMP will comply with other state and federal laws and rules.

In addition to the management mandates specific to state forest lands, the FMP addresses compliance with other state and federal laws and rules including, but not limited to, the state and federal *Endangered Species Acts* (ESAs), the federal *Clean Water Act*, the Oregon Forest Practices Act (FPA), Oregon *fish passage* laws, and *cultural resource* protection administered by the *State Historic Preservation Office* and coordinated with *the nine federally recognized Tribes in Oregon* (also known as *Tribal Partners*)[4] and the Oregon State Police.

Principle 9 – Tribal Outreach and Engagement

Reach out to and engage with the nine federally recognized Tribes in Oregon throughout the planning and implementation processes.

ODF acknowledges Tribes and the Confederations of Tribes are the original stewards of the lands currently managed by ODF and recognizes the value and importance of integrating tribal interests and perspectives into land management and implementation processes. ODF pursues opportunities to meet with tribal government executives and councils, members, practitioners, and staff to listen, learn, and seek opportunities to build collaborative relationships. Chapter 3, *Forest Resources, Goals, and Strategies*, provides additional context for outreach and *engagement* with the Tribes, and supporting plans may be developed in collaboration between the Tribes and ODF. Appendix A, *Engagement*, describes how ODF and Tribes worked together to develop the FMP cultural resources goals and strategies.

Principle 10 – Diverse Input

Seek diverse input from Oregonians.

Understanding, acceptance, and support from a wide range of Oregonians contributes to long-term success in managing state forest lands. ODF is committed to open, equitable, and transparent engagement processes. Counties containing BOFL have a statutorily established relationship with the BOF through the *Forest Trust Land Advisory Committee* (FTLAC). Additionally, the State Forest Advisory Committee, state and federal partners, and local communities provide input through public meetings and public comment periods. ODF provides accurate and timely information to ensure interested parties

[4] The nine federally recognized Tribes in Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and the Klamath Tribes.

have the information they need to ensure they can provide testimony and comment to the BOF and the State Forester.

Principle 11 – Cooperative Efforts

The FMP will achieve goals through cooperative efforts with other agencies and units of local government, user groups, and organizations.

Management objectives can often be achieved more effectively and efficiently through collaboration with others. Consultation and communication with state and federal agencies, counties and local governments, academic institutions, and non-governmental organizations, is important to identifying areas where ODF's efforts intersect with other state initiatives.

Principle 12 – Managing for Climate Change

The FMP will be implemented to adapt to climate change and mitigate its impacts on the management of state forest lands. The FMP will also contribute to climate change mitigation and sequester carbon.

Temperature, precipitation, other climate variables, and *hydrologic processes* are changing, and they are likely to increase the frequency and severity of disturbances, including insect outbreaks, disease, severe windstorm events, wildfire, flood, and drought. Within the context of ODF's adaptive management process and consistent with the CCCP (ODF 2021), the FMP contains forest management strategies intended to maintain, restore, and improve ecological processes and functional characteristics that promote resilient forests. Healthy and resilient forests sequester and store carbon from the atmosphere, a factor in mitigating global climate change. Wood products derived from working forests store carbon and are less carbon intensive than building materials such as concrete and steel. A focus on strategies that adapt to climate change increases ODF's ability to provide GPV over the long term.

1.1.2 Land Ownership and Governance

State forest lands comprise 3% of Oregon's forested landscape. The *planning area* for the FMP covers approximately 640,000 acres consisting of BOFL (614,000 acres) and CSFL (26,000 acres), two types of land that are owned by different state government entities. The BOF owns BOFL, while the *State Land Board* owns CSFL. Each land ownership has its own set of legal and policy mandates. The locations of these lands are shown on the vicinity map (Appendix B, *District Maps*, Figure B-1). Lands are organized into management districts (Appendix B, *District Maps,* Figures B-1 through B-7).

Prior to state ownership, almost all BOFL had been owned and managed by private landowners. Most of these lands had been logged, or burned and salvage-logged, and abandoned without the implementation of modern *best management practices* (BMPs). Tax-delinquent and abandoned lands reverted to county ownership. The counties entered into an agreement with the state that was codified in statute and deeded the lands to the state. Those counties share in revenues from these lands today (Oregon Revised Statutes [ORS] 530.110, 530.010–530.040). CSFL are a subset of Common School Lands that were granted to Oregon by the federal government upon statehood. The original configuration of both types of lands has changed somewhat over time due to land exchanges and acquisitions.

ODF recognizes that the lands covered by the FMP include ancestral lands of the nine federally recognized Tribes in Oregon. The people living and using the lands were displaced during federal and private land acquisition, prior to the lands being deeded to the state. The nine federally recognized Tribes in Oregon were engaged in development of the FMP with the intention of integrating their interests and recognized historical claim in the management of lands that ODF currently manages.

1.1.3 Location

The planning area is west of the crest of the Cascade Range and is distributed across 17 counties. The lands covered by this FMP include both large blocks and isolated smaller tracts of state forest lands. The three largest blocks are designated as the Tillamook State Forest, Clatsop State Forest, and Santiam State Forest. Smaller tracts of BOFL and CSFL are unnamed state forest lands, scattered throughout the planning area.

The Clatsop State Forest and Tillamook State Forest are in the northern end of the Oregon Coast Range, roughly 25 miles northwest of Portland. They are managed by the Astoria District (Appendix B, *District Maps,* Figure B-2), Tillamook District (Appendix B, *District Maps*, Figure B-5), and the Forest Grove District (Appendix B, *District Maps*, Figure B-3). The Pacific Coast is a few miles to the west and the Columbia River is to the north and east. Local communities include Forest Grove to the east, Astoria to the northwest, and Tillamook to the west.

Located almost entirely in the Astoria District, the Clatsop State Forest is the second-largest state forest and contains the first parcels that were deeded to the state in 1937. In 1957, Clatsop County transferred 141,000 acres to the state. At 364,000 acres, Tillamook is the largest state forest, located primarily in the Tillamook and Forest Grove Districts. The Clatsop and Tillamook State Forests were formally designated in 1973.

The Santiam State Forest is in the Cascade Range, roughly 25 miles southeast of Salem, in the North Cascade District (Appendix B, *District Maps*, Figure B-4). Local communities include Detroit, Mill City, and Scotts Mills. Santiam is the third-largest state forest covered by this FMP. It was dedicated in 1974.

Many scattered state forest lands are in the Coast Range between Newport and Corvallis (Appendix B, *District Maps*, Figure B-7). There are additional tracts between Florence and Eugene in the Coast Range, scattered in a checkerboard pattern, and some tracts between Reedsport and the California border (Appendix B, *District Maps*, Figure B-6).

1.1.4 History of the State Forests Management Plans

Dedication of Tillamook and Clatsop State Forests. Governor Tom McCall speaks at the formal dedication of the Tillamook and Clatsop State Forests on July 18, 1973. Today, these lands remain Oregon's largest state forests, with Tillamook encompassing 346,000 acres and Clatsop encompassing 154,000 acres.

Credit: Unknown

As with many public forests, goals and management plans for state forest lands have evolved over time in response to shifting public values, changes in environmental conditions, and better understanding of forest management effects on *ecosystem function* and biodiversity. The *Long-Range Timber Management Plan for Northwest Oregon* (ODF 1984) and *Long-Range Timber Management Plan for the Willamette Region* (ODF 1989) set sustainable timber volume targets as the objective for forest management while giving consideration to other forest resource values. By the mid-1990s, threatened and endangered species listings under the federal ESA had raised significant public concern about how state forest lands were being managed and caused substantial reductions in timber harvest objectives. Growing recreational use of the Tillamook State Forest also demanded attention, and the *Tillamook State Forest Comprehensive Recreation Plan* was adopted in 1993.

The State Forester is mandated to manage state forest lands for multiple benefits including timber, recreation, and fish and wildlife habitats (ORS 530.050). In 1998, the BOF adopted a set of administrative rules (OAR 629-035) that were intended to provide clarity around the benefits that Oregonians derive from state forest lands. The rules were also intended to direct the State Forester to pursue management practices that promote "compatibility of forest uses over time" and "integrate and achieve a variety of forest resource management goals." The State Forester is required to develop FMPs, using best available science, that establish the general management framework for state forest lands, as well as *Implementation Plans* (IPs) and *Operations Plans* (OPs) that describe more specific, smaller-scale management activities. (OAR 629-035-0030(1)).

In response to these revised rules, in 2001, ODF adopted new Northwest and Southwest Oregon State Forests Management Plans. The plans took a much more comprehensive, multi-resource, ecosystem-based approach to forest management than previous long-range plans and used a system of *integrated resource management* and a landscape-level approach to achieve GPV. The FMPs underwent modifications in 2010 as part of decadal review and updates. The modifications included *species of conservation concern* strategies and revision of landscape design. This FMP is designed to use the WOSF HCP as its compliance mechanism with the federal ESA as well as be the foundation for supporting many of the forest resource goals. It replaces the 2010 FMPs for Northwest and Southwest Oregon, and the 2011 *Elliott State Forest Management Plan*, under which some BOFL are still managed.

The North Fork Kilchis River Drainage recovery after wildfire and logging. Most state forest lands are recovering from logging or wildfire, salvage-logging, and abandonment that occurred prior to state ownership and without modern BMPs.

1.2 Plan Themes

While the current FMP was developed to address all of the guiding principles, five fundamental themes emerged that form the core of the FMP: GPV, considering and engaging all Oregonians, climate change, sustainability, and adaptive management. These themes, and how the FMP will address them, are explained in the following subsections.

1.2.1 Greatest Permanent Value

The FMP is intended to achieve GPV for Oregonians through a comprehensive, multi-resource approach of integrated forest management. GPV 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 (OAR 629-035-0020).

State forest lands in western Oregon are managed to create healthy, productive forest ecosystems that provide benefits from forest resources such as a reliable, sustainable and predictable source of timber, economic benefits to rural communities and schools, clean air and water, high-quality habitats for native fish and wildlife, and a diversity of educational and recreational opportunities for the people of Oregon.

Social, economic, and environmental goals have been developed for forest resources. GPV icons are used throughout Chapter 3, *Forest Resources, Goals, and Strategies*, to provide examples of these forest resource goals by category. (Figure 1-1).

FIGURE 1-1. Greatest Permanent Value Categories and Icons. GPV category icons are used throughout Chapter 3, *Forest Resources, Goals, and Strategies*, to indicate connections with social, economic, and environmental benefits.

Social	Economic	Environmental
		
Examples Include • Protection of cultural resources • Recreation, education, and interpretation opportunities • Opportunities to collect special forest products such as firewood, edible fungi, and salal	Examples Include • Sustainable and predictable production of forest products that support local and regional economies • Revenue generation for local taxing districts • Revenue generation for the management of state forest lands	Examples Include • Healthy, sustainable, resilient forests • Properly functioning aquatic habitats for native fish and aquatic life • Habitat for native wildlife • *Carbon sequestration* and storage

1.2.2 Considering and Engaging All Oregonians

GPV calls for providing a full range of social, economic, and environmental benefits to the people of Oregon, which necessarily requires ODF to understand and honor the diverse *demographics* of our state. The goals and strategies of the FMP are intended to serve all Oregonians and are able to adapt to Oregon's changing demographics.

An essential element of the commitment to manage for GPV is to recognize Tribes as the original stewards of Oregon's state forest lands, as well as their continued contributions to these lands as sovereign nations with unique ancestral and local knowledge and stewardship since time immemorial. Further, we recognize humans—past, present, and future—are an integral part of state forests. Oregonians benefit from *ecosystem services* that the forests provide, and our relationship with state forest lands is grounded in *reciprocity*—we care for the forests and the forests care for us and for our communities (Chapter 2, Figure 2-1).

Visitors to Tillamook Forest Center explore exhibits about the importance of woody debris on the forest floor for soil health and wildlife habitat.

Photo credit: ODF

1.2.3 Resilience to Climate Change

Stressors associated with climate change adversely affect forest ecosystem resiliency and the delivery of GPV benefits. Rising ambient air and water temperatures, extreme heat events, and increased incidences of drought can adversely affect aquatic and wildlife habitats, drinking water, forest products, and tree growth. These conditions can also influence the frequency and intensity of wildfire and storm events, resulting in *landslides*, *debris flows,* and *windthrow.* which can adversely affect road and trail conditions, soil productivity, water quality, and the availability of merchantable timber. These disturbances may also adversely affect visitor safety, state revenue, future timber productivity, fish and wildlife habitat, and tribal access opportunities.

In alignment with the VOF and CCCP, the FMP provides goals and strategies to increase the forest's capacity to adapt to, and mitigate the effects of, climate change. Both adaptation and mitigation are key tenets of *climate-smart forestry*, in which forests are actively managed to achieve resource goals, prepare for climate change, offset carbon emissions, and support communities reliant on wood products.

Chapter 2, *Management Approach*, describes the elements of managing for more *resilient forests under a changing climate.* This management approach results in a range of activities across the landscape by evaluating trade-offs in the context of climate vulnerability factors, site-specific conditions, and goals for forest resources and considering specific emphasis area designations. Future changes in forest conditions and new research findings will be incorporated through adaptive management.

Chapter 3, *Forest Resources, Goals, and Strategies*, describes management goals and strategies that increase climate resilience across resources, including wildlife, aquatics, and timber production. One way climate adaptation is achieved is through climate-informed silviculture, in which *management prescriptions* are aligned with *climate-smart forestry* approaches.

The high productivity of forests in the Coast Range and Western Cascades are well-suited for *climate change mitigation* due to their ability to sequester and store large amounts of atmospheric carbon dioxide. The carbon sequestration and storage goal has co-benefits with other resource goals, such as increasing late seral habitat for wildlife species or producing timber that can store carbon in long-lived structures like housing. Carbon is sequestered and stored long term on the landscape in dedicated *conservation areas* while areas with a timber production focus contribute to carbon storage in long-lived forest products.

1.2.4 Sustainability

Consistent with the guiding principles, the FMP is adopting an *ecologically sustainable forest management* approach. The foundation of this approach to forest management is to support the health and *function* of forest ecosystems, thereby improving the long-term delivery of ecosystem services. Healthy, diverse, productive, and resilient forests maintain ecosystem services and the benefits the public derives from them, including timber production. These services are the foundation upon which a sustainable managed forest model is built (Spies et al. 2018).

Ecologically sustainable forest management views forest resources and benefits within the context of societal values. This approach anticipates change and uncertainty in forest development and disturbance regimes, societal values and demands, and future climate effects on forest productivity, species ranges, and ecological processes. To address change and uncertainty, land managers seek outcomes to reduce risk to forest resources, and increase future options by applying strategies that improve forest resilience in an adaptive management framework. Under ecologically sustainable forest management, specific areas on the landscape emphasize different ecosystem services and benefits. The protection requirements outlined in the WOSF HCP are central in implementing the FMP habitat strategies by defining habitat emphasis areas, which safeguard conservation values while generating regulatory certainty for timber production and other active management activities covered by the WOSF HCP. For more information, see Chapter 2, *Management Approach*.

The principles of ecologically sustainable forest management are reflected in Chapter 3, *Forest Resources, Goals, and Strategies*. Goals and strategies support the delivery of ecosystem services and the values articulated in the guiding principles. The goals emphasize the function of social, economic, and environmental systems and recognize that the application of strategies differs by emphasis area, considers resource trade-offs, and adapts through time.

1.2.5 Adaptive Management

The FMP uses adaptive management to evaluate and learn from decisions and revise plans as changes occur in society, the economy, and the environment, as required by OAR 629-035-0020(3)(f) and 629-035-0030(3)(d). Adaptive management is a systematic and rigorous approach to learning from actions, improving management, and accommodating change. Chapter 2, *Management Approach*, describes how adaptive management is used to monitor and improve the sustainable delivery of ecosystem services. All strategies in Chapter 3, *Forest Resources, Goals, and Strategies*, are supported by adaptive management, which tests and monitors the assumptions and predictions of the FMP goals. Chapter 4, *Guidelines*, describes how forest management is implemented at ODF.

1.3 Relationship with Other Plans and Planning Processes

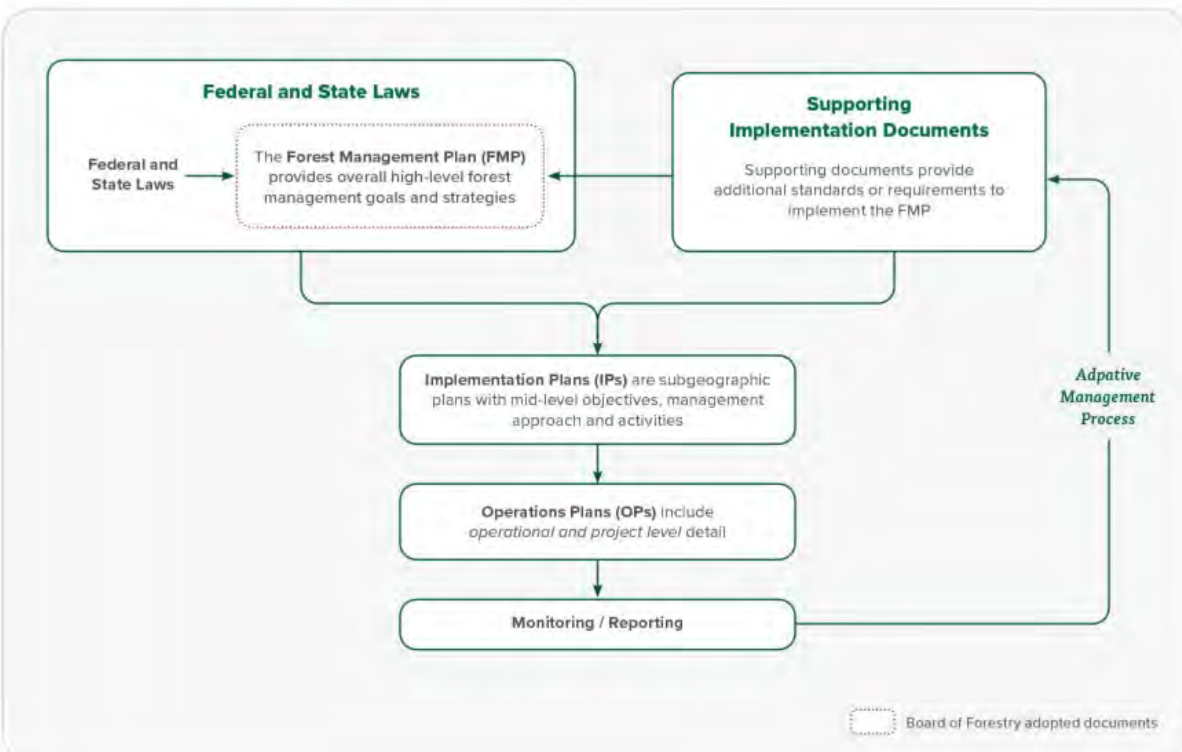
This FMP provides the overarching framework for managing state forest lands, in alignment with the VOF and CCCP. The goals and strategies described in this FMP reflect priorities articulated in the VOF and CCCP as they are applied to management of state forest lands and the delivery of GPV.

The specific requirements and standards for implementing the goals and strategies, such as riparian buffers, soil protections, and green tree requirements, are detailed in supporting plans (e.g., the WOSF HCP), laws (e.g., the FPA), performance measures, operational policies, the Forest Land Management Classification System, and BMPs. The goals and strategies in the FMP, along with the requirements and standards outlined in these supporting documents (Chapter 2, Figure 2-1) will guide the development of IPs and plans for monitoring, reporting, and adaptive management.

The FMP and supporting plans inform all lower levels of planning shown in Figure 1-2.FMP implementation is carried out through IPs, which are then achieved through on-the-ground management activities described in OPs. IPs are shorter-term plans (typically 10-year) in which the FMP goals are distilled into more specific activities, objectives, and expected outcomes for smaller sections of land. Each new IP presents an opportunity to review previous performance and make adjustments as needed, leading to adaptive management. OPs detail specific planned operations, projects, and activities that will be used to support IP objectives and budgets (biennial and fiscal) over the short term (1 to 2 years).

For additional information, see Chapter 4, *Guidelines*.

FIGURE 1-2
Relationship with Other Supporting Plans and the Planning Process. This figure provides additional detail about how federal and state laws and supporting implementation documents work in conjunction with the FMP to inform the tiered planning levels of implementation.



1.4 Overview of the Forest Management Plan Chapters

In accordance with the Forest Management Planning rule, the following chapters are included in this FMP.

- **Chapter 2, *Management Approach*.** Chapter 2 provides the vision for forest management through an ecologically sustainable forest management framework that increases the ability of the forest to continue to provide ecosystem services to Oregonians.
- **Chapter 3, *Forest Resources*, *Goals, and Strategies*.** Chapter 3 describes forest resource conditions to provide context for management. The chapter also includes the FMP's goals and strategies. The goals are statements of what ODF intends to achieve for each forest resource in the planning area. Strategies describe how ODF manages the forest resources and identifies management techniques the State Forester may use to achieve the plan's goals.
- **Chapter 4, *Guidelines*.** Chapter 4 states the general *guidelines* for asset management, implementation, adaptive management, plan revision, and public engagement. Asset management guidelines provide overall direction on investments, marketing, and expenses. Implementation guidelines prescribe the process for implementing the FMP. Adaptive management guidelines describe the approach for learning from management and applying new findings to adjust management to continue to meet GPV as conditions change. Section 4.4, *Decision Authority and Revision Guidelines,* describes what causes plans to change and how plan changes are governed. Section 4.5, *Engagement Guidelines*, describes the various levels of public engagement required by plan level.

Additionally, the FMP includes a *Glossary, List of Acronyms,* and *References* as well as three appendices. Appendix A, *Engagement*, summarizes tribal, public, and stakeholder engagement efforts during FMP development; Appendix B, *District Maps*, shows the FMP planning area by management *district*; and Appendix C, *Description of Figures,* describes the content of all FMP figures for accessibility purposes.

CHAPTER 2

Management Approach

Chapter 2 describes the *Western Oregon State Forests Management Plan* (FMP) management approach. This FMP is grounded in the concept that all economic, social, and environmental benefits of the forest are derived from *properly functioning ecosystems*.[1] It is, therefore, essential for the management approach to reciprocate by managing the forest to support *ecological function*. Chapter 2 describes how to sustain ecological function by managing the land in alignment with management *emphasis areas*, in the context of the broader *landscape* conditions, and in accordance with *stand* conditions. This chapter also clarifies emphasis area design and layout, appropriate example management treatments and their aims, and approaches for supporting ecosystem function under climate change.

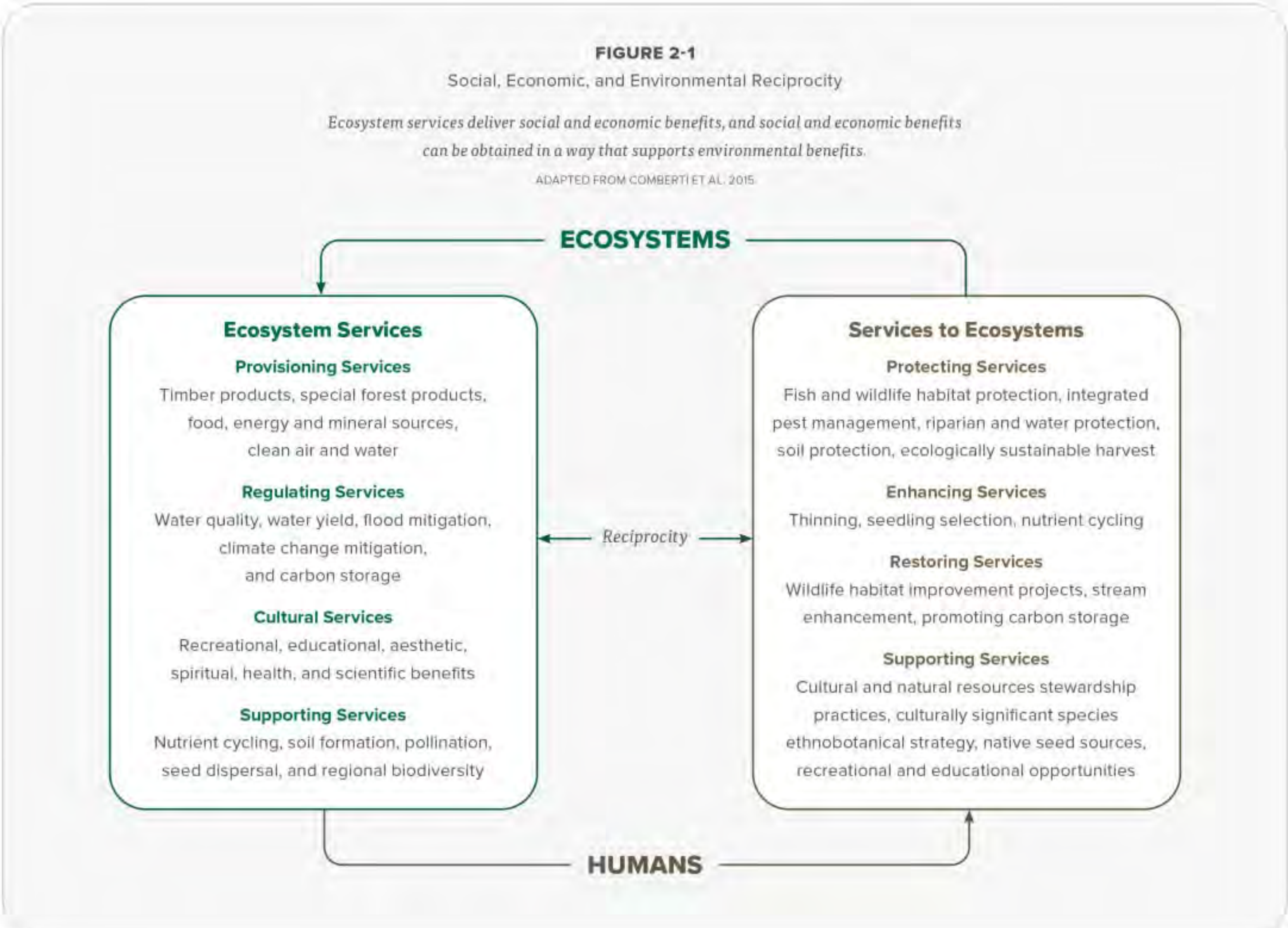
2.1 Sustainable Delivery of Ecosystem Services

Although forests have always provided for multiple uses and benefits, the Oregon Department of Forestry (ODF)'s understanding of these uses and how they are interrelated has deepened and evolved over time. ODF forest management plans have changed from a primary focus on production and harvest of wood products to a greater emphasis on 1) integrating management actions to realize multiple co-benefits such as clean water, rare *species* protections, diverse recreational opportunities and timber production; and 2) recognizing that forest uses and benefits are derived from intact, functioning forest ecosystems and ecological processes (Kline et al. 2013; Jaworski et al. 2018). ODF uses the framework of *ecosystem services* to identify how healthy forest ecosystems support social, economic, and environmental benefits, and conducts management activities in service to those ecosystems to support their functions (Figure 2-1).

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

FIGURE 2-1

Social, Economic, and Environmental Reciprocity. Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.



Adapted from Comberti et al. 2015.

Ecosystem services are the benefits provided by ecosystems to humans. These services are categorized into the following four groups: provisioning, regulating, cultural, and supporting services (Millennium Ecosystem Assessment 2005).

- **Provisioning services.** Provisioning services are resources provided by forest ecosystems that include a sustainable and predictable supply of timber, wood products, and *special forest products*; food, energy and mineral sources; and clean air and water.
- **Regulating services.** Forests help regulate ecosystem processes, for example through *carbon sequestration* and flood control.
- **Cultural services.** Forests provide sustenance; spiritual, recreational, aesthetic, and scientific benefits; and values as numerous and diverse as the people and cultures that use them.
- **Supporting services.** Forest ecosystems support regional *biodiversity* and the function of many systems including *nutrient cycling*, soil *formation*, pollination and seed dispersal.

In addition to the many important *outcomes* that contribute to community well-being, the concepts of ecosystem services and *reciprocity* create a framework that recognizes how human needs are supported by healthy ecosystems and how society, in turn, provides services to those ecosystems by supporting their functions (Figure 2-1). In this framework, management activities can enhance the quality or quantity of ecosystem services while maintaining ecological integrity and resilience (Comberti et al. 2015). Services to ecosystems can likewise be categorized into the following four groups: protecting, enhancing, restoring, and supporting services.

- **Protecting services.** Fish and wildlife *habitat* protections, *riparian* buffers, and water protection.
- **Enhancing services.** Forest growth management and development, species selection and translocation, and nutrient cycling.
- **Restoring services.** Wildlife habitat improvements, *stream* enhancements, and promoting carbon storage.
- **Supporting services.** Enhanced cultural and natural resource *stewardship* practices.

To support the delivery of ecosystem services into the future to provide *greatest permanent value* (GPV) to Oregonians, ODF manages state forest lands in western Oregon under an *ecologically sustainable forest management* approach, as described in Section 2.2, *Ecologically Sustainable Forest Management of State Forest Lands*.

2.2 Ecologically Sustainable Forest Management of State Forest Lands

Healthy, diverse, productive, and *resilient* forests maintain ecosystem services and are the foundation upon which sustainable working forests are built (Spies et al. 2018). The overall focus of ecologically sustainable forest management is the sustainable delivery of ecosystem services while maintaining the integrity of the ecosystem (Lindenmayer et al. 2012). This approach can be challenging because it requires an integrated understanding of the relationships between *forest resources* that are distributed across the landscape and change over time (Fischer 2018; Thompson et al. 2021). This understanding, while always incomplete, informs ODF's planning, decision-making, and implementation.

Specific strategies for individual resource *goals* are considered (Chapter 3, *Forest Resources, Goals, and Strategies*), as well as integrated strategies across resource goals, which include the following considerations: resilient forests, *trade-offs* among resources, and *adaptive management*. Forest managers are confronting a changing climate, chronic stressors, and disturbance regimes that are increasingly different from historical norms. Localized forest *stand management*, along with landscape-level considerations, seeks to reduce the vulnerability of state forests to ecosystem service disruption by increasing the diversity, complexity, and *adaptive capacity* of forests to tolerate, recover from, or adapt to disturbances. The focus on increasing resilience is informed by the Oregon Board of Forestry (the BOF) and ODF's shared *Vision for Oregon's Forests* (VOF) and ODF's *Climate Change and Carbon Plan* (CCCP).

To produce GPV, different resource outcomes are prioritized at different points in time or places leading to trade-offs among the many resource goals. ODF evaluates trade-offs among resource goals through a tiered planning framework that operates at multiple geographic and temporal scales. For instance, at the *policy* level, the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP) establishes overall biological goals and *objectives*, conservation actions, and the spatial design of conservation areas. At the *Implementation Plan* (IP) level, regional targets for activities and protections balance habitat, *watershed* function, social values, and sustainable timber *revenue* over the plan term. At the *Operations Plan* (OP) level, site-specific plans evaluate forest stand conditions, forest access, *best management practices* (BMPs), and resource protections to integrate co-benefits. Adaptive management links these planning levels by using *monitoring* and new information to adjust strategies and ensure long-term resilience and delivery of ecosystem services.

Adaptive management is a structured approach to learn from actions, monitor outcomes, and adjust management in response to ecological, economic, and societal changes. In ecologically sustainable forest management, ODF implements management, monitors performance relative to goals and targets, and updates plans or operations where needed. This iterative cycle links planning (FMP, WOSF HCP, IPs, OPs) to on-the-ground learning, ensuring strategies remain effective as conditions evolve. Adaptive management is one of the fundamental themes (Chapter 1, Section 1.2, *Plan Themes*) present throughout the FMP. Chapter 4, *Guidelines*, provides additional adaptive management *guidelines*.

2.3 Management Approaches within Ecologically Sustainable Forest Management

Ecologically sustainable forest management uses a combination of approaches at different scales and evaluates trade-offs among forest resources across the landscape to support ecological function and productivity. Management for diversity and complexity occurs at these various spatial scales (genes to ecosystems, individual trees to ecoregions) and timeframes (annual, decadal, plan term) in alignment with the management of each emphasis area. Approaches include management of emphasis areas, landscape conditions, and individual forest stands (Lindenmayer et al. 2012). Together, these three approaches deliver the ecosystem services to provide GPV (Figure 2-2). Each approach is described in more detail in the following sections.

2.3.1 Management of Emphasis Areas

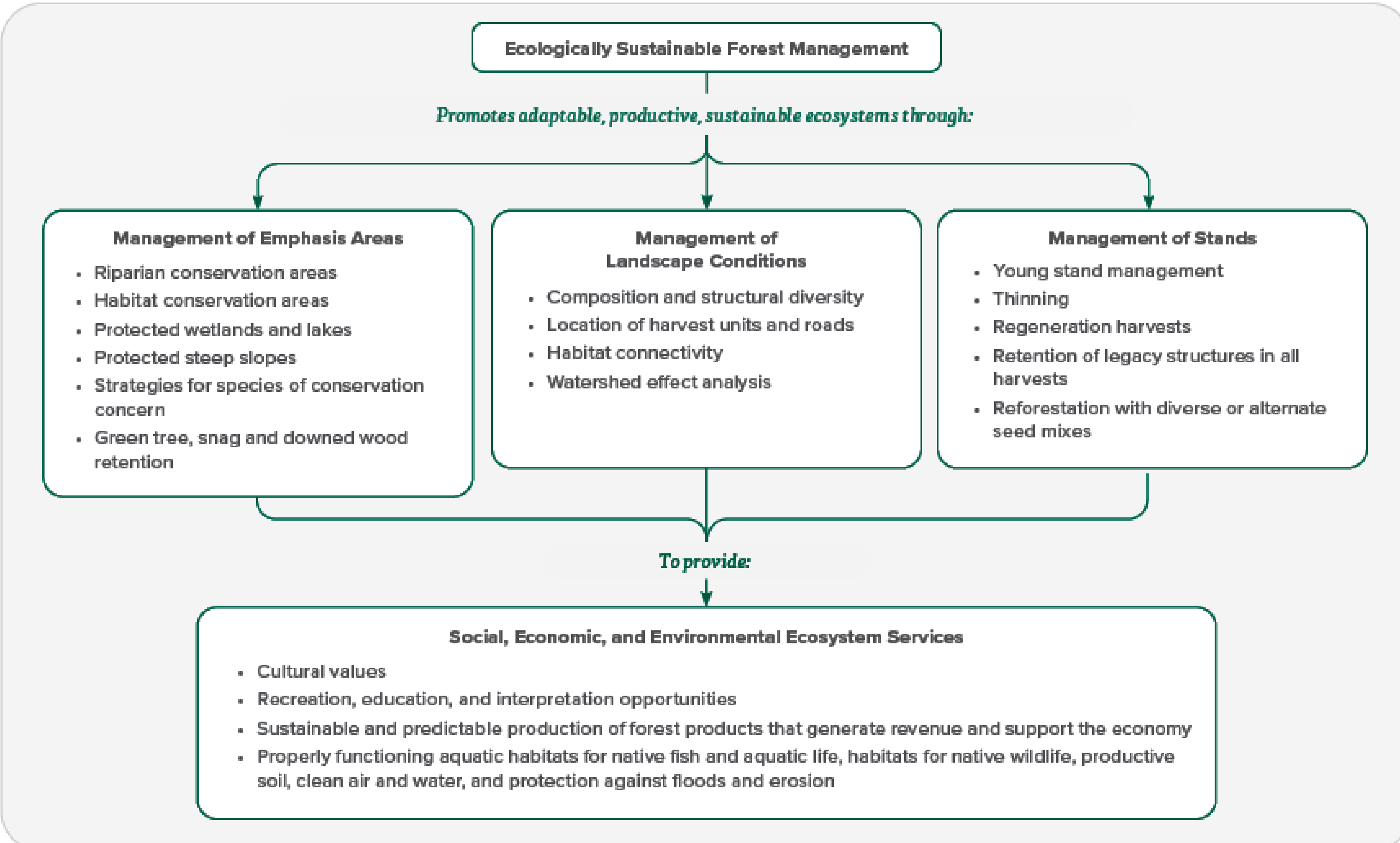
Different types of management can be applied to different areas of the forest to balance trade-offs between resource goals and to deliver the desired ecosystem services most effectively. Emphasis areas may include lands designated for environmental protection, timber production, or multiple compatible uses (Burton 2025). ODF's ecologically sustainable forest management approach designates emphasis areas that guide management priorities and acknowledge the trade-offs between different forest uses on any single parcel of forestland. These emphasis areas are mapped using the *Forest Land Management Classification System (FLMCS)*.

Forest Land Management Classification System

The FLMCS describes the *management emphasis* of specific areas of state forest lands and is implemented in accordance with Oregon Administrative Rules (OAR) 629-035-0055. The FLMCS identifies the extent to which a parcel of land can be managed for a variety of forest resources. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority in its management. The spatial locations of the emphasis areas are mapped according to the FLMCS classification criteria and are based on the requirements and *standards* found in supporting plans such as the WOSF HCP, laws, operational policies, and BMPs.

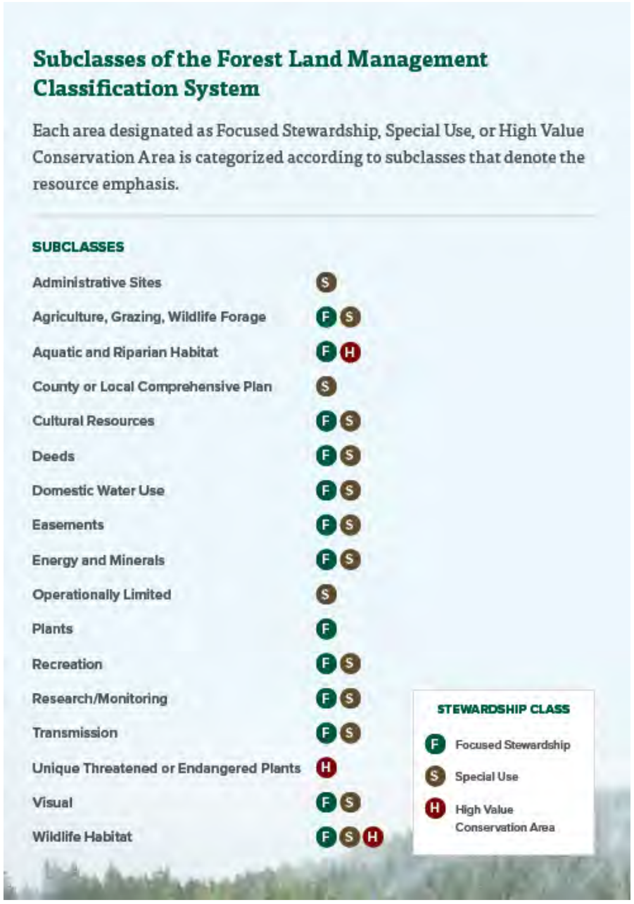
The FLMCS is made up of four land management stewardship classes: General Stewardship, Focused Stewardship, Special Use, and High Value Conservation Areas (HVCAs). Within the Focused Stewardship, Special Use, or HVCA Stewardship classes, the resource emphasis is defined in more detail with subclasses. In many instances there may be several forest resources in an area that result in overlapping subclasses and stewardship classifications. In other areas, these specific forest resources may be absent and are classified as General Stewardship. These classifications are not prescriptive in nature but provide a guide during implementation to the types and appropriate range of management activities, and the forest resource or resources that should be considered and prioritized for each area.

FIGURE 2-2
Ecologically Sustainable Forest Management. Practices that promote adaptive capacity to secure GPV.



Adapted from Lindenmayer et al. 2012.

General Stewardship



General Stewardship is a classification with the broadest range of potential management activities. General Stewardship lands that are designated as *silviculturally capable* under the Oregon Forests Practices Act are actively managed to meet the requirements of OAR 629-035-0020(2), which is to "provide sustainable timber harvest and revenues to the state, counties, and local taxing districts." Non-silviculturally capable lands in this classification are not managed for timber harvest, but are managed to meet the remaining goals of GPV (OAR 629-035-0055(4)(a)).

Focused Stewardship

Focused Stewardship lands contain these lands that require heightened or focused awareness, supplemental planning or modified management practices may be required to achieve the goals of the FMP, WOSF HCP, FPA, or other legal requirements (OAR 629-035-0055(4)(b)).

There are several resources within Focused Stewardship lands that are identified by specific subclasses, including areas with *cultural resources*, domestic water use, or recreational uses, where additional planning or management practices are considered to maintain and protect these resources.

Special Use

Special Use is a classification of lands that are "managed for a specific forest use. Integrated management is conducted on these lands to the extent possible without interfering with the management of the specific forest use" (OAR 629-035-0055(4)(c)). On lands classified as Special Use, a legal or contractual constraint, such as an administrative site or easement, dictates a clear priority and precludes the integrated management of all forest resources. These lands are committed to a specific use, and management activities are limited to those that are compatible with the specific use (OAR 629-035-0055(3)(c)). The Tillamook Forest Center and Smith Homestead day use area are examples of Special Use lands. In accordance with the governance documents for these sites, the forest is specifically managed for visitor and facility needs—such as access, recreation, education, interpretation, hazard mitigation, and maintenance and compliance with other laws.

High Value Conservation Areas

HVCAs are a classification of lands managed for a specific conservation value, where forest management activities are designed to promote specific conservation values, avoid long-term adverse impacts on those values, and are consistent with applicable legal requirements (OAR 629-035-0055 4(d)). *Habitat conservation areas* (HCAs) and *riparian conservation areas* (RCAs) are examples of HVCAs where specific wildlife or riparian needs are promoted by applying forest management activities according to the specifications set out in the WOSF HCP. Examples include limiting harvest in RCAs to improve stream shade, and thereby salmon habitat, and designing harvest in HCAs to improve habitat for covered species.

2.3.2 Management of Landscape Conditions

While applying different management approaches among emphasis areas increases the effective delivery of ecosystem services, the spatial arrangement of emphasis areas across the landscape can promote the resilience of ecosystem services to unpredictable changes. The spatial layout of emphasis areas and pacing of management activities are intentionally designed to support diversity, complexity, connectivity, and *redundancy* across the landscape and its ecosystem functions and processes. Decadal targets for management activities and outcomes are set in IPs and OPs prescribe specific spatially explicit annual management activities, in alignment with the IPs.

The distribution of stands of various ages and structural conditions affects a broad range of ecosystem services, such as availability of wildlife habitats (Figure 2-3) and timber over time. Sustainable timber production requires a balanced set of forest ages across districts in General Stewardship areas, while many wildlife species require specific habitat elements, *patches* of sufficient size and connectivity among them allow for production and dispersal. Consideration of how management in one area affects the adjacent areas and, vice versa, how the surrounding forest influences management outcomes is critical for functional landscape design. Diverse landscape conditions are managed to increase connectivity of forests for wildlife dispersal and flow of ecosystem services like pollination. This, in turn, promotes biodiversity and related ecosystem processes, such as seed and fungal spore dispersal, soil and nutrient cycling, water quality, and aquatic habitat, which further enhances function and increases resilience to stochastic and chronic disturbance (Carey 2007; Franklin et al. 2018). Active management for diversity, while incorporating or emulating natural disturbance events, further increases the complex arrangement of stands and distributes flows of resources across the landscape and through time.

The size and layout of HCAs and RCAs in relation to one another creates a connected network of conservation features across varied forest types, elevations, and climate zones. Even within a single type of emphasis area (i.e., HVCA), wildlife habitat reflects a diversity of climate conditions, disturbance history, and patch sizes. Connectivity is provided in part by RCAs that allow trees to grow old in long swaths alongside streams, traversing through a landscape of diverse age classes. Meanwhile, the network of HCA patches creates the opportunity to improve wildlife habitat connectivity throughout the forest uplands (Figure 2-4, View A). Distributing emphasis areas across the landscape builds redundancy in ecological functions and mitigates the risk of exposure to disturbances and climate stress.

Losses to ecosystem services in any one area are compensated through the abundance of similar features elsewhere on the landscape.

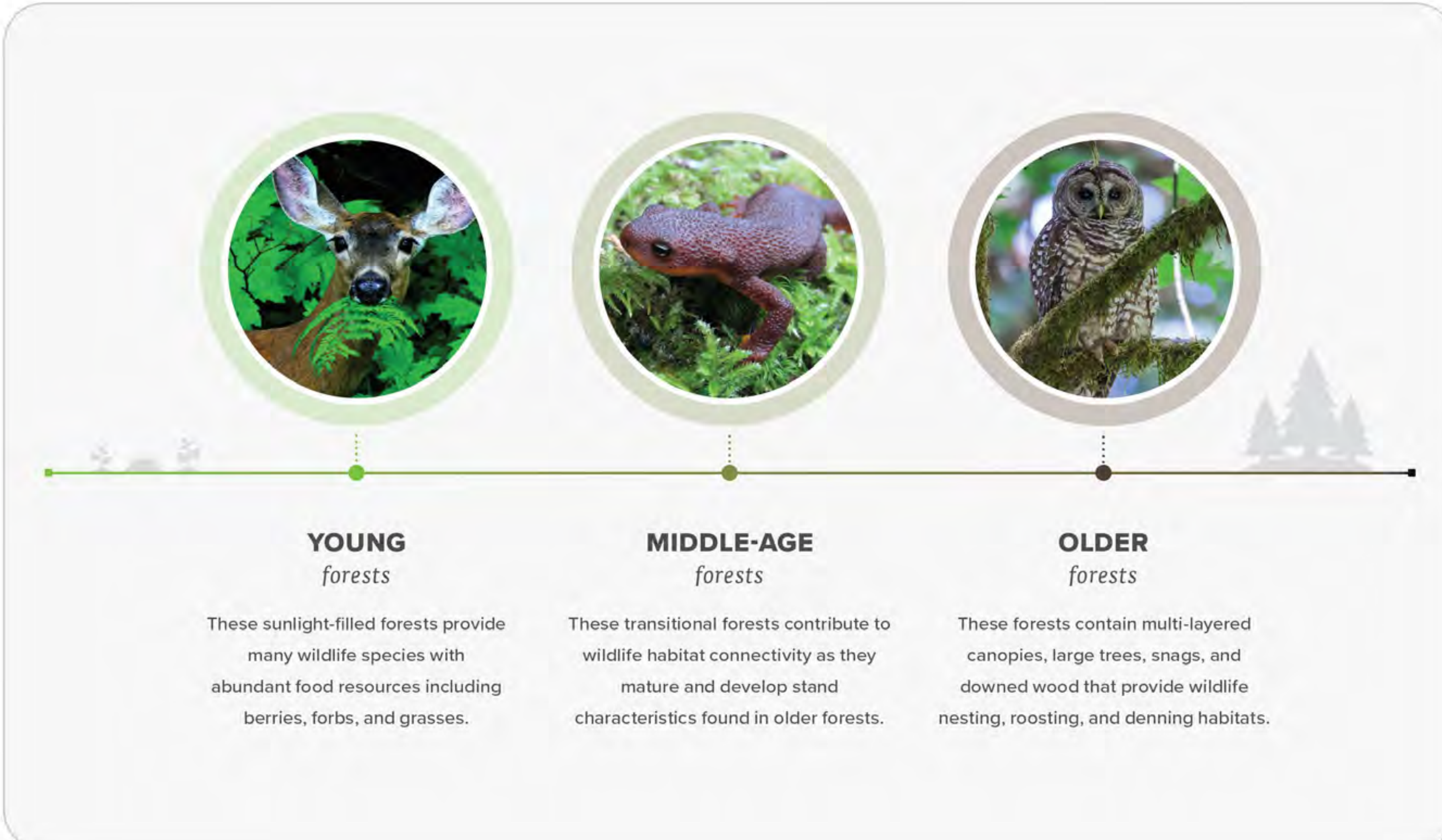
The size and layout of conservation areas among actively managed forest is intentional. Placing HCAs next to, and RCAs throughout, General Stewardship emphasis areas with active management, the landscape becomes a complex mix of habitat types and forest stages that provide diversity between forest stands and supports complementary ecosystem services that deliver multiple benefits. A complex landscape with diverse forest types can increase the resilience of the forest to threats, such as an insect or disease. The complex arrangement of forest types, tree ages, and emphasis areas can also provide a range of options for recovery or adaptation after disturbances (Burton 2025). For instance, a wildfire or ice storm that causes patchy areas of tree mortality could be followed by natural seed dispersal from nearby surviving trees that persisted because they were a less-susceptible age or on a sheltered landscape feature.

Emphasis areas of different types are integrated and overlaid across the forest to create a landscape of diverse uses and benefits (Figure 2-4, View B), which are managed for multiple values, improving GPV. In this way, emphasis areas work together to produce timber, provide social benefits such as public access, and protect a wide array of ecosystem services.

2.3.3 Management of Stands

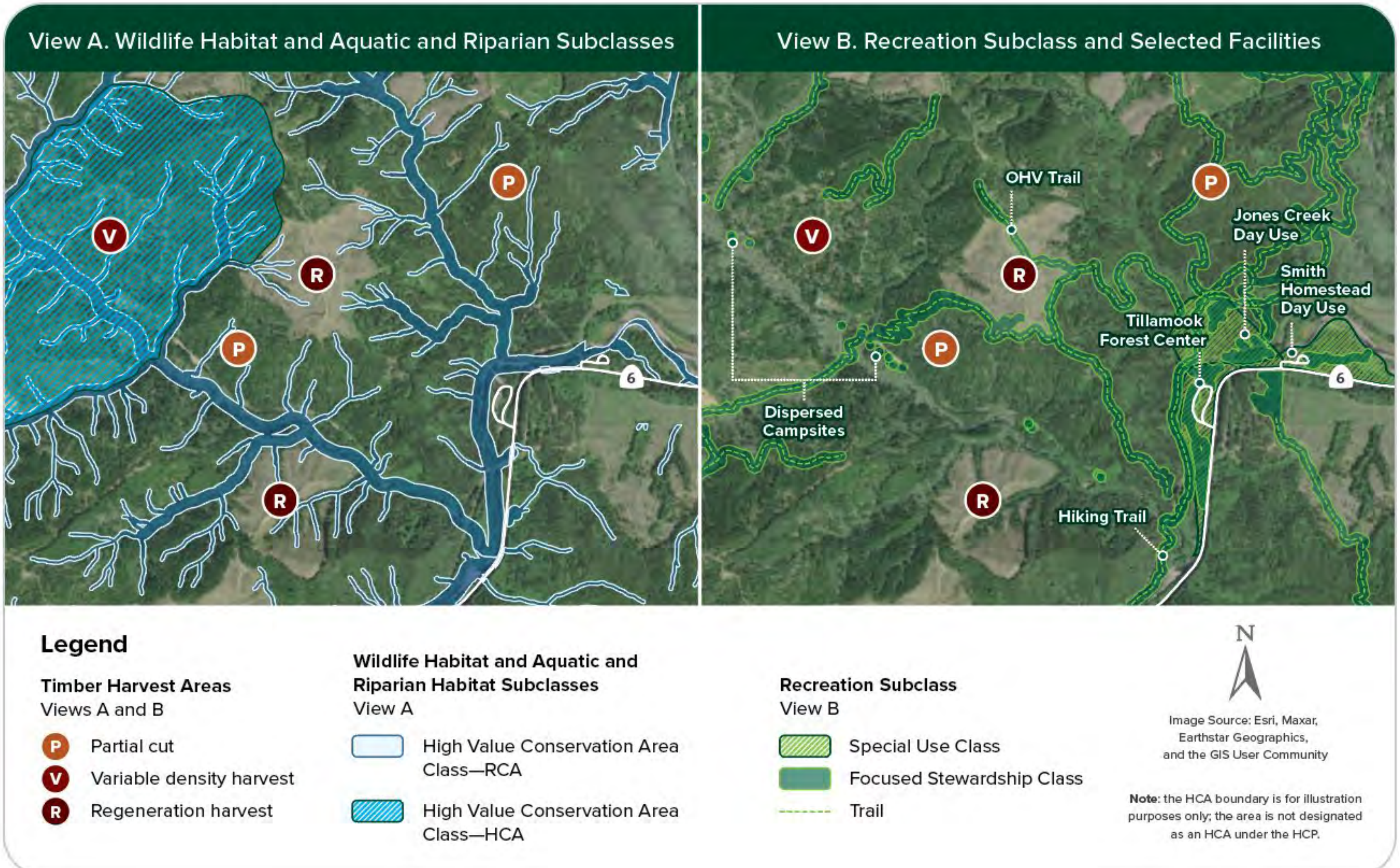
Management of individual forest stands is based on site-specific resource goals. Management varies depending on existing tree conditions and can include *young stand management*, thinning older trees *regeneration harvests*, retention of biological *legacies*, and *reforestation*. Options for management approaches for forest stands are detailed in Chapter 3, Section 3.1.3, *Forest Resilience*. Within emphasis areas, stand management activities have similarities based on the common resource goals. However, even within emphasis areas, the site conditions and trade-offs among resources lead to different treatments. The emphasis areas found in FLMCS can generally be placed into the social, economic, and environmental categories that make up GPV. Descriptions provided in the following subsections give examples of how ODF management may vary at the forest stand level given the considerations of the emphasis areas.

FIGURE 2-3
Landscape-Level Forest Stand Diversity Contributions to Ecosystem Function. Management across the landscape supports diversity, connectivity, complexity, and redundancy, which, in turn, supports adaptive capacity of the forest for sustained ecosystem services delivery under changing conditions.



Source: Oregon Forest Resources Institute 2022.

FIGURE 2-4
Examples of Emphasis Areas across the Landscape. Active management is integrated across the landscape guided by resource management emphasis areas.



Note: The HCA boundary is for illustration purposes only; the area is not designated as an HCA under the WOSF HCP.

Social Emphasis

State forests provide for a wide range of social benefits, including clean air and water, abundant fish and wildlife habitat for fishing and hunting, carbon sequestration, forest products, job opportunities, and revenue (Figure 2-4, View B). While social benefits are present across all emphasis areas, there are also specific areas managed primarily for social benefits such as *scenic* highways and *scenic waterways*; public access through developed and dispersed recreational opportunities including hiking, motorized trails, and camping; and educational and interpretive services. The cultural goals and strategies outlined in Chapter 3, *Forest Resources, Goals, and Strategies*, provide for tribal access, opportunities for co-stewardship of culturally significant species, and protection of cultural resources.

Management within social emphasis areas also integrates other resource goals and strategies. For example, planning and construction of new trails follow standards in the WOSF HCP for location, stream-crossing design, and hydrological connectivity. Campgrounds in certain areas of the forest may be required to implement trash management practices described in the WOSF HCP to protect marbled murrelets. Stand management may occur in social emphasis areas when it supports social benefits, such as thinning in campgrounds or on lands deeded to ODF for recreational use to enhance scenic qualities or remove safety hazards. While these activities may produce other incidental benefits, such as economic revenue, this is not their primary purpose.

Economic Emphasis

On state forest lands, timber revenue funds the majority of management activities, including habitat *restoration*, fuels reduction, recreation, educational programs, and infrastructure development and maintenance. These funds are also the primary vehicle for providing economic benefits to rural communities and public services. Emphasis on timber-production goals and related *silvicultural* strategies are prioritized on a significant portion of the landscape, especially on General Stewardship lands. Although economics is the emphasis of General Stewardship lands, these lands are managed to continue to provide a suite of additional ecosystem services such as clean water, *carbon sequestration* and *storage*, and habitat for many different wildlife species associated with early- and mid-*seral* forest types (Figure 2-3). Environmental and social goals and strategies in Chapter 3, *Forest Resources, Goals, and Strategies*, apply during management of General Stewardship lands.

With an economic emphasis, silvicultural practices in forest stands consider the long-term resilience of tree growth and production of wood products under climate change. To moderate the uncertain impacts of future climate conditions, stand management may vary by the anticipated vulnerability of the stand (e.g., based on its aspect, elevation, precipitation, and species mix). Diversifying management strategies at the stand level provides risk management across the General Stewardship lands. Options include increasing the number of species used or adjusting planting density, different thinning types, and timing of cutting activities. Some approaches may perform better or worse in the future compared to what is currently optimal, but preserving a range of options for future management provides some assurance of maintaining long-term timber *sustainability* under an adaptive management approach (Puettmann 2011).

Management activities are reviewed during individual project planning to ensure alignment with FMP goals and strategies. For example, harvest operations on General Stewardship lands are planned with the management emphasis of revenue and timber production.

Other co-benefits are realized from these operations.

- Domestic water intakes in or adjacent to a harvest area and are protected according to applicable rules and policies.
- RCAs and leave tree and downed wood requirements (defined in WOSF HCP Chapter 4, *Conservation Strategy*) retained within the *harvest unit* contribute to fish and wildlife habitat, clean water, and carbon storage.
- Harvested timber contributes to carbon storage in manufactured wood products.
- Policies and BMPs may be used to minimize impacts on a recreation trail located within a harvest area.

Figure 2-4 shows how forest and social resources protections and considerations and active management are integrated across the landscape.

Environmental Emphasis

Environmental benefits are found throughout the forest from healthy stands with productive soils, fish and wildlife habitat, and clean air and water. Areas with an environmental emphasis include *wetlands*, meadows, lakes, and larger conservation areas to provide habitat to a multitude of species. These conservation areas also provide extensive carbon storage, maintain large portions of continuous tree cover within *viewsheds*, and support recreation through trails, camping, and other outdoor activities. While treatments and management actions in these areas are designed to increase the quantity and quality of certain habitats, these actions also generate economic and social co-benefits.

The WOSF HCP defines two types of conservation areas: HCAs and RCAs. A mix of *passive management* and *active management* in HCAs maintains and develops, structurally complex forests as they relate to specific habitat needs for *native* wildlife species that rely on them. Predominantly passive management in RCAs improves habitat for native aquatic and riparian-dependent species and increases resilience by buffering ecological function against changes in streamflow and temperatures resulting from climate change.

Active management in a portion of the HCAs promotes habitat development and adaptive capacity by incorporating principles of *ecological silviculture* and *adaptation silviculture* (Palik et al. 2020; D'Amato and Palik 2020). Ecological silviculture is based on the spatial heterogeneity and historical range of variation found in unmanaged old forests and seeks to emulate *stand initiation* and development processes that result from small-scale natural disturbances (e.g., *windthrow*, lightning, insects, disease) to promote within-stand diversity and complexity. Natural history (forest development, dynamics, species, and *structures*) is a model for management and provides insight into potential pathways, trajectories, limitations, risks, and options. Natural forest development principles (e.g., disturbance, succession) inform management strategies and prescriptions related to stand initiation and development, forest maintenance, retention of biological legacies, and landscape mosaics (Carey 2007). However, management based on historical conditions may become less relevant with climate change, leading to greater use of adaptative silviculture that increases the forest's ability to adapt to changing conditions and continue to deliver ecosystem services (Nagel et al. 2017). The outcomes of ecological silviculture—stands with greater diversity and complexity—remain relevant to adapting to novel conditions (D'Amato and Palik 2020). Habitat conditions and ecosystem services are assessed in HCAs in light of novel conditions to determine when to modify management principles.

Both active and passive management can be used to promote complex stands that enhance adaptive capacity and produce resilient, heterogeneous landscapes. For example, active management can reduce *stand density* in young stands to encourage trees more likely to withstand wind (Mitchell 2000; Moore et al. 2003). The location of treatments in HCAs can also be a factor to help build *resistance* to disturbance. Variable-retention harvest or variable-density thinning creates spatial heterogeneity for habitat development purposes (e.g., robust shrub and forb communities) in closed-canopy, homogeneous stands (e.g., Berrill et al. 2018; Willis et al. 2021) and may also reduce fuels to mitigate fire risk depending on site conditions (Prichard et al. 2021). Conifer restoration actions in *Swiss needle cast*-infected stands and some *hardwood stands*, are implemented to guide stand development to resilient stands with more desirable long-term habitat quality and improved carbon sequestration. Reforestation using diverse tree species mixes, with limited site preparation and young stand management, introduces complexity early in stand development.

Where current stand development is expected to achieve long-term objectives for fish and wildlife habitat, passive management to promote complex older stands may be the optimum approach to increase adaptive capacity (Nagel et al. 2017). Passive management promotes development and recruitment of biological legacies and accommodates small-scale disturbances followed by natural *regeneration*. In some cases, the existing components within a stand are well adapted to the site and have persisted through previous disturbances, providing long-term *refugia* and habitat types on the landscape (Krawchuk et al. 2020). High genetic diversity within stands increases adaptive capacity when natural regeneration is allowed to occur and well-adapted and diverse seedlings grow after disturbances. Forests managed passively in RCAs produce increasingly complex and resilient riparian conditions over time, as shade increases to maintain water temperature and large wood increases habitat complexity in streams as trees fall.

Both active and passive management can facilitate transformative change, e.g., by actively introducing future-adapted tree stocks and a diverse species mix during reforestation or allowing transformation over time to future-adapted species or *populations* within the existing plant community, if present. Whether to enable transformative changes after disturbances and under climate change in conservation areas is assessed under an adaptive management framework with regard to habitat requirements for WOSF HCP-covered species. The varied sizes and distribution of HCAs, coupled with more regular distribution of RCAs, is intended to create a functional network of habitat *patches* across the plan area, that provide opportunities for diversity of trajectories and redundancy, which supports resilience.

Ecologically sustainable forest management integrates emphasis areas, landscape conditions, and stand management to sustain social, economic, and environmental benefits over time. By designing a functional landscape, applying stand-level practices that build resilience, and evaluating trade-offs through a transparent planning and adaptive-management framework, ODF maintains ecosystem integrity while delivering GPV to Oregonians. The principles of ecologically sustainable forest management are reflected in Chapter 3, *Forest Resources, Goals, and Strategies*. Each goal represents a forest resource, and management strategies are designed to foster resilient forests that deliver multiple ecosystem services. Chapter 4, *Guidelines*, provides implementation guidance and decision processes that link monitoring to management adjustments.

CHAPTER 3

Forest Resources, Goals, and Strategies

The planning rule requires that the *Western Oregon State Forests Management Plan* (FMP) set forth management goals, which are statements of what the State Forester intends to achieve for each forest resource consistent with greatest permanent value (GPV) and management strategies, which describe how to manage the forest resources in the planning area to achieve those goals. The strategies identify management techniques that may be used to achieve the goals of the FMP during the implementation phase of the plan.

Chapter 3 describes the types and conditions of *forest resources*, how they contribute to *greatest permanent value* (GPV), the long-term *goals* for each resource, and high-level *strategies* the Oregon Department of Forestry (ODF) uses to achieve those goals. The resource description, goals, and strategies described in this chapter reflect the five plan themes described in Chapter 1, Section 1.2, *Plan Themes*. ODF does not optimize any one goal across the entire *landscape* but applies the strategies using the principles described in Chapter 2, *Management Approach*, to produce a blend of outcomes for forest resources that meets GPV.

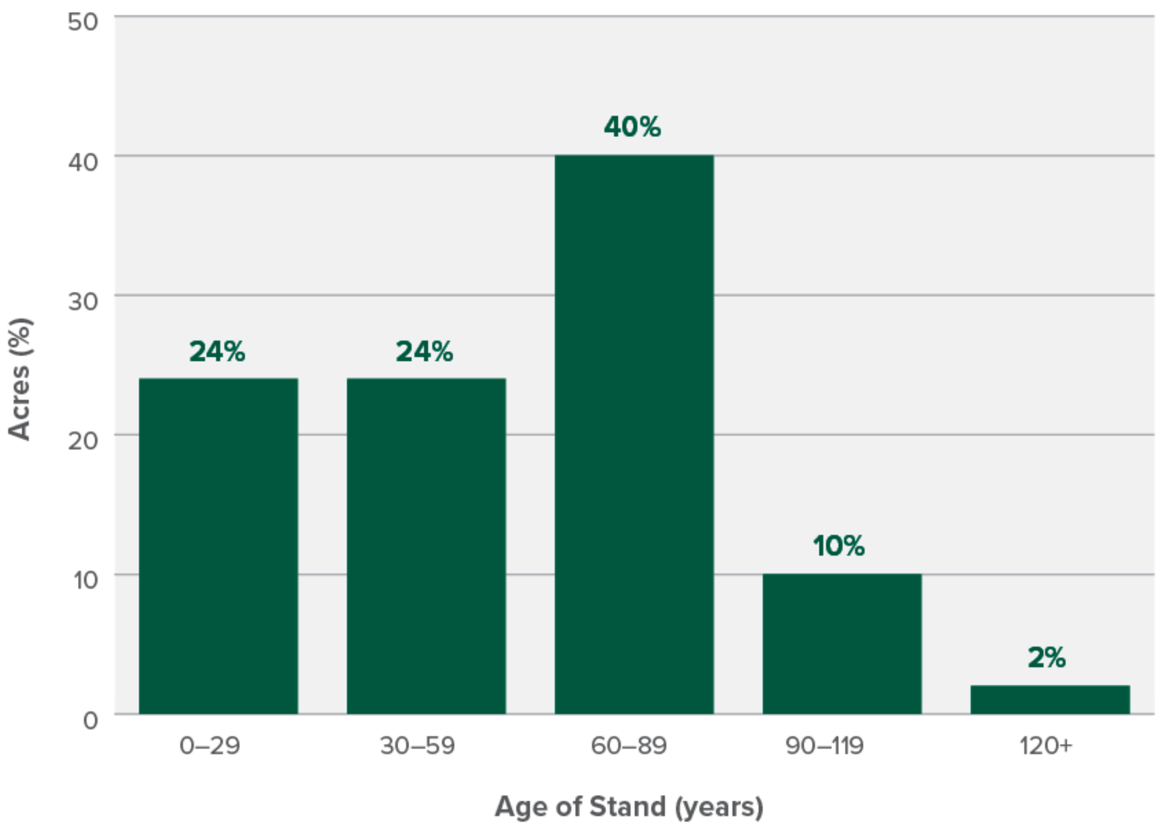
3.1 Forest Condition

To better understand and provide context for the resource goals and strategies, this section details the current state forest condition. Forests are complex *ecosystems* with numerous *biotic* and *abiotic* interactions. State forests managed under the *Western Oregon State Forests Management Plan* (FMP) are distributed from the California border to the Columbia River, and from the coast to the crest of the Western (Old) Cascades. The diversity of forest types and plant communities reflect much of the variation in environmental gradients (precipitation, temperature, elevation) across western Oregon as well as local geology, disturbance history, and past management. Many state forest lands were affected by repeated, large wildfires or were extensively logged prior to acquisition by the State in the first half of the 20th century. *Reforestation* and *restoration* efforts were implemented across state forest lands to replant burned or harvested lands after the State took ownership. The age and *species* distribution of state forests reflect this history of large fires, salvage logging, and reforestation (Figures 3-1 and 3-2).

Forest types vary across the geographic range of state forests. Species composition and age class distribution have important implications for future management.
Credit: ODF.

The current species composition and age class distribution across state forest lands affects future management, particularly in the development of *silvicultural* pathways and conservation strategies aimed at promoting *biodiversity*, improving *adaptive capacity*, and promoting resilient forest and *aquatic* ecosystems. Resilient ecosystems deliver important co-benefits over time, including functional aquatic and terrestrial habitats for *native* fish and wildlife, *carbon sequestration* and *carbon storage*, production of forest products, health soils, clean air, and access for all Oregonians. Approximately 40% of state forest lands in the *planning area* have a *dominant cohort* of trees between 60 and 89 years old. These lands include 49% of the merchantable timber volume in the planning area. The relative abundance of stands in this age bracket reflects a period of reforestation following salvage logging and a series of repeated wildfires (1933, 1939, 1945, 1951) referred to as the Tillamook Burn, prior to State ownership. Dominant cohort age is not the only factor that influences stand conditions, however; site productivity, past management practices, and current and historical *disturbance* regimes interact to produce the forests that ODF manages today.

FIGURE 3-1
Distribution of Stand Ages as a Percentage of Area of Western Oregon State Forests. Stands in the 60–89 year age bracket represent a plurality of stands, reflecting the management history of state forest lands. Reforestation following a period of salvage logging and a series of wildfires in the early 20th century resulted in a large number of stands in this age range.



Source: ODF 2022.

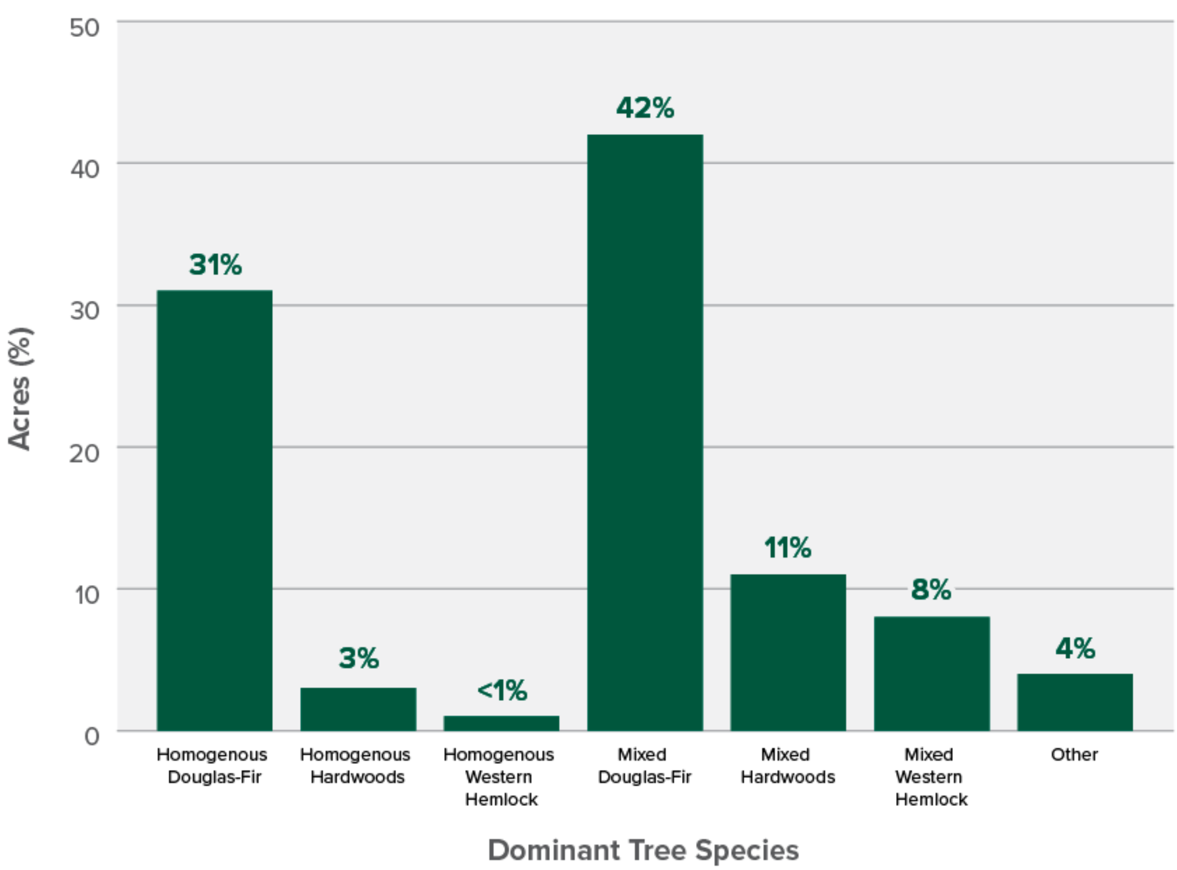
Note: Stands that experienced stand-replacing fire within the Beachie Creek Fire (North Cascade District) had their stand initiation date reset to 2020. Thus, the distribution of stand ages likely differ markedly from previously published reports that used the *Stand Level Inventory*.

3.1.1 Conifer Management

Management history and geography strongly influence the stand composition of tree species and stand age across space and through time (Figures 3-1 and 3-2). Because of their relatively fast growth rate and value as merchantable timber, Douglas-fir (*Pseudotsuga menziesii*)–dominated forests, in which Douglas-fir accounts for the majority of the stand, are the most common forest type on state forest lands, making up approximately 73% of the forested landscape (homogeneous Douglas-fir plus mixed Douglas-fir stands in Figure 3-2). Western hemlock (*Tsuga heterophylla*)-dominated forests and red alder (*Alnus rubra*)-dominated forests are the next most common forest types. Nearest to the ocean, within the Astoria and Tillamook districts, Sitka spruce (*Picea sitchensis*) is a dominant or *co-dominant* species in stands with a maritime climate with milder temperatures and abundant moisture. As shown in Table 3-

1, true firs (*Abies* species), western redcedar (*Thuja plicata*), and various hardwood species (Section 3.1.2, *Hardwood Management*) add diversity within stands dominated by other species in the North Coast and Western Cascades. In the forests in southwestern Oregon, stands are the most diverse, with additional conifers and hardwoods adapted to drier sites and more frequent fire. In general, each of these forest types presents distinct management opportunities, offers different economic return, provides habitat for different species, and offers different levels of resilience to extreme weather conditions. Species selected to be cut and planted are based on the *emphasis area*, landscape context, stand conditions, and best available information. For example, in General Stewardship lands, planted trees consist primarily of commercially viable conifer species, because they are the most efficient stock to provide timber products, *revenue*, and local jobs. However, non-commercial species are also planted or allowed to regenerate naturally, as these areas still provide a level of diversity.

FIGURE 3-2
Tree Species Composition in Western Oregon State Forests. Stand composition affects potential vulnerabilities or resilience to disturbances and stressors such as insect outbreaks, pathogens, fire, windthrow, drought, and climate change.



Source: ODF 2022.

Note: For this figure, homogenous is defined as >80% of the stand *basal area* in a single species group; mixed stands have >50% of the stand basal area in the named species group. Other includes stands <50% of the stand basal area in Douglas-fir, western hemlock, or hardwood species.

3.1.2 Hardwood Management

Native hardwood trees, such as red alder, bigleaf maple (*Acer macrophyllum*), Pacific dogwood (*Cornus nuttallii*), bitter cherry (*Prunus emarginata*), golden chinquapin (*Chrysolepis chrysophylla*), willow (*Salix sp.*), and others provide a *diversity* of cultural and provisioning services, like timber, food, fiber, shelter, and ecological *functions* and resources for wildlife that complement the conifer-dominated forests typical of state forest lands (Ellis and Betts 2011). Maintaining hardwood diversity within stands involves retaining some hardwood species as leave trees during harvests and including hardwood species during replanting or allowing natural regeneration hardwood species. Management actions for hardwoods depend on the designation of the stand, such as whether it is intended for revenue generation from timber harvest, or a *habitat conservation area* (HCA) intended to grow more complex habitat. In some cases, hardwood-dominated stands may not provide desired values, such as large trees for wildlife habitat or carbon storage, and may be managed to introduce additional conifer species, as in the example of anticipated red alder management below. At the time of writing, homogeneous hardwood stands account for just under 15% of total acres in the planning area. Table 3-1 shows the distribution of forests dominated by hardwood and other tree species across the state forest districts.

TABLE 3-1
Distribution (acres) of Forest Types on Western Oregon State Forests. Douglas-fir–dominated forests comprise the majority of all districts other than Tillamook, but forests dominated by species other than Douglas-fir or by multiple species exist in all districts.

District	Homogenous Douglas-Fir	Homogenous Hardwoods	Homogenous Western Hemlock	Mixed Douglas-Fir	Mixed Hardwoods	Mixed Western Hemlock	Other
Astoria	31,310	1,050	1,080	64,240	8,710	21,750	8,720
Forest Grove	59,620	540	30	43,930	1,830	1,660	7,390
North Cascade	14,220	10	120	24,870	730	2,040	5,490
Tillamook	50,260	16,680	1,430	93,670	51,540	22,650	14,360
West Oregon	23,430	500	0	9,130	1,550	630	1,330
Western Lane	17,930	360	20	26,050	4,310	660	3,710

Source: ODF 2022.

Note: For this table, homogenous is defined as >80% of the stand in a single species group; mixed stands have >50% of the stand in the named species group. Other includes stands <50% of the stand in Douglas-fir, western hemlock, or hardwood species.

Red alder is a native hardwood that is ecologically and commercially important. In Pacific Northwest forests, red alder is a species that readily colonizes disturbed areas, particularly when reseeding or planting of conifers does not occur. Alders contribute to soil creation and *nutrient cycling* by fixing nitrogen while also supporting *regeneration* of shade-tolerant conifers (Hibbs et al. 1994). This ecological role is particularly important where soil has been damaged by disturbance (e.g., high-severity wildfire), such as portions of the Tillamook Burn that were subject to repeated fire events.. Goals and strategies for soil resources are discussed in Section 3.2, *Integrated Resource Management*.

A history of repeated fires and cut-and-run logging practices prior to the creation of state forest lands resulted in relatively large areas dominated by alder on the North Coast and in the Tillamook and Clatsop State Forests in particular. There are more than 70,000 acres of alder-dominated stands that lack any significant conifer component on the Tillamook District alone. The age of the dominant cohort in red alder-dominated forests primarily ranges between 40 and 80 years old. Red alder rarely live more than 100 years (Hibbs et al. 1994). Red alder mortality in the Tillamook District will increase in the next 20 years as these trees approach the end of their life expectancy. Dead and dying alders provide important nesting and denning habitat for diverse wildlife species (Carey et al. 1997). As red alder-dominated stands unravel, the regenerating forest can provide diverse and complex young forest habitats. Goals and strategies for wildlife habitat are discussed in Section 3.2, *Integrated Resource Management, Wildlife*.

The relatively large proportion of alder stands in some state forest landscapes provides opportunities for both *active management and passive management* for specific resource values. The pace, scale, and intent of active management is different in different emphasis areas. In areas with an economic emphasis, conversion of some *hardwood stands* to *conifer forests* is an important priority, but ensuring a continued supply of hardwood logs to local mills remains a priority as well. The intent for activities that reduce the proportion of hardwoods is not to eradicate these species or ignore their key role in promoting biodiversity, but to provide a greater array of co-benefits. In conservation emphasis areas (including HCAs), conifer restoration treatments are intended to promote development of habitat for covered species listed in the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP), but will have relatively greater retention of hardwoods compared to timber harvest in General Stewardship areas.

There are at least 30,000 acres of hardwood-dominated stands on areas that are *operationally limited* for timber harvest, or are otherwise protected, across the planning area. Stand development in these areas continues to occur without active management. For example, hardwood stands in *riparian conservation areas* (RCAs) are protected under the WOSF HCP, where cutting of trees is not allowed except for limited circumstances such as stream crossings, yarding corridors, hazard tree falling, and aquatic restoration activities. These passively managed stands serve as an important baseline for comparing a broad suite of management approaches to promote conifer and habitat development in an *adaptive management* framework.

3.1.3 Forest Health

There are several *forest health* challenges for state forest lands throughout the planning area. Some forest health concerns are the result of past practices and history of the lands, including earlier attempts to restore deforested lands. For example, much of the Tillamook Burn was planted or seeded with Douglas-fir from non-local seed sources, at a time when less was known about the importance of locally adapted seed sources. These non-local trees are known to exhibit reduced growth as they mature and are also one of the contributing factors to increased impacts of *Swiss needle cast* (SNC).

The increasing popularity of recreational activities on northwest Oregon state forest lands increases the likelihood of new invasive species being introduced. Recreationists often unknowingly transport invasive species on their vehicles or by bringing firewood and recreational equipment carrying invasive species. This, in turn, affects ecosystem function and long-term forest health.

The frequency, duration, and magnitude of extended drought periods and heat waves also stress the forest ecosystem. For example, in the aftermath of the June 2021 heat dome, which brought record-breaking temperatures to the Pacific Northwest, nearly 5% of trees in western Oregon and Washington forest canopies had visible damage to their foliage (Sibley et al. 2025). Because of *climate change*, hotter and drier summers create more favorable conditions for insect outbreaks, making trees more vulnerable to infestation (Fettig et al. 2022). Drought-stressed trees are often subsequently attacked by secondary agents, such as *pathogens* (Simler-Williamson et al. 2019).

Forest health strategies are addressed on a site-specific basis. Considerations for treatments include species, aspect, elevation, soil types, disease presence, tree stocking guidelines, natural tree regeneration, and *desired stand goals*. Such strategies also anticipate and plan for drier and hotter future conditions resulting from climate change. This site-specific approach to forest health provides for a diverse, healthy, productive, and *sustainable* forest ecosystem over time that is more resilient to change.

The *integrated pest management* process guides herbicide application and other management techniques that control pest damage or unwanted vegetation. It uses site-specific management *objectives* and *best management practices* (BMPs) to decrease adverse impacts of herbicides and other control measures on other forest resources and ecosystem processes. The integrated pest management process is similar across emphasis areas. Actual use of pest management depends on the issue, regional context, *Forest Land Management Classification System* (FLMCS) designation, existing conditions, and desired *outcomes*. For example, insects and disease may be treated differently in HCAs than outside of HCAs, where they have wildlife benefits. ODF participates in cooperative applied research and *monitoring* projects with partner agencies, universities, and organizations that encourage cross-ownership treatments and allow for adaptive integrated pest management.

Diseases

Swiss Needle Cast

SNC is a native disease of Douglas-fir caused by the fungus *Phaeocryptopus gaeumannii* that has intensified on coastal lands managed by ODF since 2010. It affects trees of all ages and causes premature loss of needles, especially in the upper crown, which reduces tree growth and vigor. Trees from non-local seed sources or growing in poor soil conditions are affected more severely, which can be seen by the management and fire history in the Tillamook District. Growth reductions decrease future timber yields and affect ODF's ability to manage stands toward desired conditions. While native throughout the range of Douglas-fir, SNC is most prevalent on the west slopes of the northern Oregon Coast Range from the coastline to 28 miles inland. In recent decades, the zone of highest prevalence has not shifted, but the severity of SNC has increased (Shaw et al. 2021). Management actions have occurred over the last 20 years to harvest the most severely affected Douglas-fir stands and replant with alternate species such as western hemlock or Douglas-fir that has been bred to be resistant to SNC.

Laminated Root Rot

Laminated root rot, a native disease caused by the fungus *Phellinus weirii,* affects many conifer species, and is the most widespread and destructive root disease of Douglas-fir in the Oregon Coast Range and Western Cascade Range. Results from forest health surveys show that in northwest Oregon state forest lands, at least 10% of the Douglas-fir-dominated stands are affected by this disease. The acres affected in individual stands range from 0% to over 75% of the area. The most susceptible host species are Douglas-fir, grand fir (*Abies grandis*), and mountain hemlock (*Tsuga mertensiana*). Western hemlock and noble fir (*Abies procera*) have intermediate susceptibility, pines and cedars are resistant, and hardwoods are immune. Treatment of infected areas is accomplished by replanting with more resistant species after harvest.

Black Stain Root Disease

Black stain root disease, caused by the fungus *Leptographium wageneri*, has been detected in many areas but is thought to be more localized in southwest Oregon. In recent years, reports of black stain root disease in young, intensively managed Douglas-fir stands have increased in the northwest part of the state. Treatment of infected areas is accomplished by replanting with more resistant species after harvest.

Forest Insects

Douglas-fir Bark Beetle

Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) usually infest trees following *windthrow*, disease, or drought. When major disturbances occur, a large supply of high-quality downed Douglas-fir allows beetle *populations* to erupt. Outbreaks typically last 2 to 4 years, though can be prolonged when conditions are favorable. Management to reduce the likelihood of outbreaks involves timely salvage of dead or downed trees.

Emerald Ash Borer

Emerald ash borer (*Agrilus planipennis*) is an invasive species that has killed ash trees across the United States since its introduction in Michigan in 2002. It was detected in Forest Grove, Oregon in 2022, and has spread to multiple counties since then. Oregon ash (*Fraxinus latifolia*) is the native tree at risk of infestation and rapid mortality, affecting *riparian* forests west of the Cascades and below 2,000 feet elevation. There are currently no feasible, preventative treatments for this pest that can be applied on a forest-wide scale. Management includes continued *monitoring*, replanting with alternate species where mortality occurs, and breeding programs to create resistant ash hybrids.

Sitka Spruce Weevil

Sitka spruce weevil (*Pissodes strobi*) commonly kills the current and 1-year-old terminal shoots of Sitka spruce. The weevil typically affects trees between 3 and 20 years old. At times, foresters have avoided planting Sitka spruce in western Oregon because repeated weevil outbreaks slow tree growth and produce severe stem deformations (ODF 2007). When planting Sitka spruce, ODF uses seed sources that have shown natural resistance to the weevil. ODF is participating in research to determine the most resistant seed sources, improve understanding of the damage caused by the weevils, and obtain necessary information to breed more resistant seed sources for future planting.

Spruce Aphid

Spruce aphid (*Elatobium abietinum*) is an invasive species that causes premature loss of older needles in Sitka spruce and eventually kills branches or the entire tree. Much of the spruce decline along the Oregon Coast is attributable to the spruce aphid. ODF follows genetic testing studies and breeding programs to determine the most resistant seed sources for planting.

Noxious Weeds

Noxious weeds are terrestrial, aquatic, or marine plants designated by the Oregon State Weed Board under Oregon Revised Statutes (ORS) 569.615 as representing the greatest public menace and are a top priority for action by weed control programs. The Oregon Weed Control Policy (ORS 869.180) declares weeds "shall be detected, controlled and, where feasible, eradicated on all lands in this state." As a result, ODF is responsible for developing and implementing an eradication plan on state forest lands. Currently, roughly 120 species are listed as noxious weeds across Oregon. Many of these species occur on state forest lands. The most common, Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and Japanese knotweed (*Reynoutria japonica*) are well established throughout all state forest lands. Other non-native invasive species on the state's noxious weed list expanding on state forest lands include false brome (*Brachypodium sylvaticum*), English ivy (*Hedera helix*), garlic mustard (*Alliaria petiolata*), and non-native geraniums (*Geranium* spp.).

Rum Creek Fire burned near Ennis Riffle County Park after igniting by lightning on August 17, 2022. Fire has always been part of Oregon forests and, when managed proactively, can contribute to forest health and development.
Credit: ODF.

Wildfire

Oregon's forests are shaped by, and adapted to fire. Fire can have many positive outcomes for forests under the right conditions. However, uncontrolled or high-severity wildfire presents a threat to many forest co-benefits, including habitat, carbon storage, healthy soils, clean water and clean air. As the original stewards of these forests, indigenous peoples used fire on the landscape to maintain and enhance forest conditions. In modern times, human-caused fires have resulted from various activities, usually accidental. For over 100 years, the response to both human and natural fires has been to suppress fire in the forest to protect life and property, including timber values. This has resulted in conditions where fuels for fire have accumulated, creating increased risk of uncontrolled and even catastrophic wildfire.

There are many examples of historic fire and related salvage activities across the planning area. Forest wildfires in Oregon are expected to burn larger areas and possibly become more severe as climate change affects the state into the future (Dalton and Fleishman 2021; Reilly et al. 2022).

General Stewardship lands are actively managed and provide various options for exploring fire mitigation and response. ODF's management of these areas includes thinning at key points during forest stand development that reduces the density of trees to maintain stand growth and reduce fire risk. All timber-management activities on General Stewardship lands account for fire risk both during (e.g., operational restrictions) and after (e.g., slash mitigation) operations. The transportation system that supports state forest management also provides access for suppression of wildfires where they occur.

Managing fire risk inside HCAs and RCAs is consistent with the WOSF HCP. Habitat enhancement prescriptions provide mitigation, and adaptive management is employed to provide opportunities to address additional mitigation measures in response to worsening conditions that put habitat values at risk. Future potential mitigation needs in HCAs and RCAs will be developed in collaboration with NOAA Fisheries and the U.S. Fish and Wildlife Service.

3.1.4 Forest Resilience

Through activities on the forest, the overarching aim of the FMP goals is to ensure healthy, sustainable, and resilient forest ecosystems that help achieve environmental, social, and economic goals that benefit all Oregonians. Functioning ecosystems on state forest lands provide a variety of co-benefits including clean water, recreation, wildlife habitat, timber, and other *ecosystem services*.

For this FMP, the health of a forest is defined as its ability to increase or maintain productivity and function while maintaining *resistance* and *resilience* to biological and physical stressors. Fire, windstorms, ice storms, *landslides*, heat, drought, insects, and diseases present both discrete events and chronic conditions that affect forest health. Some disturbances are natural and necessary processes of the forest ecosystem that increase the forest's complexity and reduce the intensity of future disturbances. However, active management may be necessary to reset stand trajectories toward goals based on the *management emphasis* of the affected area.

The forest is actively managed to achieve objectives within stands and across the landscape to create a variety of forest conditions designed to improve resilience and capacity for adapting to climate change consistent with the *Vision for Oregon's Forests* (VOF) and the ODF *Climate Change and Carbon Plan* (CCCP). Table 3-2 provides examples of management options that foster resilience and adaptation.

TABLE 3-2
Examples of Management Options that Foster Resilience and Adaptation.

Management Options to Increase Climate Resilience	Examples
Sustain ecological functions	Maintain or restore hydrology and *riparian areas*
Reduce the impact of existing stressors	Reduce tree density to minimize water stress
Protect from severe disturbances	Alter forest structure to reduce fire or windthrow risk
Maintain *refugia*	Protect unique sites or habitat of *species of conservation concern*
Enhance tree species and structural diversity	Promote diverse age classes, diverse tree species, and biological legacies
Increase redundancy across the landscape	Manage forest and habitat types over a range of sites and environmental conditions
Promote landscape connectivity	Maintain and enhance habitat conditions that support wildlife dispersal and population flow,
Enhance genetic diversity of trees	Use seed sources adapted to future conditions, diversify nursery stock
Aid tree species transitions	Favor drought tolerant species, guide species composition during *young stand management*, consider assisted migration of species
Plan for disturbances	Replant promptly and retain seed source to allow for natural regeneration

Source: Burton 2025.

The effectiveness of novel *silviculture prescriptions* under a changing climate is evaluated during the planning and adaptive management processes described in Chapter 4, *Guideline*s.

Stand Management

Creating forest resilience through management follows three major steps: 1) retention of important *legacy structures* (e.g., leave trees, snags, *downed wood*, minor vegetative species) during *regeneration harvest*; 2) successful replanting using a variety of tree species; and 3) conducting harvest activities that promote forest conditions with multiple age groups, tree densities, and stand complexity that deliver ecosystem services. Stand management operations include a full suite of silvicultural prescriptions. These include partial cuts like fixed and variable density thinning or *variable retention harvest* and regeneration harvests. Leave trees, downed wood, and stream buffer requirements are defined in the

WOSF HCP as part of the conservation strategies. Stand-level management decisions and trade-offs are informed by other resource goals and strategies at the stand, basin, or landscape level. Stand management differs among emphasis areas. Environmental emphasis area management prioritizes fish and wildlife habitat and carbon sequestration. Management within social emphasis areas focuses on safety, stand health, and scenic quality. Economic emphasis area management emphasizes growing healthy and resilient stands to support timber production and generate revenue for social services.

Reforestation and Young Stand Management

Stand initiation after harvest, salvage, or areas affected by wind or fire is conducted through a combination of tree planting on the majority of sites and allowing for natural regeneration on some sites. Stand initiation and young stand development are imperative to set a stand on a course to achieve management objectives. Each area planted is assessed to determine which species to plant, the number of trees per acre to plant, size of the seedlings, and site preparation needs such as *slash* piling or herbicide treatment. In areas where there is a disease present, seedlings are selected that are more tolerant to the disease, if available.

ODF's ongoing efforts to enhance seedling genetics are vital to improving future resilience of these forests. This includes selective breeding to strengthen tolerance to drought, temperature shifts, insects, and forest diseases that are expected to increase with climate change. ODF also participates in assisted migration studies that evaluate the performance of alternative seed sources or species across a range of site conditions. Findings from these efforts help inform future reforestation strategies and ensure that seed selection contributes to long-term forest health, productivity, and sustainability.

Young stand management activities are important to ensure a stand is on a path to reach the long-term goal for the stand based on its emphasis areas, adaptive capacity needs, and role in meeting *Implementation Plan* (IP) and performance measure targets. Young stand management can include precommercial thinning for spacing and species selection, or removal of competing vegetation to provide more growing space and accelerate tree development. Incorporating uneven-aged stands across the landscape promotes a diverse *structure* with small, medium, and large trees providing a multi-layered canopy. A forest diverse in species type, age, and structure can provide needed or preferred habitat for many plant and wildlife species, improve soil conditions by providing diverse tree hosts for mycorrhizal fungi, increase the resilience of forests to climate change, and reduce susceptibility to diseases and insect infestations that affect stand health and timber productivity in the long term.

Disturbance Response

Over the duration of this FMP, disturbances from wind, fire, ice, and insects or disease will occur. While some disturbance is a part of functioning systems and can be accommodated or incorporated at some scales and in some emphasis areas, strategies that build forest resilience and adaptive capacity are also a key component of ensuring sustainable timber production. When disturbance events happen, the affected area is assessed to better determine response. The assessments consider the scale, location, and long-term goals of the forest for habitat development or management. Details for reforestation actions and activities are addressed at the mid-term planning level, through IPs, at the project level through *Operations Plan* (OP)s, and through *standards* and specifications set in *operational policies*.

Mitigation responses to future wildfire include reducing the risk through fuel management, prevention, and education. Fuel management prioritizes restoration actions and treatment areas, based on risk to communities and critical infrastructure, and emergency ingress and egress. Activities include density management, slash reduction, and prescribed fire, as well as coordinating priorities and responsibilities for maintaining defensible space with critical facility owners, such as water, power, communications utilities, and non-ODF road owners. In addition, ODF engages *Tribal Partners* to find opportunities to reintegrate traditional cultural fire practices to provide ecological benefits. ODF may also partner with neighboring landowners and communities on prescribed burn projects that include common objectives.

Among the management techniques used in response to disturbance, salvage harvest can be used to remove timber after a natural disturbance affects forest health. Harvest intensity can range from the selective harvest of individual trees to regeneration harvest, depending on the degree of the disturbance event and forest management goals. Salvaging can be employed to remove merchantable timber from disturbed areas, prevent the spread of disease or insect infestation, reduce safety hazards, and promote forest health for future harvest, while considering potential negative impacts (Lindenmayer et al. 2012).

Responding to disturbance and managing state forest lands in accordance with the resource goals of a particular area, promotes sustainable *ecological silviculture* and the continuation and enhancement of ecosystem services. Prescriptions in disturbed areas still follow minimum legacy retention standards, but depending on the event may present additional opportunities to retain additional snags or increase inputs of larger pieces of downed wood. Ultimately, disturbance responses, whether passive or actively managed, present learning opportunities in an adaptive management context.

3.2 Goals and Strategies for Resource Management

This section describes the conditions of forest resources and the overarching goals and strategies for each to sustain GPV across state forest lands over time. Each of the forest resource management goals support and contribute to different aspects of GPV. Quantitative targets for goals at a smaller scale are defined in IPs, specific project locations where strategies are enacted are defined in OPs, and detailed standards governing the IP and OP processes are defined in operational policies, the WOSF HCP, and other laws. In the following sections, GPV category icons (Chapter 1, Figure 1-1) and the resource descriptions are used to indicate connections with social, economic, or environmental resources and concepts. GPV can be tracked using the highlighted icons next to each goal.

Because forest resources coexist in space and time, integration of goals and strategies is necessary to minimize conflicts, facilitate decision-making, and generate the co-benefits that flow from resilient forest landscapes. Chapter 2, *Management Approach*, provides a discussion of FLMCS stewardship classes across the landscape. Chapter 4, *Guidelines*, provides additional detail on implementation and how trade-offs are considered. Adaptive management enables ongoing assessment and modifications of goals and strategies and their application in response to new information and changing circumstances, such as natural disasters, climate change, and new research findings. Effective integration entails synthesis of knowledge, experience, and best available science from multiple disciplines including *forestry*, wildlife and fisheries *ecology*, *geology* and *hydrology*, *engineering,* and recreation resource management.

3.2.1 Forest Resource 1: Timber Management

Forests in western Oregon are some of the most productive in the world. Timber harvested from Oregon forests continues to be both an important component of Oregon's economy and a provider of wood products across the nation and globally. Average weekly wages in the western Oregon timber industry are higher than the average weekly wages in other industries in western Oregon (Daniels and Wendel 2020). The availability of harvestable timber directly affects local forestry and mill jobs and indirectly affects the number of additional jobs in local communities.

Timber log deck during harvest operations in Santiam State Forest.
Credit: ODF

Forest products are used to build homes, businesses, schools, and other structures needed by society. Revenue from state forest lands comes largely from timber sales, though smaller amounts are received from the sale of *special forest products*, leases and agreements, recreation fees, and special use fees. Within the planning area, 14 Oregon counties, and the local taxing districts within them, share in revenues from these lands. As mandated by state law, 63.75% of Oregon Board of Forestry (the BOF) revenues are distributed to counties, which further distribute revenues to taxing districts. This revenue is a significant contributor to local budgets used to help pay for local community services such as education, rural fire protection districts, law enforcement, roads infrastructure, and community health.

The remaining 36.25% of revenue from state forest lands pays for the management of Board of Forestry Lands. This management includes planting trees, managing young stands, conducting *threatened and endangered species* surveys, improving fish and wildlife habitat, providing fire protection, and providing recreation, education, and interpretation programs, staff, and infrastructure.

Revenue from timber harvest on Common School Forest Lands (CSFL) is transferred to the Oregon Department of State Lands and deposited in the *Common School Fund*. The Oregon Department of State Lands reimburses ODF for CSFL management costs and related overhead from the Common School Fund.

ODF has historically managed the forest with the objective of maximizing timber volume over the long term. This results in the regeneration harvest of individual stands near the point where tree growth slows, which can be between 70 and 90 years old, depending on the productivity of the site (e.g., soils, precipitation, and other factors). This plan allows for flexibility in harvest objectives over time, but it is likely that ODF will continue to manage for sustainable, long-term maximization of volume in general stewardship areas.

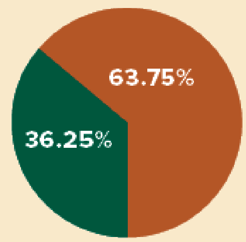
Goal: Timber Production

Provide a sustainable and predictable supply of timber that generates revenue for the benefit of the state, counties, and local taxing districts, and that results in economic opportunity, jobs, and availability of sustainably harvested forest products.

98%

of State Forests Division Revenue is generated from timber sales

State Forests Revenue Disbursement



Retained by the **State Forests Division** for forest management and restoration

Distributed to **local counties and taxing districts** for local services and schools

Strategy: Sustainable Harvest

Determine the sustainable harvest level during IP development to ensure predictable timber supply over the life of the IP.

a. Harvest timber within an adaptive capacity framework to promote resilient forests and the ecosystem services they provide.

Intent

The intent of this strategy is to ensure predictable long-term flow of timber from state forest lands with associated economic benefits to the state, counties, and local communities. The emphasis on timber-production goals is prioritized on a significant portion of the landscape, especially on General Stewardship lands. Although economics is the emphasis of General Stewardship lands, these lands are managed to continue to provide a suite of additional ecosystem services such as clean water, carbon sequestration and carbon storage, and habitat for many different wildlife species associated with early- and mid-*seral* forest types. Active management in HCAs is focused on habitat restoration for wildlife species associated with late-seral forests, but will also result in additional timber volume.

Strategy: Silviculture Practices for Stand Management and Development

a. Implement a variety of silvicultural prescriptions to ensure successful stand initiation and development of a variety of tree species, ages, and densities that are resilient to disturbance and climate change and sustainably deliver ecosystem services, based on emphasis area.

b. Use silvicultural prescriptions designed for sustainable timber production and economic performance in General Stewardship areas, while still providing for retention of legacy structures in varying arrangements, forest connectivity, and species diversity.

c. Diversify tree species for reforestation to consider species that are likely to have better growth and survival under projected future climate conditions.

Intent

The intent of this strategy is to support timber production and wildlife species that are associated with early- and mid-seral forests while increasing the resiliency of all stands across the landscape. Lands in stewardship classes other than General Stewardship may require silviculture prescriptions that emphasize other objectives, such as safety in Recreation Special Use and Focused Stewardship classes, or traditionally important natural resources in Cultural Resource Special Use and Focused Stewardship classes.

The intent of this strategy is also to maintain and enhance habitat for the species covered by the WOSF HCP. Management of HCAs incorporates principles of ecological forestry. During harvest of SNC and hardwood stands, and gap creation in variable retention treatments, additional legacy features are retained, an even greater variety of tree species planted, and herbicide use limited to regenerate forests that provide complex early-seral habitat that is positioned to grow into mature stands with high biodiversity. Variable retention treatments are designed specifically to emulate processes that result from small-scale natural disturbances (e.g., windthrow, lightning, insects, disease) that promote within-stand diversity and complexity in mid-seral stands. Passive management in HCAs and RCAs for late-seral conditions also promotes resilience in mature forests and provides a baseline for comparison of strategies. The majority of treatments to reduce fire, insect, and disease risk occur in stands outside of the HCAs.

Strategy: Timber Sale Design

Design timber sales that consider timber markets and cost of logging, to ensure efficient operations and increased revenue consistent with other desired outcomes, and FMP goals and strategies.

Intent

The intent of this strategy is to increase the revenue generated from timber sales by designing sales with cost-effective and logical harvest units. Well-designed harvest units decrease logging costs and can also lead to more competitive bidding on timber sales, leading to increased revenue. Structuring timber sales to target specific log product markets and scheduling timber sales to take advantage of historic seasonal trends (e.g., bid prices for timber that can be logged in the winter months are typically increased) can increase revenues. OPs balance low- and high-value timber sales and units to ensure that forest management treatments are conducted where need, not just in high-value areas.

Strategy: Timber Salvage

Implement a timely response to natural disturbances (e.g., fires, windstorms, ice storms) to salvage merchantable timber, in accordance with the management emphasis of the affected areas, other forest management plan goals and strategies, and opportunities for additional legacy retention on the landscape.

a. Limit salvage within HCAs and RCAs to hazard tree felling.

b. Develop and implement responses to more extensive events in HCAs and RCAs in collaboration with NOAA Fisheries and U.S. Fish and Wildlife Service

Intent

Natural disturbances occur periodically across the landscape. These can result from different events such as windstorms, ice storms, and fires. These disturbed areas can range in size and impact and require careful consideration by foresters. The intent of this strategy is to ensure that timber is salvaged quickly after natural disturbances to recover economic value and reduce safety and wildfire risks.

3.2.2 Forest Resource 2: Transportation

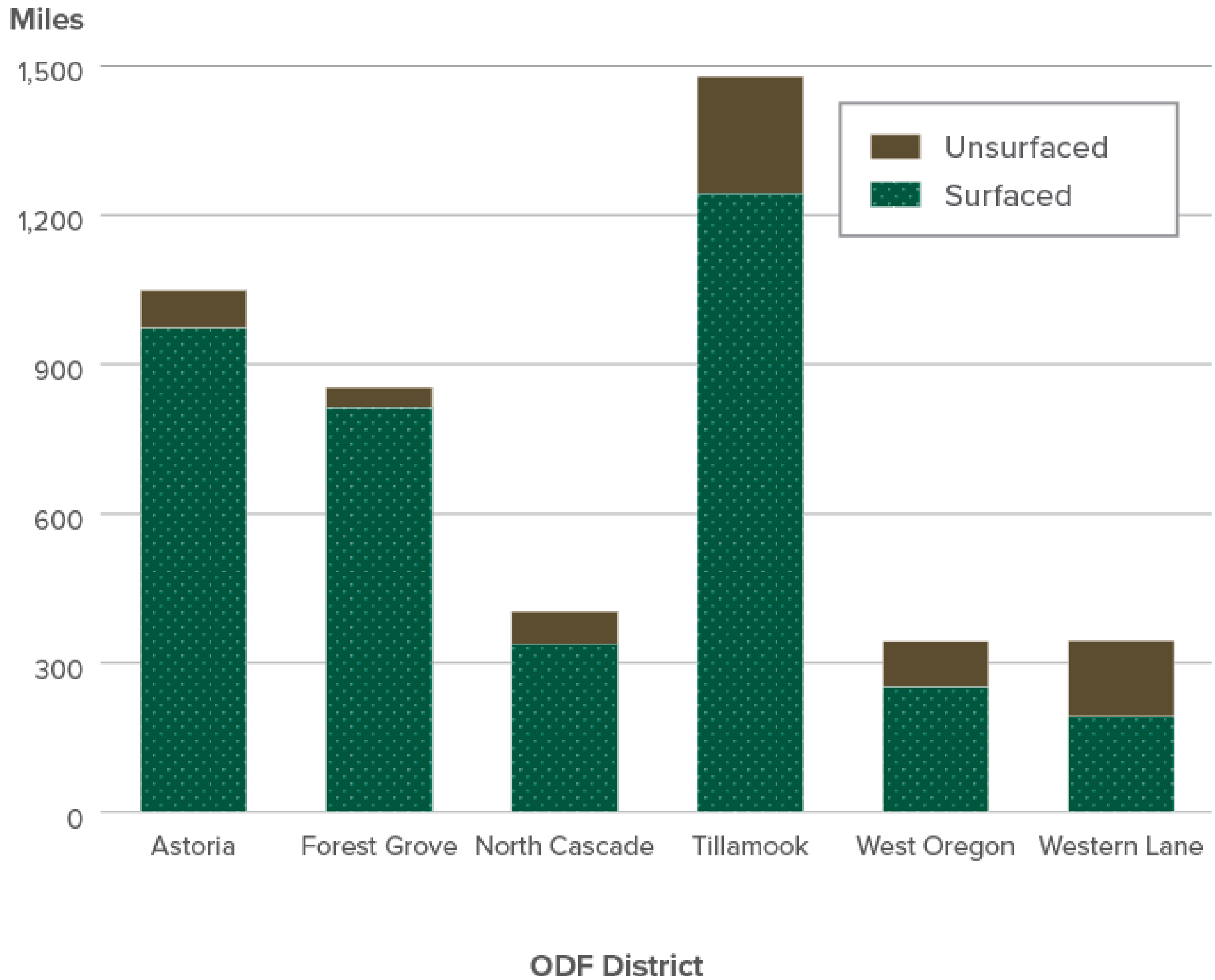
Bridge replacement in the Tillamook State Forest. Stream crossing improvements can help protect water quality.
Credit: ODF.

The state forests road system is an integral part of achieving desired economic, social, and environmental outcomes by providing access for the many activities that happen on state forest lands.

There are approximately 4,500 miles of road on state forest lands, and 88% of all state forest land acres are within 0.25 mile of a road. Approximately 85% of the roads are surfaced, mostly by gravel, which reduces risk of roads contributing fine sediments to streams and adversely affecting water quality and aquatic habitat (Figure 3-3). The road system has the potential to adversely affect natural resources, particularly water quality and aquatic species migration when it is not properly maintained. The condition of the road system is dynamic and changes over time depending on weather conditions, soil saturation, vegetation growth, public use, and hauling activities. Monitoring these conditions is important and BMPs must be incorporated to protect natural resources.

The transportation system is evaluated on an ongoing basis to determine the current condition, potential resource impacts, and future access needs. Different emphasis areas help guide management decisions for road construction, improvement, maintenance activities, as well as vacating, which can involve removing the road or closing it. For example, the WOSF HCP conservation actions guide road construction in RCAs and HCAs. An example could be building a temporary dirt spur that is only used in the summer and vacated after use, which would eliminate the need for long-term maintenance, reducing potential resource impacts.

FIGURE 3-3
State Forest Roads by District. There are approximately 4,500 miles of road on state forest lands; approximately 85% of these roads are surfaced (primarily graveled, though some main travel routes are paved).



Source: ODF 2026.

Existing roads are improved if determined to have potential impacts on aquatic species based on the transportation assessment. Roads outside of HCAs and RCAs go through the same assessment process; however, the improvement strategy may include more rock replacement, mitigation strategies, and BMPs for water quality if wet weather timber-hauling activities are anticipated.

A major concern for forest roads is hydrologic connection to streams, where water from the road drains directly into a stream, which can negatively affect water quality. ODF collects and maintains data over time to track where these connections exist so that ODF can target road-drainage improvements that reduce the negative impacts of roads on water quality. Adding drainage features, like cross-drains and rolling water dips, to ensure road segments drain water to hillsides instead of streams, combined with maintenance of the road surface, ditches, and drainage features, reduces erosion, sediment loading, and potential impacts on natural resources. Road improvement projects are prioritized to address large hydrologic disconnection projects, culvert replacements that are barriers to fish migration, infrastructure stability for public safety, and facilitation of timber sales.

Goal: Transportation System Management

Manage the transportation system in a fiscally sound manner that protects resources and promotes transportation efficiency and safety.

Strategy: Transportation Planning

Use transportation planning principles, engineering standards, and BMPs to ensure that the transportation system facilitates achievement of GPV, provides for safe and efficient traffic flow, and minimizes impacts on natural resources.

Intent

The intent of this strategy is to build a lasting transportation system with an informed and holistic view, which considers all factors relevant to management decisions, resource protection, and public safety. Using these principles, standards, and BMPs reduces erosion potential, disconnects road segments from streams, maintains adequate surface conditions, and mitigates chronic issues over time through road vacating or other methods. Priorities for different emphasis areas are considered during the planning process, including following the WOSF HCP conservation actions that guide road construction in HCAs and RCAs. Additional details can be found in supporting documents, including the WOSF HCP, ODF guidance, State Forest Roads Manual, BMPs, Oregon Forest Practices Act (FPA), and other applicable laws.

Strategy: Transportation Assessment

Monitor and assess the transportation system to ensure alignment with other FMP goals and strategies, resource protection standards, and safety.

Intent

The intent of this strategy is to collect information over time to verify the transportation system is being managed according to standards and policies. This information helps inform adaptive management decisions to address management goals, resource protections, and public safety related to the transportation system. The effectiveness of standards and BMPs can be evaluated and refined through this process. Through this assessment, projects can be prioritized for improvement based on potential impacts on natural resources, infrastructure stability, and public safety.

3.2.3 Forest Resource 3: Cultural and Historic Resources

Traditional cedar bark collection in the Astoria District. Western redcedar) is one of the most culturally significant trees on ODF land.

Credit: Keepers of ancestral knowledge. Photograph taken by Fran McReynolds, with permission from the Confederated Tribes of Warm Springs.

Cultural and *historic resources* provide a record of our shared past, present, and future relationship with the land and how this relationship changes over time. These resources are often observed in physical forms, such as historic buildings, arrowheads, rock art, basketry, and other items. What is not as apparent is the interconnectedness of humans and the natural and cultural resources that support them. These relationships with the land are illustrated through practices, such as preserving sites and objects of cultural importance, and cultivating plants and trees and other natural resources for traditional uses. Protecting cultural and historic resources is a shared responsibility for all Oregonians, as they provide an opportunity to apply knowledge from past civilizations to inform management practices and approaches to living with the land. The tribal cultural resources goals for the FMP were developed in collaboration with the *nine federally recognized Tribes of Oregon* in government-to-government forums.

Tribal Partners:[1] Natural Resources Protection

ODF recognizes that Tribal Partners have lived in *reciprocity* with the landscape since time immemorial, using sustainable management practices to achieve quality, abundance, and self-sustaining plant and wildlife populations. Each Tribe has a unique perspective and history, with cultural identities that are intrinsically tied to their ancestral lands. ODF seeks to honor these relationships by working with Tribal Partners in shared stewardship toward a sustainable future. ODF is committed to integrating tribal cultural stewardship practices and *Indigenous Traditional Ecological and Cultural Knowledge*[2] (ITECK) into planning, implementation, and adaptive management processes to ensure that tribal ancestral lands are respected and honored by state forest's management activities.

Landscape-scale stressors such as droughts, floods, wildfires, plant and animal extinctions, and changes in climate occurred in the past, as did Native Americans' adaptations to such events. Working with the Tribes to integrate their cultural and natural resources knowledge and stewardship practices builds

[1]Tribal Partners include the nine federally recognized Tribes of Oregon: Burns Paiute Tribe, Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians, Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Coquille Indian Tribe, Cow Creek Band of the Umpqua Tribe of Indians, and the Klamath Tribes.

[2] Indigenous Traditional Ecological and Cultural Knowledge (ITECK) is grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. ITECK is inherently heterogenous and unique to each Tribe due to the cultural, geographic, and socioeconomic differences, as well as their history and the surrounding environment.

adaptive capacity across the landscape. Tribal Partners, their communities, peoples, ancestors, and culturally significant places persist, as do their ancestral knowledge and practices. They hold a rich diversity of holistic strategies, technologies, and management techniques that have existed through many generations and can help inform current conversations regarding climate change and landscape resiliency.

ODF is committed to working with Tribal Partners to understand, identify, manage, and provide access to native populations of culturally significant plants, trees, animals, places, and waters on ODF-managed lands. This includes working with Tribal Partners to develop *ethnobotanical* strategies that are adaptive to the effects of climate change, using native seed sources to encourage self-sustaining plant communities over time, and using fire-adapted *successional* plants to prevent *erosion*. ODF also commits to diversifying tree species in reforestation efforts to encourage proliferation of traditional plants.

The following description of culturally significant natural resources is intended to provide a generalized understanding of the past and present cultural and natural resources that occur or have existed on state forest lands. Culturally significant natural resources, their uses, and associated management practices are extensive. A few examples are provided with the intent of demonstrating the concept of reciprocity, in which all plants, trees, animals, and humans were a part of and contributed to a holistic ecosystem.

Among the many traditionally important natural resources, western redcedar (canoe cedar) is one of the most culturally significant trees on ODF land (Whereat-Phillips 2016). It has healing and symbolic properties that are at the source of many Tribal Partners' ideological and cultural identities. The cultural significance of western redcedar is inextricably tied to its ideological value, as well as its many uses, including medicine-making and ceremonial uses. Western redcedar provides material for basketry, mats, buildings, canoes, cups, buckets, backpacks, spears, bedding, pest abatement, and much more.

Pacific yew (*Taxus brevifolia*) and ash (*Fraxinus*) trees provide raw materials for bows. Arrows are sometimes made from hazel (*Corylus cornuta*), oceanspray (*Holodiscus discolor*), or other available plant species, and vine maple (*Acer circinatum*) is used for making net and spear handles.

Sitka spruce is an example of a culturally important tree species that requires careful tending of individual trees to strengthen the root system and promote healthy growth. It has many important uses, including basketry and making multiple types of fishing and foraging devices to gather eel, smelt, salmon, and other aquatic species. In addition, Sitka spruce's versatility serves well for making larger bowls and cups and other vessels.

Tribes' management of natural resources includes the extensive use of fire to create clearings in the forest to promote growth of successional plants like serviceberry (*Amelanchier alnifolia*). Various parts of serviceberry are used for medicinal purposes and consumption (raw, dried, or made into a preserve), and the branches serve as tool handles, ropes, and sometimes spears or arrow shafts. Bear grass (*Xerophyllum tenax*), bulrush (*Typha*), hazel, and fireweed (*Chamaenerion angustifolium*) are examples samples of other plant species that require burning for production. These species colonize clearings and decline as the forest canopy closes and shade inhibits their growth.

Understory burning that maintains forest canopy cover produces habitat for large and small game including elk, deer, and other sustenance-providing animals; however, animals are more than food. The animal shares its life with people to make clothing, bones for fishing implements, sinew for binding, brains for hide tanning, bones for gaming pieces, and shells for trade, jewelry, rituals, and symbolic displays. Still, many animals are not used for food or other utilitarian purposes but hold deep symbolic meaning in the form of cultural origin stories, and inform and contribute to medicinal practices.

Goal: Tribal Access and Use of Natural Resources

In coordination with the nine federally recognized Tribes of Oregon, provide access, availability, and enhancement of cultural resources and natural resources on state forest lands.

Strategy: Tribal Engagement

Engage Tribal Partners in planning processes for state forest lands and provide opportunities for implementation of cultural and natural resources stewardship practices appropriate to location and habitat.

Intent

The intent of this strategy is to ensure that significant cultural and natural resources are recognized and integrated into planning and management activities. ODF and tribal governments meet regularly to ensure that communication is occurring early and often with the appropriate staff, and at the appropriate levels. The intent is also for tribal and ODF staff to understand respective organizational structures and planning processes to identify meaningful points of engagement, cultural and natural resources stewardship practices, and culturally significant plant and animal species. ODF works with interested Tribes to integrate cultural and natural resources stewardship and restoration practices and priorities for culturally significant plant and animal species in the IP, OP, and adaptive management processes.

Strategy: Coordinate Tribal Ethnobotanical Strategy

Coordinate with Tribal Partners to develop and implement an ethnobotanical strategy that is adaptive to the effects of climate change and ensures self-sustaining populations of culturally significant species are abundant and available on state forest lands.

Intent

The intent of this strategy is to have a process for including or introducing culturally significant plant species and cultural techniques into forest management practices, including native seed source recommendations that consider appropriate habitat in planting regimes, climate resiliency, and legacy seed source information that contributes to a storied landscape understanding.

Strategy: Tribal Seed Sources

Collaborate with Tribal Partners on native seed source recommendations that consider appropriate habitat in planting regimes, climate resiliency, and legacy seed source information that contributes to a *storied landscape* understanding.[3]

Intent

The intent of this strategy is to identify and cultivate partnership opportunities with established native nurseries, including but not limited to the Coastal Native seed partnership, the Oregon Department of Agriculture's (ODA) seedbank, and tribal seed nurseries. The intent is also to continue to work with Tribal Partners in IP, OP, and adaptive management planning processes to develop and implement climate adaptation strategies to support culturally significant plant and animal species.

Strategy: Tribal Access

Work with Tribal Partners to develop and administer processes that facilitate *unimpeded access*,[4] with protected allowances for Tribal Partners' to access, use, and manage cultural and natural resources (e.g., western redcedar bark peeling, bear grass collection) on state forest lands.

Intent

The intent of this strategy is to implement processes necessary to allow protected tribal access to state forest lands. ODF and Tribes build their understanding of locations and logistical needs for accessing culturally significant locations and forest resources. ODF and Tribes clarify responsibility for ensuring access, including but not limited to identifying entities responsible for access administration, methods of identification of tribal members, and provisions and conditions for gathering, cultivating, and harvesting. Tribal input on access is considered during IPs. ODF may consider Oregon Parks and Recreation Department tribal collection processes as a model program.

Tribal Partners: Cultural Resources Protection

European settlement in western states destabilized existing human-ecological systems and severed ties between the past and present that are culturally significant to Tribal Partners. Historic practices, behaviors, and laws physically, emotionally, and spiritually forced tribal peoples from their lands and ways of life, yet the history, language, and people endure. Human remains (ancestors), funerary objects (tangible pieces of death rites and ceremonies), objects of cultural patrimony (spiritual and material associations), and culturally significant objects (religious or spiritual objects used in ceremonies) are prevalent across Oregon, including on state forest lands. These non-renewable resources may include culturally modified trees, rock cairns, waterfalls, caves, and other features. Visible evidence of ancestral communities include items of everyday life, such as animal bones, mollusks, beads, needles, and obsidian

[3] Within tribal contexts, storied landscape refers to a multitude of intrinsically linked and deeply held understandings, relationships, and actions between indigenous cultures and the landscapes with which they interact throughout time, including but not limited to origin stories, landscape features, and wildlife attributes that signal hunting, gathering, planting, and other seasonal use patterns.
[4] Provide reasonable opportunity for access, considering public safety, infrastructure, and topographic constraints.

tools. Protection of culturally significant sites and objects is critical for honoring and maintaining connections between ancestors, current tribal members, and future generations of tribal descendants.

ODF is committed to the shared and facilitated protection and repatriation of any items[5] (spiritual or material) that are considered culturally significant by Tribal Partners. Protection extends to known sites and locations, identification of undocumented sites, and avoidance of sacred spaces and places of concern. Protection of cultural resources also extends to management and recovery activities related to fire, restoration, flooding, wind, landslides, and other disturbance events.

The FMP provides for access, availability, protection, and enhancement of cultural resources on state forest lands. The plan recognizes these lands are a part of a long historical relationship, and access to *Traditional Cultural Places*[6] for spiritual, ceremonial, and traditional practices enables Tribes to maintain cultural identity, which is deeply rooted in the land. These locations are typically kept from common knowledge because of their sanctity and are almost exclusively known to Tribes and tribal members. Sometimes, only certain groups within a Tribe are keepers of such knowledge. Traditional Cultural Places and culturally significant forest and natural resources are *confidential*, and as such, ODF is committed to shared stewardship with Tribes, with stewardship being the protection of locational knowledge, meaning, and materials (ORS 192.005–192.170). ODF is also committed to increasing internal and external cultural awareness, understanding, and accountability through regular training focused on prioritizing, recognizing, and protecting cultural resources. These commitments are only successful through shared stewardship and partnership, built from mutual respect, trust, and understanding.

Goal: Tribal Cultural Resources Protection

Take an inclusive and proactive approach to working with Tribes to identify, record, preserve, protect, and keep confidential[7] culturally significant resources, including but not limited to *archaeological* and *historic sites* and *objects*, considerations for human remains, historic artifacts, and real property.[8]

Strategy: Tribal Relationships

Develop and maintain relationships with Tribal Partners to facilitate consistent information sharing and collaboration on state forest management activities that may affect cultural resources, including timber harvest and related activities, wildfire suppression and recovery, and habitat restoration.

[5] 43 CFR § 10 (Native American Graves Protection and Repatriation Act); 16 U.S.C. § 1B (Archaeological Resources Protection Act); 16 U.S.C. § 470 (National Historic Preservation Act), ORS 97.740–97.760, ORS 358.905–961, and ORS 390.235–390.240. Oregon EO 17–12, 368.905–358.961; 97.740–97.760; 390.235.

[6] The National Historic Preservation Act and the 36 CFR 800 regulations implementing it refer to "properties of traditional religious and cultural significance." These are geographic places prominent in a particular group's cultural practices, beliefs, or values, when those practices, beliefs or values: (i) are widely shared within the group, (ii) have been passed down through the generations, and (iii) have served a recognized role in maintaining the group's cultural identity for at least 50 years.

[7] Includes culturally sensitive locations in *State Historic Preservation Office* and tribal databases and places known by affiliated Tribes.

[8] EO 96-30; EO 17-12; ORS 358.640 and 358.653, ORS 97.740 to 97.760; 358.905 to 358.955; and 390.235.

Intent

The intent of this strategy is to promote communication with Tribes about potential impacts and opportunities of forest management activities by developing tribal engagement policies and procedures and ensuring ongoing consultation and coordination. This includes working with Tribal Partners toward a systematic notification and record keeping process for state forests management activities and emergency operations (e.g., fire, flood, wind) that provides established points of contact and a collaborative structure for protection and rehabilitation of natural and cultural resources.

Strategy: Cultural Resources Inventory

Develop a comprehensive and ongoing cultural resources survey and inventory strategy to increase the understanding of culturally significant archaeological, historic, and cultural sites and objects on state forest lands, and implement the strategy in coordination with Tribal Partners over time.

Intent

The intent of this strategy is to work with Tribal Partners to develop and implement cultural resources protection processes and strategies associated with all forest management activities to help identify and protect culturally significant resources and to ensure their protection is part of IP, OP, and adaptive management processes.

Strategy: Determining Level of Cultural Significance

Coordinate with Tribal Partners to identify Tribes that have direct ties to state forest lands (in terms of location, materials, knowledge, and practice); determine the level of significance of archaeological, historic, and cultural sites and objects; and solicit recommendations for protection and preservation thereof.

Intent

The intent of this strategy is to promote communication with Tribes to determine significance and relative protection measures to be taken.

Strategy: Cultural Resource Awareness

Increase internal and external cultural awareness, understanding, and accountability for cultural resources protection through regular training focused on prioritizing, recognizing, and protecting cultural resources.

Intent

The intent of this strategy is to provide ongoing education to ODF staff, volunteers, contractors, and visitors to state forests so they understand their role in cultural resources protection. The intent is also for ODF to provide internal and external cultural awareness training opportunities for staff, volunteers, and contractors, and coordinate with Tribal Partners on curriculum development, including Senate Bill

(SB) 13:[9] Tribal history/Shared History curriculum (as outlined by Tribal Partners). Awareness training opportunities for visitors is provided through education and interpretation programs and the Tillamook Forest Center.

Strategy: Intergovernmental Agreements

Use intergovernmental agreements[10] with Tribal Partners to facilitate cooperation, information exchange, and cost sharing.

Intent

The intent of this strategy is to codify communication processes, cultural and natural resources protection strategies, and land management partnerships.

Historic Cultural Resources

Historic sites and artifacts across Oregon's landscape tell a rich story of people, communities, travel, conflict, trauma, and persistence, which collectively represent the diversity of descendants of Oregonians today.

European explorations intensified in the early 1800s and expanded significantly with the 1850 Oregon Donation Land Law bringing over 30,000 white settlers. This cultural shift, predicated on colonization and western cultivation of the landscape, brought extractive agriculture, ranching, logging, and homesteading (a foreign concept of land ownership and control for Native Americans). The European explorers and settlers also brought diseases that decimated Native American peoples and *lifeways*. The Native Americans that survived this era of disease and genocide were forced to join an unfamiliar labor culture to provide for their families.

Other groups also found their way to what is now Oregon, despite laws that intended to keep them out. Even before Oregon became a U.S. territory, the Provisional Government of Oregon enacted laws that banned both free and enslaved Black people from Oregon and threatened violence to those who stayed. Oregon's state constitution was the first to ban Black residents and barred Chinese residents from voting, despite having worked and lived in Oregon since the early 1800s. Despite these laws and bans, these marginalized communities endured. For example, Maxville, a logging camp east of the town of Wallowa, was home to a multi-cultural logging camp, with 400 residents, 40 to 60 of which were Black people. It was the largest town in Wallowa County between 1923 and 1933 and is memorialized by the Maxville Heritage Interpretive Center.

Other immigrants continued to find their way to Oregon, including the Basque (primarily sheepherders), Mexicans who mined gold and tended livestock, and Chinese who established mining camps in southwest and northeast Oregon and continued to work on building the transcontinental railroad. The Chinese Exclusion Act of 1882 forced many Chinese immigrants, and their American-born children, to

[9] Senate Bill (SB) 13 Tribal History/Shared History directs the Oregon Department of Education to create the K-12 Native American Curriculum for inclusion in Oregon public schools and provide professional development to educators.
[10] ORS 190.110, National Historic Preservation Act Section 106, ORS 358.653.

leave the state. This resulted in labor shortages that were filled by immigrants from Japan and other parts of Asia. The influence of these many communities can still be found upon the state's landscape and are visible in the historic cultural resources memorializing their experiences.

Historic cultural resources are some of Oregon's most valuable and important *assets*. Buildings, structures, sites, furnishings, art, objects, and items of personal property that are important to local, state, or national history can tell the story of a region's cultural history. These cultural resources are protected under the National Historic Preservation Act and Oregon state law when they meet certain criteria.[11] ODF is committed to historic cultural resources stewardship through the identification and protection of culturally sensitive resources across state forest lands. Historic cultural resources protection provides an opportunity for visitors to state forest lands to connect with the state's history and people.

Goal: Historic Cultural Resources Protection

Identify and protect historic cultural resources.

Strategy: Archaeological Review

Perform archaeological review of all operation locations and protect historic resources following applicable rules and statutes.

Intent

The intent of this strategy is to incorporate historic cultural resources review by qualified cultural resources specialists, in compliance with state and federal regulations, into operation planning processes to ensure protection of historic cultural resources across state forest lands.

3.2.4 Forest Resource 4: Recreation, Education, and Interpretation

Mountain biking on one of ODF's many trail systems. Demand for outdoor opportunities in Oregon is increasing.
Credit: ODF.

ODF's recreation, education, and interpretation program manages both developed and *dispersed recreation* and interpretive programming across all state forest lands, with the greatest concentration of opportunities and visitor use in northwest Oregon on the Clatsop, Santiam, and Tillamook State Forests. The program aims to welcome all visitors, provide opportunities to learn about forest stewardship, and ensure lasting, diverse, and accessible outdoor experiences.

On state forest lands, visitors enjoy a wide range of activities such as camping, hunting, fishing, hiking, mountain biking, boating, horseback riding, target

[11] National Historic Preservation Act Section 106, ORS 358.653.

shooting, and motorized trail use. These opportunities are regulated under Oregon Administrative Rules (OAR) 629-25 to ensure safety and resource protection.

Recreation on state forests involves more than leisure activities—recreation is an ecosystem service that improves quality of life, supports cultural traditions, and connects Oregonians to their state forests. It also generates significant economic benefits for nearby communities and the state as a whole. According to Oregon's 2025–2029 Statewide Comprehensive Outdoor Recreation Plan (SCORP), outdoor recreation in Oregon contributes nearly $57 billion annually to the state's economy and saves billions in health-related costs (Oregon State Parks 2025).

SCORP data show that demand for outdoor recreation continues to grow across the state. Hiking, camping, and wildlife viewing remain among the most popular activities, while mountain biking and non-motorized trail use are seeing steady growth. At the same time, barriers persist for some groups, including low-income households, people with disabilities, and racially or ethnically diverse communities. This highlights the need for more inclusive access and programming.

As demand grows and user demographics evolve, the recreation program continues to adapt facilities, trails, and educational offerings to meet changing needs and create more inclusive experiences. The following sections describe some of these recreational opportunities in detail and outline strategies for future improvements.

Motorized Trail Use

State forests provide some of the most diverse and challenging off-highway vehicle (OHV) opportunities in Oregon, filling an important recreational niche in the Pacific Northwest. OHV staging areas, including campgrounds and day-use sites, offer parking and camping that support access to trail systems.

The Clatsop and Tillamook State Forests feature extensive OHV networks for motorcycles, quads, side-by-sides, and four-wheel-drive vehicles, with trails ranging from beginner-friendly to highly technical. The Santiam State Forest and the West Oregon District offer smaller systems with easy-to-moderate routes for motorcycles and quads. OHV trails are generally open year-round, with peak use in spring and fall.

Non-motorized Trail Use

State forests offer an extensive network of non-motorized trails for hiking, horseback riding, trail running, and mountain biking. These trails range from scenic forest paths to purpose-built mountain bike routes, including cross-country, downhill, and freeride options. The Black Rock Mountain Bike Area in the West Oregon District is a prime example, managed in partnership with the Black Rock Mountain Bike Association to provide advanced riding experiences.

Looking ahead, maintaining and expanding these trails will require strong collaboration with local trail organizations and other nearby systems—such as those managed by counties, cities, and nonprofits—to create seamless connections between state forests and regional networks. These linkages enhance recreational opportunities, reduce congestion, and support tourism by offering longer, integrated trail experiences.

Camping

Camping on Oregon's state forests offers a range of experiences, from rustic dispersed sites to developed campgrounds with amenities. ODF manages three primary types of camping: developed campgrounds, designated sites outside campgrounds, and dispersed camping across forest lands. Developed campgrounds vary in size and features, including drive-in sites for recreational vehicles and tents, walk-in tent sites, horse camps designed for equestrian users, and OHV campgrounds tailored for motorized recreationists.

ODF campgrounds serve as hubs for recreation, providing access to trails, rivers, and scenic viewpoints. Many sites are intentionally kept simple to maintain a natural forest experience, while still offering essentials like fire rings, picnic tables, and vault toilets. Future priorities include improving accessibility for all visitors, upgrading infrastructure for safety and sustainability, and exploring partnerships to expand camping options near high-demand areas.

Day-Use Activities

ODF manages a variety of day-use sites that provide essential amenities for visitors, including trailheads, picnic areas, boat launches, target-shooting lanes, interpretive sites, and demonstration forests. While facilities are generally rustic, many offer river access, restrooms, and picnic shelters. These sites serve as gateways to recreation, supporting activities like hiking, mountain biking, fishing, and OHV riding. Target shooting is also supported at designated shooting lanes, which are maintained to improve safety and reduce environmental impacts.

Future priorities include improving accessibility, upgrading infrastructure for safety and sustainability, and enhancing interpretive elements to enrich visitor experiences.

Aquatic Activities and Hunting

State forest lands provide abundant opportunities for water-based recreation and hunting, both deeply rooted in Oregon's outdoor traditions. Rivers and lakes within the forests support fishing, boating, and swimming. ODF manages several primitive boat launches, some in partnership with the Oregon Department of Fish and Wildlife (ODFW), and small lakes in the Santiam and Clatsop State Forests offer angling and non-motorized boating. RCA protections support healthy fish populations and ensure the recruitment of in-stream downed wood and other habitat elements over time.

Hunting remains a cornerstone activity on state forests, with ODF working closely with ODFW and hunting organizations to manage access and maintain habitat to support healthy populations of game animals. *Travel management are*as and selective road closures create walk-in hunting opportunities while balancing habitat protection and safety. These activities not only connect people to Oregon's natural heritage but also contribute to local economies and community wellbeing.

Looking forward, ODF aims to enhance water access points, improve signage and safety features, and strengthen partnerships to support sustainable hunting practices and aquatic recreation.

TILLAMOOK FOREST CENTER

Annual Overview

Visitors
62,700

Volunteer Hours
3,070

Education Programs (participants)
2,700

Interpretive Services (participants)
5,200

Data averaged from FY 2024 and FY 2025.

Interpretation and Education Services

Education and interpretation are central to the VOF by fostering stewardship and understanding of Oregon's forests. Since the mid-1990s, programs have provided insight into forest ecology, wildfire history, and sustainable management practices *on working forests* that promote resilient ecosystems. The Tillamook Forest Center, built in 2006, is the flagship facility—a premier destination for locals and visitors alike. It features interactive exhibits, an award-winning film on the Tillamook Burn, accessible trails, seasonal presentations, traveling exhibits, and school programs. School programs for K–12 classrooms are especially important for ensuring that school children experience the forest and are aware of future career opportunities in stewardship of their natural resources.

Future plans emphasize modernizing interpretive services, expanding digital engagement, and strengthening partnerships with schools and community organizations. These efforts aim to reach broader audiences, integrate climate and wildfire education, and ensure that interpretation remains relevant and engaging for the next generation.

Goal: Recreation, Education, and Interpretation Opportunities

Provide forest recreation, education, and interpretation opportunities to create meaningful and enjoyable experiences that foster appreciation and understanding of state forest lands and contribute to community health, sustainable working forests, and economic wellbeing.

Strategy: Welcoming and Accessible Recreation, Education and Interpretation Opportunities

Assess, maintain, and improve recreation, education, and interpretation opportunities on state forest lands through existing trails, facilities and future development.

a. Consider connecting to existing recreational infrastructure when planning new development in close proximity.

b. Use BMPs, engineering standards, and planning principles suited for facility and trail development on public lands.

Intent

The intent of this strategy is creates enjoyable experiences across the recreation spectrum and within educational fields that build appreciation for state forests and support connection with Oregon's history, people, and environment

Strategy: Visitor Use Research and Monitoring

Monitor visitor use of program assets to inform decisions related to the recreation, education, and interpretation program., Support efforts to diversify program funding mechanisms, contribute to program sustainability, and help the program describe and deliver its contribution to GPV and resilient ecosystems.

a. Regularly collect and analyze data on how visitors use state forest recreation, education, and interpretation facilities and programs to guide decisions and improve services.

Intent

The intent of the strategy is to prioritize infrastructure upgrades, design new programs, and demonstrate the value of investments to stakeholders.

Strategy: Community Engagement

Build partnerships and community connections to increase investment, collaboration, and support for recreation, education, and interpretation programs.

Intent

The intent of this strategy is to create a sense of shared ownership around the mission, vision, and brand of the recreation, education, and interpretation program through collaboration and engagement with diverse audiences, partners, and stakeholders that creates community connections, develops broad support for and investment in the program, and increases our collective capacity.

3.2.5 Forest Resource 5: Visual Resources

Western Oregon state forest lands are near some of Oregon's major cities. Several *scenic* highways and rivers cross the planning area and attract people to recreational infrastructure including many campgrounds and extensive trail networks. Sightseeing is popular in state forests, and visual resources play a major part in the quality of experience in social activities, such as camping, trail use, fishing, wildlife watching, rafting, and driving. Visual resources enhance the quality of social benefits and attract tourists whose spending supports the local tourism economy and contributes to revenues.

In many places, smaller parcels of state forest lands are not readily distinguishable from other surrounding forestlands by visitors. By contrast, the Clatsop and Tillamook State Forests are large, consolidated blocks of state forest lands that are signed and well-known to many visitors and dominate *viewsheds* along some busy travel corridors, especially between Portland and the Oregon Coast. Goals for retaining visual buffers from timber harvest are balanced with goals for maintaining safe conditions for motorists and recreationists.

Santiam State Forest. On state forest lands visitors can expect to see a wide range of forested settings, streams, rivers, lakes, and other scenery.
Credit: Zak Stone.

State forest lands are also home to state-designated *scenic waterways*, which are designated to create a balance between protecting natural resources, scenic value, and recreational use of these rivers.

Scenic Highways, Byways, and Visually Sensitive Corridors

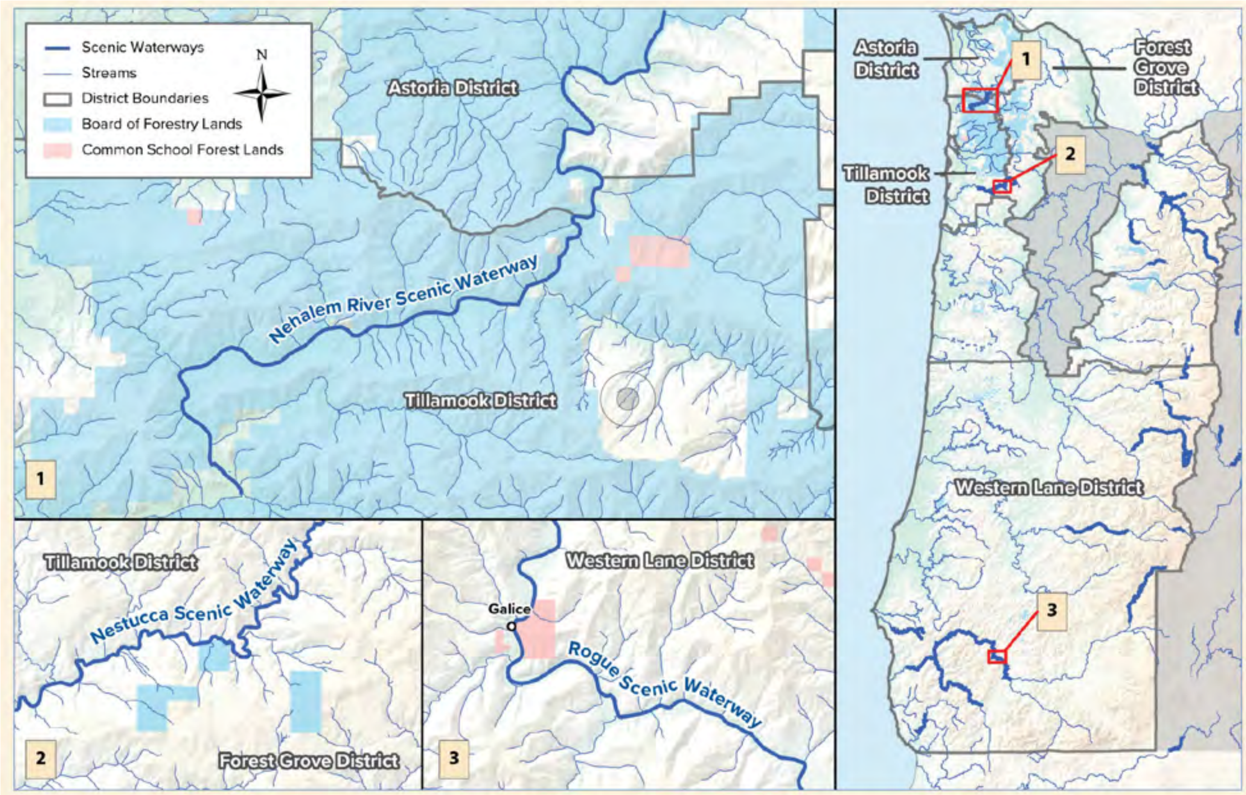
State forest lands are a major part of the view along some stretches of Highway 6 and Highway 26 in the Oregon Coast Range. Along major highways, the immediate visual foreground is protected either by Oregon Department of Transportation-owned scenic buffers or by statute. Many highways in western Oregon are designated as scenic for the purpose of visual corridor management (ORS 527.755) and are within or adjacent to state forest lands.

Special rules apply to timber harvest in *visually sensitive corridors*. Goals for retaining scenic buffers are balanced with goals for maintaining motorist safety. Additionally, Highway 6, located in the Tillamook State Forest, is designated as a portion of the Trees to Sea Scenic Byway and must be maintained as a scenic corridor per the *Trees to Seas Highway 6/131 Scenic Byway Corridor Management Plan* (ODF 2018).

Scenic Waterways

There are three state scenic waterways on or adjacent to state forest lands. Management of lands in and adjacent to designated scenic waterways is subject to the provisions of ORS 390.805 to 390.925, and administrative rules adopted by the Oregon Parks and Recreation Department. The first designated waterway is the Nestucca River Scenic Waterway in Forest Grove and Tillamook Districts (designated by ORS 390.826(11); OAR 736-040-0041) (Figure 3-4). The second state scenic river is a 17.5-mile section of the Nehalem River located in the Clatsop and Tillamook State Forests (designated by Executive Order 2019-05; OAR 736-040-0120). The third state scenic river is the Rogue River Scenic Waterway (designated by ORS 390.826(9)) located adjacent to CSFL in the Western Lane district near the small town of Galice (16 miles northwest of Grants Pass). This same reach is also part of the Lower Rogue National Wild and Scenic River, which is one of eight rivers established under the passage of the Wild and Scenic Rivers Act in 1968.

FIGURE 3-4
Scenic Waterways. Scenic-designated segments of the Nestucca, Nehalem, and Rogue Rivers flow through the planning area.



Goal: Visual Resources

Manage forests in ways that value scenery and a range of forested settings based on emphasis area.

Strategy: Scenic Considerations

Integrate scenic considerations into management decisions where compatible with safety considerations, other resource priorities, harvest plans and operational needs. Scenic emphasis areas are mapped as part of the FLMCS based on classification criteria for visual sensitivity. Classification criteria may include factors such as number of viewers, viewing distance, viewing angle, landform, vegetation, water and uniqueness. Table 3-3 provides examples of visual sensitivities.

TABLE 3-3
Examples of Visual Sensitivities used to Map Scenic Emphasis Areas as Part of the FLMCS

Visual Sensitivity	Examples
High	Areas where state and federal regulations apply such as scenic highways and scenic waterways.
Moderate	Portions of the viewshed visible from established campgrounds, high use vistas, viewpoints along major highways, urban views, and heavily used recreation areas.

Intent

The intent of this strategy is to provide views of a wide range of managed forest settings, including areas where scenic considerations are regulated by law. Active management of state forest lands provides a unique experience where visitors can expect to view a range of forest conditions ranging from newly planted seedlings to stands of large, mature trees; management activities including thinning and regeneration harvests with leave trees, snags, and resource buffers; and natural features like streams, rivers, lakes, and waterfalls. The varied scenes experienced on state forest lands reflect the social, economic, and environmental co-benefits that come from these working forests.

3.2.6 Forest Resource 6: Special Forest Products

Hand-picked Chantrelle mushrooms. Special forest products provide social and economic benefits for communities.
Credit: ODF.

Special forest products are non-timber products that are collected for personal and commercial uses. They include firewood and other products identified by the BOF (ORS 530.050 and 164.813; OAR 629-028). In western Oregon State forest lands, special forest products include, but are not limited to, bear grass, evergreen boughs, cedar shakes, cones, ferns, firewood, moss, mushrooms, vine maple cuttings, poles, Oregon grape (*Mahonia spp.*), salal (*Gaultheria shallon*), and Pacific yew bark.

The special forest products industry makes an important contribution to Oregon's economy, cultural values (Section 3.2.3, *Cultural and Historic Resources*, for more details), and social wellbeing. The types of products vary among districts. Managing special forest products as a viable, sustainable commodity program, compatible with other forest resources, provides economic and social benefits for local communities and allows the special forest products industry to adapt and serve changing needs over time.

Goal: Special Forest Products

Provide opportunities for sustainable harvest of special forest products for personal and commercial use.

Strategy: Special Forest Products Harvest

Sell permits for sustainable commercial harvest of special forest products. Provide the public with information on locations and acceptable collection limits of products for personal use, consistent with other goals and the protection of forest resources.

Intent

The intent of this strategy is to provide opportunities to harvest special forest products that are compatible with other resource goals, while complying with ORS 530.050 and 164.813. The permitting process is used to guide personal or commercial users to specific areas of the forest where special forest products are available and harvest is unlikely to affect other resources (e.g., sensitive wildlife areas, campgrounds).

3.2.7 Forest Resource 7: Mining, Agriculture, Grazing, Administrative Sites

Tillamook Forest Center is a modern education and interpretive center in the heart of the Tillamook State Forest. Through hands-on exhibits, attractive riverside and forest trails, and educational offerings, visitors take a journey through the history of Oregon's forests, the power of wildfire and the art and science of sustainable forest management today.
Credit: ODF.

Mining, agriculture, grazing, and *administrative sites* provide direct economic benefits by generating income and revenue, and indirect social benefits by supplying education and interpretation facilities and materials for developing and maintaining the transportation network. The mineral, oil, and gas potential of western Oregon state forest lands is largely unknown. Few systematic surveys have been conducted for most commodities, and no regional geochemical studies have been conducted to define or eliminate areas of possible metal mineralization

Generally, except where a prior reservation exists, minerals and geothermal resources are owned by the State of Oregon and are managed jointly by the State Forester and the Department of State Lands (ORS 530.050(2) and ORS 273.551). ODF's share of revenues or royalties from these resources under ORS 530.110 and 530.115 is typically distributed to the Common School Fund by operation of ORS 273.780 and 273.785(4), while the counties' share of such revenues under Chapter 530 are distributed to the counties under ODF's revenue distribution statutes. Development of subsurface mineral resources may still require easements or special use permits issued by ODF and other agencies.

ODF may use soil, clay, stone, sand, and gravel for constructing or repairing roads or other state facilities (ORS 530.050). State forest lands can provide rock for local road surfacing, which is an important resource for road construction, road improvement, and road maintenance.

Although state laws permit agriculture and grazing on state forest lands if those uses are compatible with other forest resources, the topography of state forest lands is generally not suitable for most agricultural uses. Historically, under the open-range laws, all of the districts in western Oregon allowed grazing on burned or logged areas. As forests were re-established, grazing diminished. Open-range grazing ended in the early 1980s, and grazing is now almost non-existent on state forest lands.

Goal: Permit Mining, Agriculture, Grazing, Administrative Sites

Permit mining, agricultural use, development and use of administrative sites, and livestock grazing when these uses are compatible with other forest resource goals.

Strategy: Special Use Permit Evaluation

Consider mining, agricultural use, administrative sites, and livestock grazing on a case-by-case basis, such that use is not detrimental to the best interest of the state, is allowed by law, and is compatible with ODF resource management policies and plans.

Intent

The intent of this strategy is that proposals for uses such as mining, agriculture, grazing, and administrative sites be considered only after consultation with a staff biologist, an aquatic and riparian specialist, a land specialist, planners, and districts to ensure alignment with ORS 530.050. The purpose of the consultation is to evaluate whether these uses are compatible with other forest resource goals and with maintaining forests. Potential subclasses include Administrative Sites, Agriculture, Grazing Wildlife Forage, Easements, Energy and Minerals, or Transmission.

3.2.8 Forest Resource 8: Geology and Soils

Dynamic processes, such as forest succession, wind, and fire affect the accumulation of organic matter and available nutrients in the soil.

Credit: ODF.

The landscape upon which forest management occurs is affected by historic geologic processes and their resulting *formations*. Volcanic activity, sediment deposition, *uplift*, soil formation and erosion are the driving forces that have given western Oregon its unique terrain. The soils, which are derived from geologic and biological materials and form the bedding from which Oregon's forests grow, provide many ecosystem services that are key to maintaining resilient forests. Tree and other plant community productivity is determined mainly by soil characteristics and soil health. Road and recreation infrastructure depend on soil and topographic characteristics for stability and seasonal accessibility. Inoperable areas that are not available for active management due to unstable slope characteristics, provide other ecosystem functions such as wildlife habitat and carbon storage.

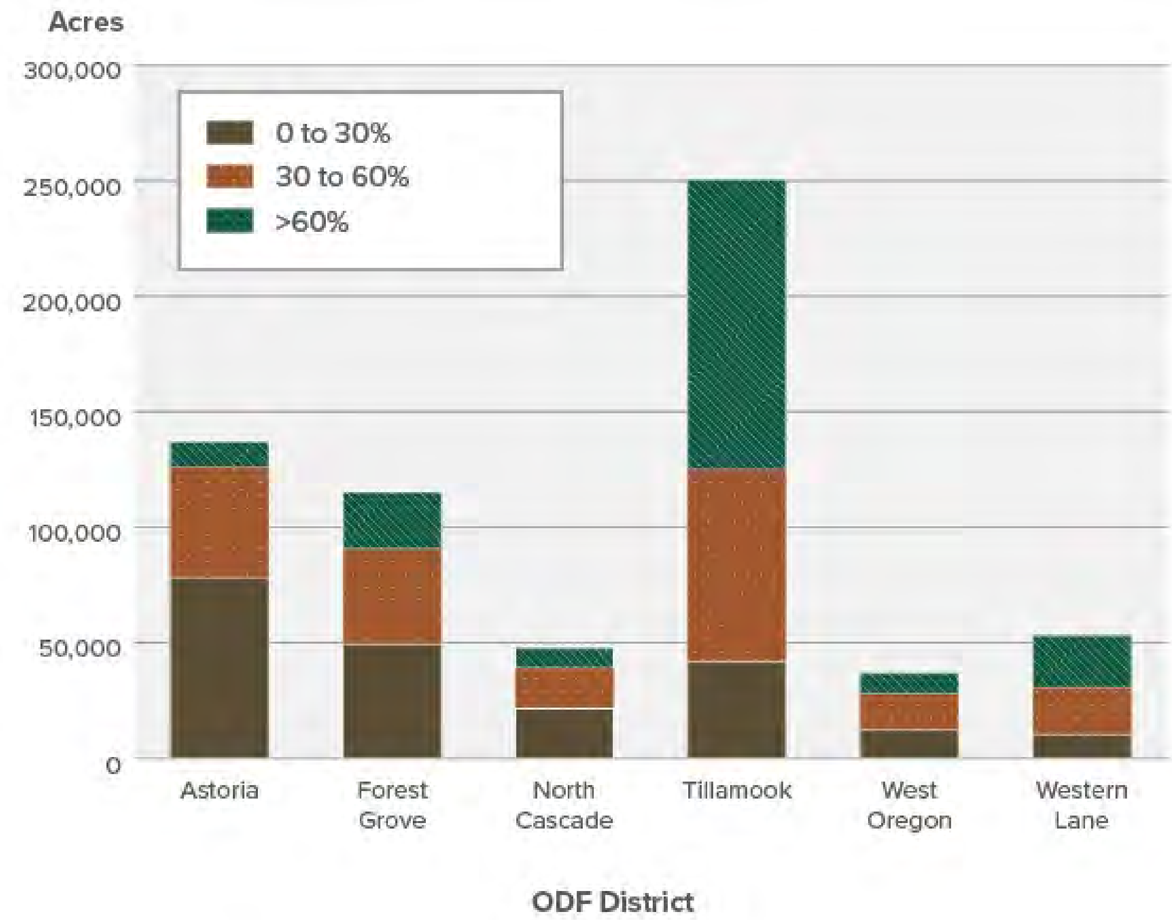
Geology

The planning area includes a diverse mix of terrain and soil types owing to a variety of geologic processes over time. Submarine volcanic activity, deposition of marine siltstones, sandstones and mudstones, and uplifting have resulted in mountainous terrain across most of the planning area. In addition, fluid basalts from volcanic activity further east flowed down the ancestral channel of the Columbia River Gorge into the lower areas of the Willamette Valley to the margins of the present coastline throughout much of the northern area of the planning area. Erosion from heavy precipitation and landslides transported large amounts of sedimentary material downstream, resulting in the deeply incised and complex topography that is the present-day Oregon Coast Range. Periodic earthquakes triggered many large, deep-seated landslides that exist throughout this area today.

Concurrent with the shaping of coastal mountains, volcanism formed the high Cascade mountains along the eastern edge of the planning area. Following their formation, the topography was further shaped by erosion processes similar to the coastal mountains, but also by the formation and subsequent receding of glaciers.

The net effect of geology, erosion, and climate is apparent in the distribution of slope steepness across the planning area. Nearly 33% of state forest lands have a slope greater than 60% (Figure 3-5). Steeper slopes are generally more prone to landslides as a result of harvest and road construction, more difficult to safely operate on, and can be less productive for tree growth in general. Where steep slopes are prevalent, logging and building access roads is more costly, and some areas are inoperable and excluded from timber harvest planning.

FIGURE 3-5
Slope Steepness across the Planning Area. The highest percentage of steeper slopes in the planning area are in the Tillamook and Western Lane Districts.



Source: Oregon Lidar Consortium 2007–2020.

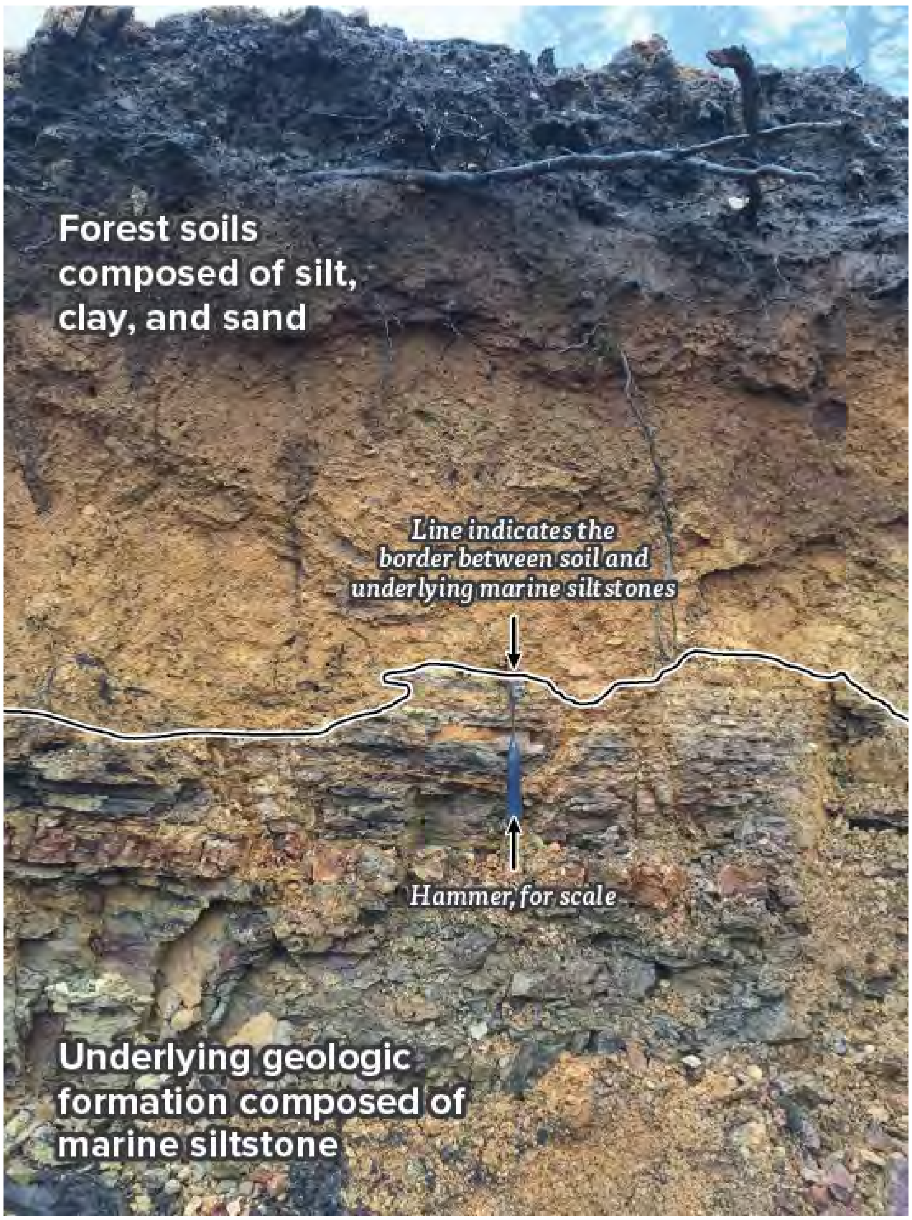
Soils

There are three general soil types: those formed from underlying volcanic formations, those from underlying marine formations, and those from alluvium (unconsolidated materials deposited by streams and rivers). Alluvial soils are a very minor portion of planning area soils and are wholly contained with RCAs. Soils are almost always thinner along ridgetops and thicker in *swales* due to faster and deeper weathering of underlying formations, which are wetter for longer periods, and gradual downslope soil movement, which increases soil depth in low areas. All soils contain organic and biological components in addition to minerals.

Soils formed on volcanic formations in the planning area are classed predominantly as gravels. These soils are very well drained, often occur on the steepest slopes in the planning area, and tend to be thinner than soils formed from marine formations or alluvium. The highest concentration of volcanic soils is in the Tillamook Highlands, the Cascade foothills, and near the Columbia River. While these soils are still suitable for growing trees, they tend to be less productive than deeper soils that store more water and nutrients.

Soils formed on underlying marine sedimentary formations are predominantly silts, sands, and clays with minor amounts of gravel (Figure 3-6). These occur in many areas outside the Tillamook Highlands. These soils are well drained on hillslopes but can be wet most of the year in low-lying areas. Water permeates through these soils much slower than the volcanic soils due to their fine-grained texture. These soils tend to be highly productive, due their retention of water and nutrients.

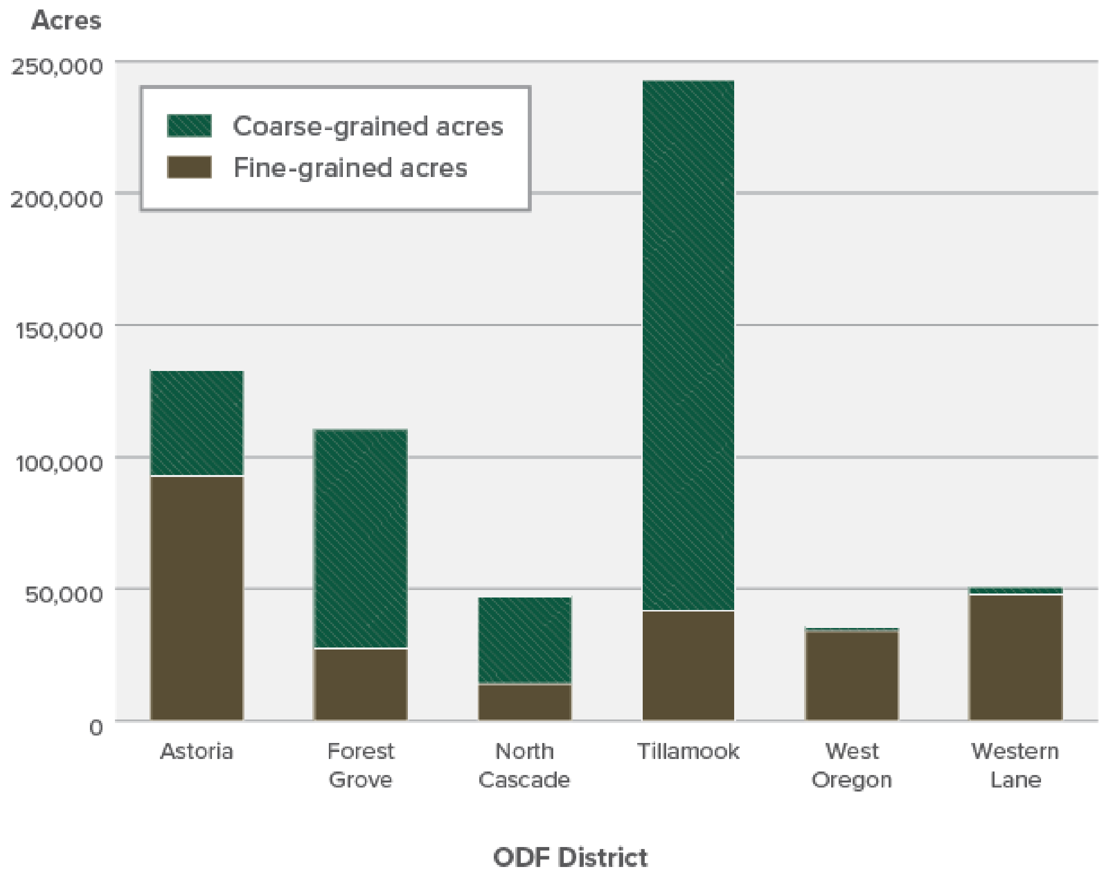
FIGURE 3-6. Forest Soils Developed on Marine Siltstones in Less Rugged Coastal Areas. Past geologic processes create many different layers in the soil, which contribute to different forest types and management actions.



Source: ODF.

Due to the influence of ancient volcanism, the Forest Grove, North Cascade, and Tillamook Districts have predominantly coarse-grained soils, while the remaining districts' soils are fine-grained and were derived from softer marine sediments (Figure 3-7).

FIGURE 3-7
Fine- and Coarse-Grained Soils by District. The Tillamook District has the highest proportion of coarse-grained soils in the planning area.



Source: ODF analysis of underlying geology in Oregon Department of Geology and Mineral Industries (DOGAMI) 2015.

Some locations have the ability to grow timber more easily than others. Forest site productivity is controlled by a complex relationship among topography, slope, aspect, soil depth, porosity, biology, and the availability of nutrients in the soil. Dynamic processes, such as forest succession, wind, and fire affect the accumulation of organic matter nutrients in the soil. The amount and *composition* of organic matter affect soil fertility. Small materials such as needles and twigs have the highest concentration of nitrogen. Large materials such as downed trees influence soil nutrients and soil moisture and can stabilize soils on moderate and steep slopes. *Downed wood* is an important component of forest soils, providing nutrients, habitat, carbon storage, and soil structure that promote both storage and transport of water. Retention standards for downed wood during timber harvest activities are detailed in the WOSF HCP.

While forests in the Oregon Coast Range are widely recognized as some of the most productive in the world, there is local variation, based on the attributes discussed above. Productivity of locations along the Western Cascades can be slightly lower. The most productive sites have deeper, nutrient-rich soils, which remain moist during dry periods. The least productive sites occur on and near steep rock outcrops that lack organic nutrients and dry out quickly.

Slope Stability

Soil movement, from gradual creep to landslides, occurs in both managed and unmanaged forests. Landslides are a natural part of ecosystem processes, delivering woody debris along with gravels, sands, and silt-sized material to streams. These organic and inorganic components can contribute positively to the aquatic ecosystem.

Landslides are a dominant erosional process in the planning area, and timber harvest and road-building activities can increase the rate of occurrence of landslides compared to unmanaged areas. This makes management around potential landslide areas a key focus for land managers. For a limited period after canopy removal, the frequency of slides increases in western Oregon (Turner et al. 2010; Robison et al. 1999). Slides that initiate and move through harvested terrain, may not deliver the same component of beneficial woody debris important for the aquatic system, depending on the amount of tree retention along the debris flow track during harvest. To mitigate this risk, ODF assesses potential landslide areas during the planning of management activities and applies standards described in the WOSF HCP to both reduce the risk of slope failure and ensure that landslides that may occur deliver woody debris to the aquatic system. Table 3-4 shows the landslide density associated with 100-year storm intensity as a function of stand age and slope.

TABLE 3-4
Landslide Density Associated with 100-Year Storm Intensity as a Function of Stand Age and Slope. Both the age of a stand and the slope steepness affect the likelihood of slide initiation during large storms.

Stand Age (years)	Landslide Density per Square Mile (steepest slopes)	Landslide Density per Square Mile (all slopes)
0 to 9	51	13
10 to 30	22	7
31 to 100	19	7
Greater than 100	26	13

Source: Robison et al. 1999.

Within the planning area there are also hundreds of deep-seated landslides, a few of which are active and many more that are prehistoric and presently not moving. Almost all of these examples were caused naturally, many probably initiated by large offshore earthquakes. However, some forest practices can affect the initiation and movement of these slides. These practices include large topographic modifications such as quarrying and stockpiling rock and creating large slope cuts or placing large amounts of fill material during road construction, especially along the bottom edges of these landslides. ODF mitigates these risks by assessing the landscape for the presence of deep-seated landslides and applies BMPs to avoid practices that might trigger their movement.

Goal: Soil Health

Maintain natural soil processes, protect soils from damage, and increase soil carbon and other nutrients.

Strategy: Soil Protection

Follow BMPs during forest operations, such as road building, timber harvesting, trail construction, and site preparation to ensure protection of soils against erosion and loss of organic materials and soil structure.

a. Use BMPs to protect against erosion and loss of soil structure during harvesting, site preparation, and road and trail construction, improvement, and maintenance. Evaluate and refine the effectiveness of BMPs through adaptive management.

b. Implement downed wood, snag, and leave-tree retention practices as specified in the WOSF HCP to recruit organic content into soils across emphasis areas.

Intent

The intent of this strategy is to plan and implement management activities that protect and maintain the organic content of soils on a landscape scale and to increase carbon, water, and nutrient storage. Management activities protect against erosion and loss of soil structure by using BMPs during harvesting, site preparation, and road and trail construction, improvement, and maintenance. The effectiveness of BMPs is evaluated and refined through adaptive management.

This strategy applies across emphasis areas. For example, in General Stewardship areas, downed wood, snag, and leave-tree retention practices contribute to recruitment of organic content into soils as those materials break down over time. In areas with an environmental emphasis, stands remain largely intact with harvest prescriptions designed to increase the growth of large trees that will eventually die and decay resulting in continual recruitment of organic material into the soil. In HCAs, passive management plays a role through natural disturbances such as insect and disease processes, windthrow, and mass-wasting along with regular trees growth and senesce. RCAs also build soil stability through continued recruitment of large woody debris, mostly through passive management, as trees in these buffer zones grow large and slowly senesce over time.

Goal: Slope Stability

Minimize and mitigate negative impacts on public safety, transportation infrastructure, and aquatic resources from landslides that may be triggered by management activities.

Strategy: Landslide Evaluation and Protections

Use the planning and assessment tools described under the Transportation System goal and the WOSF HCP strategies as described under the Functional Aquatic and Riparian Habitat Resources FMP goal.

Intent

The intent of this strategy is to reduce risks to people and resources associated with landslides while supporting beneficial ecological outcomes in appropriate scenarios.

3.2.9 Forest Resource 9: Carbon

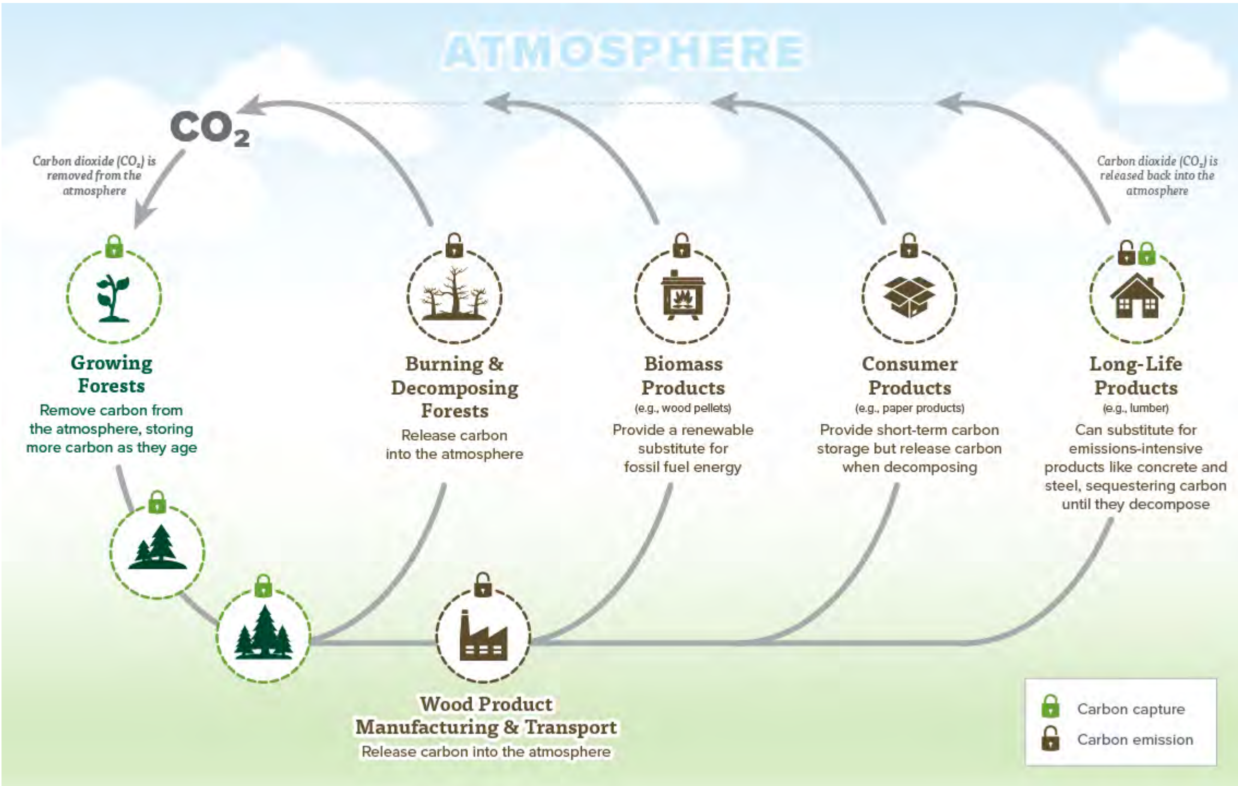
Growing trees sequester carbon. Forests provide long-term storage of carbon in trees, snags, downed wood, vegetation, and soils.
Credit: ODF.

Forests provide carbon storage and sequestration as ecosystem services. Carbon storage and sequestration help mitigate climate change by reducing the amount of greenhouse gases in the atmosphere. Greenhouse gas mitigation supports resilient forest ecosystems by assisting with slowing the pace of climate change and allowing systems to adapt to climate change consequences, such as droughts, extreme heat, wildfire, insect and disease outbreaks, and storms.

Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils (Figure 3-8).

Forests in the Oregon Coast Range and Western Cascades have the capacity to accumulate some of the highest densities of carbon on Earth through their productivity (Keith et al 2009). *Live trees* are the largest store of carbon (Table 3-5) and the component most affected by management via timber harvest and reforestation.

FIGURE 3-8
Paths of the Forest Carbon Cycle. Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils.



Source**: ODF.**

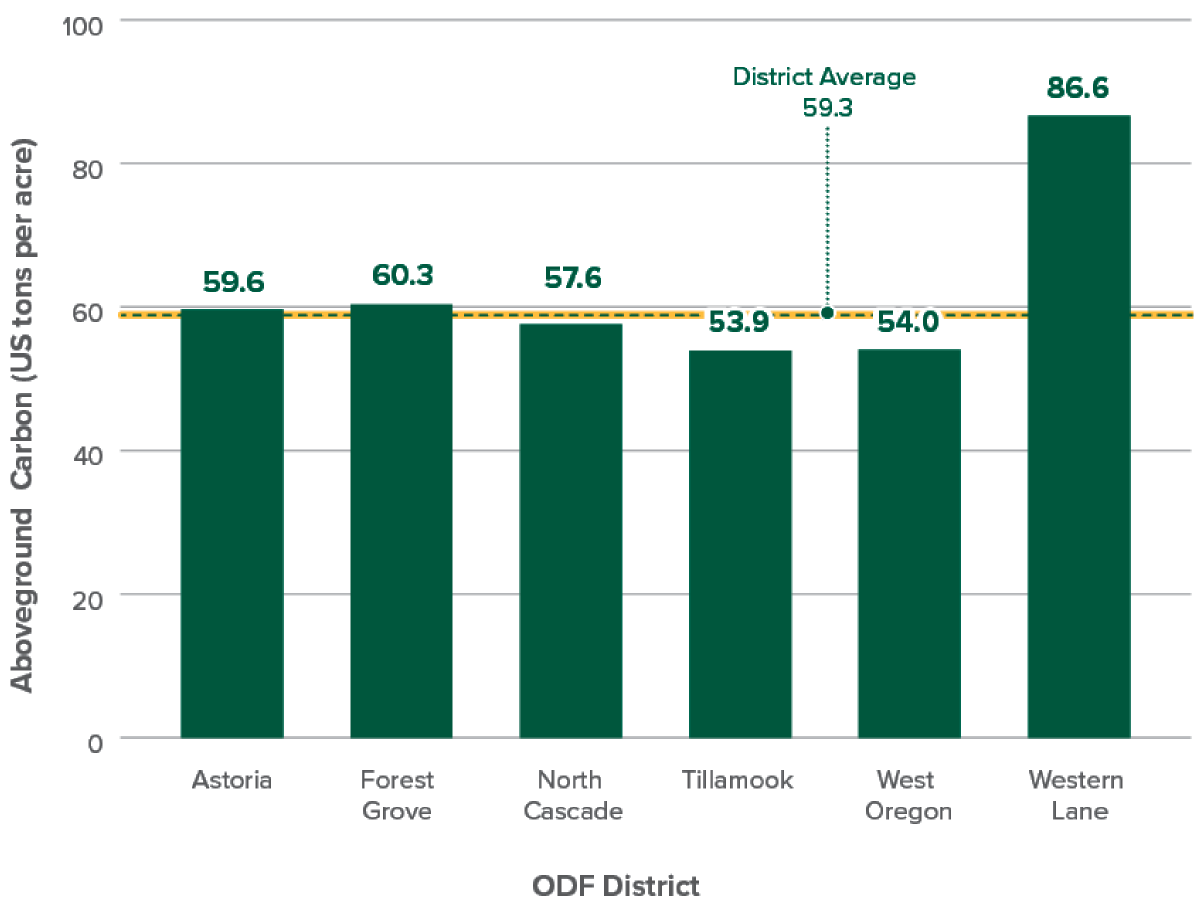
TABLE 3-5
Forest Carbon Pools. Approximate percentage of carbon stored in each pool on state forest lands in the Oregon Coast Range.

Forest Carbon Pools	Description	Percentage [a]
Live trees	Roots, bole, branches, bark, and foliage of live trees	44.8%
Standing dead trees	Roots, bole, branches, and bark of snags	2.5%
Fallen dead trees	Logs and large branches lying on the forest floor, larger than 3 inches diameter	6.6%
Forest floor	Litter, duff, and low vegetation	2.8%
Soil	Organic material, excluding coarse roots	43.3%

[a] Percentage calculation is from Forest Inventory and Analysis plots on ODF and other state-owned lands in the Oregon Coast Range.
Source: Christensen et al. 2019

Forests continue to sequester carbon as trees grow. Western Oregon state forests store an average of 59.3 tons of carbon per acre aboveground in live trees. Estimates of average aboveground carbon storage varies by district due to stand types, ecoregions, and management history (Figure 3-9).

FIGURE 3-9
Estimated Average Aboveground Carbon in Live Trees across ODF Districts. Data are based on the 2022 Forest Inventory and Analysis estimate on western Oregon state forests.



Note: Some data in this figure were collected prior to the 2020 Labor Day fires, estimated from plots measured in 2013–2022.
Source: USFS 2024.

Goal: Carbon Sequestration and Storage

Contribute to climate change mitigation through carbon sequestration and storage on state forest lands and in harvested wood products.

Strategy: Long-term Carbon Storage

Implement management activities that improve long-term carbon storage in the forest and in harvested wood products.

a. Consider carbon sequestration as part of IP development. This can be done through modeling carbon processes in forest activity planning, restoring underproductive timber stands, and passively managing forests with high carbon storage potential in HCAs and RCAs.

b. Include management options to promote adaptation to climate change in the management approach (Chapter 2, *Management Approach*, and Section 3.1.3, *Forest Resilience*). This includes managing stands to withstand drought and disturbances, maintain climate-adapted trees, and provide continuity of ecosystem services as the climate warms.

Intent

In alignment with the CCCP, the intent of this strategy is to promote climate change mitigation by integrating carbon sequestration and long-term carbon storage with other resource goals and strategies. Areas of land managed for timber production contain both trees that actively sequester and store carbon while they are growing, as well as trees that continue to store carbon when they are manufactured into wood products. Timber harvest results in a portion of sequestered carbon released back into the atmosphere through burning of fossil fuels during harvest operations and burning or decay of slash. Carbon stored in wood products can serve as short-term or longer-term storage depending on their use and longevity. Harvesting trees reduces carbon storage in the forest in the short term, but reforestation after harvest maintains a landscape of actively growing trees to sequester and store carbon as they age. HCAs and RCAs can also serve as long-term stores for carbon as a co-benefit of managing for late-seral forest habitat conditions.

Strategy: Carbon Monitoring and Markets

Model the impact of management on carbon sequestration and storage in forest planning, monitor carbon pools through time, and explore additional potential revenue sources from carbon markets.

a. Forecast and monitor carbon sequestration and storage.

b. Where compatible with other forest resource goals, participate in carbon offset markets to diversify revenue streams. Share revenues derived from ODF participation in carbon offset markets or other carbon finance products with county partners pursuant to ORS 530.110, as described in the *Timber Management* section.

Intent

The intent of this strategy is to have predicted and monitored carbon sequestration and storage as a key component of state forests' inventory to inform forest planning and report the long-term carbon storage in the forest and harvested wood products. Participation in carbon markets or exploring other carbon finance products can help diversify revenue sources for state forests management and provide additional revenue to counties and local taxing districts while supporting many other ecosystem services (e.g., air quality, wildlife habitat).

3.2.10 Forest Resource 10: Air Quality

A healthy and productive forest ecosystem provides clean air, which is an important ecosystem service that supports the health and wellbeing of Oregonians. In contrast, if air quality is poor, this has a negative impact on health, safety, and local and state economies. Wildfires and *prescribed burns* can adversely affect air quality. Advanced planning and consideration of best burning practices during prescribed burns protect air quality and the associated health risks to the public.

Air quality is regulated under the federal *Clean Air Act*, the primary law regulating air quality. Under the law, the U.S. Environmental Protection Agency (EPA) sets the National Ambient Air Quality Standards (NAAQS). In Oregon, the Oregon Department of Environmental Quality (DEQ) develops and carries out the *State of Oregon Clean Air Act Implementation Plan* (OAR 340-200-0040) to meet the NAAQS. This State Implementation Plan also includes the Oregon Regional Haze Program (OAR 340-223), which protects visibility in *Class I areas*. Class I areas include national parks and certain wilderness areas (OAR 629-048-0005(5)).

Mount Jefferson as seen from the Santiam State Forest on a high visibility day.
Credit: ODF.

Timber harvest results in a large quantity of slash. This material is an important pool of carbon, serves as an input of organic matter to soil, and provides habitat for a variety of organisms. In some cases, this leftover slash can be a barrier to tree planting, increase fire risk, and increase the potential for pest infestations (Buhl et al. 2021). Where the quantity and distribution of slash impedes achieving management goals, prescribed burns may be used as a tool to mitigate the impacts of slash accumulation.

ODF regulates prescribed burning on all forest lands in Oregon, including federal, state, and privately owned lands through the *Oregon Smoke Management Plan* (OAR 629-048). Some of its objectives are to protect public health, minimize smoke intrusions into designated population areas, reduce emissions from prescribed burning in western Oregon, and comply with state and federal air quality and visibility requirements.

Current annual levels of burning on state forest lands represent less than 10% of the total burning annually on all ownerships west of the Cascade Crest. Prescribed burning on state forest lands is estimated to contribute much less than 1% of the air pollution in western Oregon cities (ODF 2021b).

Goal: Air Quality

Maintain and protect healthy air quality.

Strategy: Smoke Management

Follow Smoke Management rules (OAR 629-048) and the *State of Oregon Clean Air Act Implementation Plan* (DEQ 2022), which includes planning guidance, visibility objectives, and BMPs, as well as information on regulated and sensitive areas and special protection zones to reduce smoke and smoke-related consequences.

Intent

The intent of this strategy is to minimize the public's health risks related to smoke from prescribed burning by encouraging the minimization of emissions and the avoidance of smoke intrusions.

Strategy: Slash Management and Alternative Burning Practices

Treat slash and debris in manners other than burning, when feasible.

a. Retain slash in harvest units where fire risk is low and complimentary to other forest resource goals (e.g., Soil Health)

b. Explore cost-effective alternatives to burning, such as selling to small-diameter timber markets, using high-efficiency incinerators, and exploring methods of converting slash to other uses, such as biofuels or *biochar*.

Intent

The intent of this strategy is to minimize the public's health risks from prescribed burning by minimizing emissions and avoiding smoke intrusions.

3.2.11 Forest Resource 11: Aquatic and Riparian Resources

Juvenile coho salmon (*Oncorhynchus kisutch*). Aquatic and riparian ecosystems provide essential habitat and resources for many species, including food and drinking water for humans *(Homo sapiens)*.
Credit: Wild Salmon Center.

Resilient and properly functioning aquatic and riparian ecosystems provide many co-benefits that support GPV. In addition to environmental benefits, social activities such as fishing, swimming, and sightseeing depend on healthy, functioning waterways. For example, the commercial and recreational fishing industry, which is a significant component of Oregon's regional economy, relies on healthy rivers and streams. Properly functioning aquatic and riparian systems also protect drinking water quality and quantity by reducing erosion, regulating air and stream temperatures, and replenishing groundwater supplies. Aquatic resources include, but are not limited to, surface waters such as rivers, streams, lakes, springs, and *wetlands*, and subsurface waters contained in aquifers or subsoils. Riparian areas are transitional zones between terrestrial and aquatic environments where the vegetation and microclimates are influenced by year-round, or seasonal water and soils that are saturated by flowing surface water for all or portions of the year.

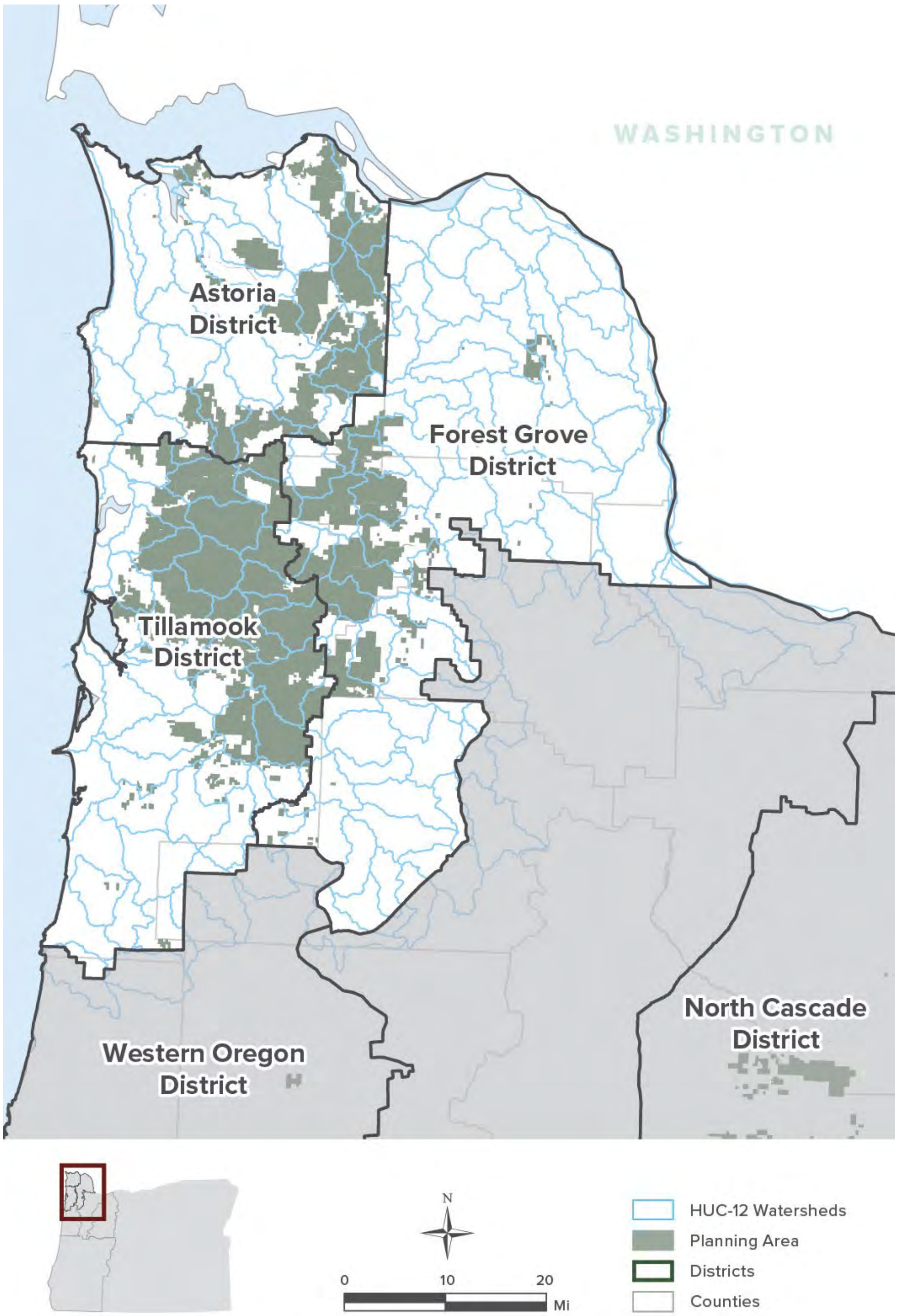
Properly functioning riparian areas provide important ecosystem benefits and contribute to shading of surface waters that regulate water temperatures, bank stabilization, and enhanced water quality by filtering of water pollutants. Removal of riparian vegetation can increase water temperature and have cascading effects on water quality and quantity that negatively affect native aquatic species, recreation, and domestic drinking water. Natural disturbance in riparian areas such as high flow events, windstorms, debris flows, and other ecological processes create complex aquatic habitats by contributing woody debris, creating suitable fish spawning areas, and depositing organic materials that maintain properly functioning stream ecosystems.

Properly functioning riparian areas provide important ecosystem services, including creating complex habitats and regulating water quality.
Credit: Erik Moberly, ODF.

Climate change models predict a rise in air and stream temperatures resulting in disrupted precipitation and streamflow, creating significant challenges to native aquatic species and their habitats. Changes may not occur evenly in all habitats or through time, but the occurrence of less-suitable environmental conditions for native species may increase overall.

Maintaining and enhancing the functional components of aquatic ecosystems relies on strategic long-range planning and adaptive management approaches that focus on reducing the vulnerability of native aquatic species and their habitats to climate change. Aquatic enhancement projects support the persistence of native aquatic species by maintaining and restoring aquatic and riparian habitats to address impacts from climate change. Projects are prioritized to increase resistance to and resilience against the expected effects of climate change to achieve the greatest benefits to native aquatic species. In addition, ODF supports the implementation of aquatic enhancement projects through partnerships with local and regional stakeholders in the planning area. ODF's ability to directly influence aquatic conditions are tied to the portion of watershed it manages. Most of the subwatersheds with substantial ODF ownership are in the North Coast Districts as shown in Figure 3-10.

FIGURE 3-10
Watersheds Overlapping with North Coast Districts and the Planning Area. The median percentage of ODF-managed lands in northwest districts by HUC-12-sized [a] subwatersheds is 26% (range <1% to 100%).



[a] Hydrologic Unit Code (HUC)-12 subwatersheds are the smallest-sized watershed delineated by the U.S. Geological Survey.

Classification of Waters for Protection

The FPA Water Protection Rules classifies waters by matching the physical characteristics and beneficial uses of a water body to a set of appropriate protection measures, in compliance with state regulations intended to meet the Clean Water Act (OAR 629-635-0200; DEQ 2021, 2018). Stream classification is based on flow permanence, fish presence, permitted private and public domestic water use, and average annual flow. For purposes of protection, streams are classified into five beneficial categories including fish use, non-fish use, perennial, seasonal, and domestic water use. Streams are also further classified by a waterbodies size including small, medium, and large. For purposes of classification, a stream is considered to have domestic water use only if a water use permit has been issued by the Oregon Water Resources Department (OWRD).

Aquatic and Riparian Habitat Conditions

Aquatic and riparian ecosystems occur adjacent to one another and have been shaped over time by human and natural disturbances. Physical habitat assessments conducted by ODFW indicated a lack of large wood in streams and large conifers in riparian areas compared to ideal large wood requirements (ODFW 2019). This is a result of the planning area's history of large fires, past logging practices, and in-stream large wood removal practices, resulting in younger riparian forests and a lack of large wood in streams and many riparian areas. Larger riparian buffer protections and an active stream restoration program during recent decades have begun to improve degraded historic conditions on aquatic and riparian ecosystems in the planning area.

ODF implements stream enhancement projects to improve the health of aquatic ecosystems benefit native aquatic species.
Credit: ODF.

Threatened or Endangered Species and Species of Conservation Concern

Numerous native aquatic species occur either in the planning area or adjacent to state forest lands. These include distinct populations of coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), and chum salmon (*Oncorhynchus keta*), all of which are listed as threatened under the federal Endangered Species Act (ESA) or are under review for listing. Additionally, several native aquatic amphibians, such as torrent salamanders (*Rhyacotriton* spp.) and coastal tailed frog (*Ascaphus truei*) also occur in the planning area. Many of these are also under review for federal listing or are designated as sensitive species in the *Oregon Conservation Strategy* (ODFW 2016).

ODF's species of concern policy and associated species list was developed in 2010 and updated in 2025 and is used for identifying strategies for managing habitat for these species. The policy identifies aquatic and terrestrial species that need immediate and focused conservation efforts and informs the development of conservation tools. The species list was established from multiple sources including federal and state lists of threatened, endangered, and *candidate species*, as well as the *Oregon Conservation Strategy* (ODFW 2016) and ODFW's sensitive species list (ODFW 2021). The policy and associated list are updated as needed and captured in IPs as state and federal lists are updated, or as new data or science become available.

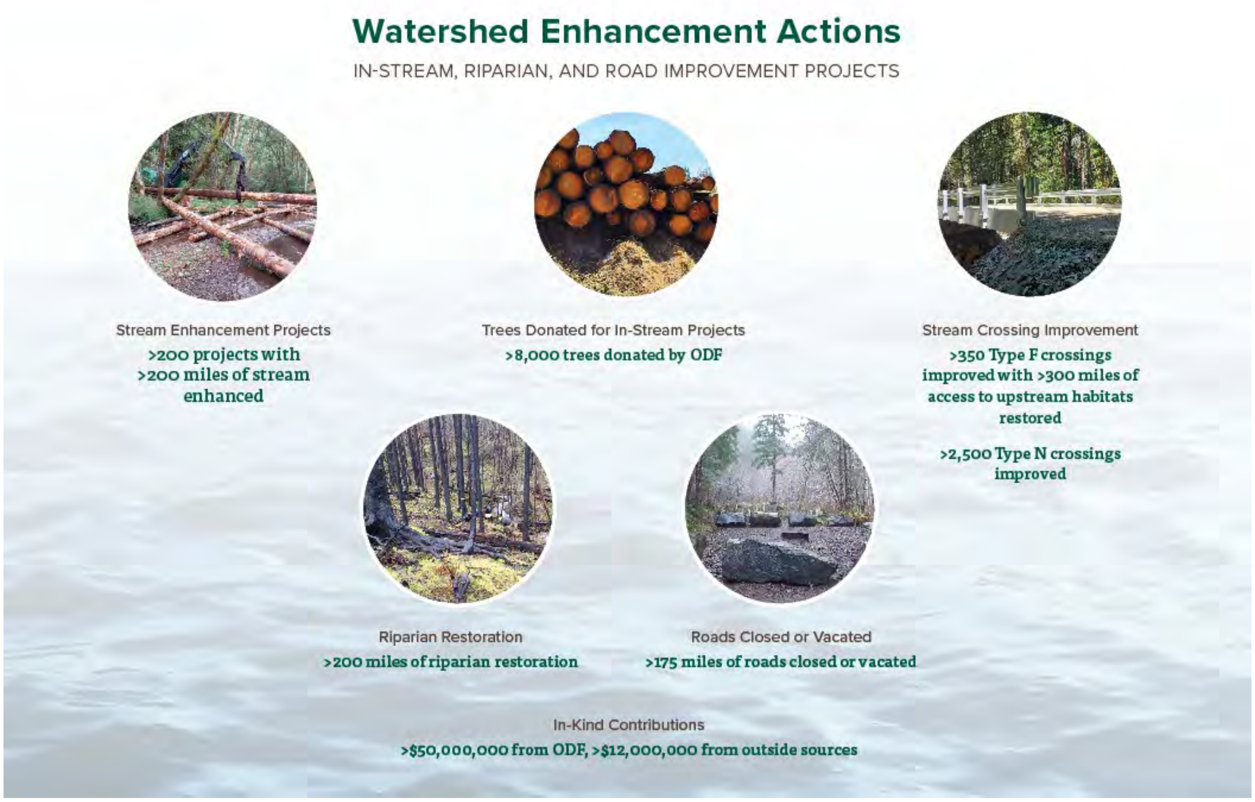
Aquatic Habitat Enhancement

Culvert replacements like this one on Warner Creek (Astoria District) improve aquatic organism passage and restore habitat connectivity.
Credit: ODF.

Aquatic habitat enhancement projects focus on restoring ecosystem functions and accessibility for native aquatic species. The placement of appropriately sized wood in streams, addressing fish passage barriers, riparian planting, and road/trail improvement or vacating are examples of projects that restore properly functioning fish habitat, fish passage, and water quality conditions. ODF is committed to enhancing aquatic habitats and has implemented thousands of aquatic habitat enhancement projects over the past few decades.

The Oregon Watershed Enhancement Board (OWEB) maintains the most comprehensive online reporting system to track projects that improve habitat for native aquatic and terrestrial species. The most current information can be found on the Oregon Watershed Restoration Inventory website managed by OWEB. Activities on state forest lands that contribute to *watershed restoration projects* (as defined by OWEB) include projects that improve in-stream habitat, as well as and road-related projects that provide aquatic organism passage, disconnect road-drainage systems from streams, and minimize sediment delivery to streams (Figure 3-11). For more information on the condition of road-stream interactions, see Forest Resource 2: *Transportation*.

FIGURE 3-11 Watershed Enhancement Actions. In-stream, riparian, road improvement, and donations tracked by OWEB, 1995–2025.



Drinking Water

An important component of aquatic and riparian area management includes the protection of permitted private and public water supplies. Stream ecosystems are dynamic and can experience fluctuations in water quality and quantity due to natural and human factors. Forest management activities can affect the quality, supply, and storage of this key ecosystem service through various mechanisms. Currently, there are 125 permitted private or public domestic points of diversion on and adjacent to state forest lands in six districts with Tillamook and Astoria Districts having the most (OWRD 2023).

EPA provides federal oversight and approves water quality standards that are used to assess whether the quality of Oregon's rivers and lakes is adequate for drinking water and other beneficial uses such as recreation and fisheries. The Clean Water Act requires states to adopt water quality standards designating beneficial uses of the state's waters, including drinking water, and to set criteria designed to protect those uses. Surface and groundwater quality standards are regulated by DEQ.

Any forest operations on forestlands within the state must be conducted in full compliance with the rules and standards of the Environmental Quality Commission related to air and water pollution control (ORS 527.724). ODF is a Designated Management Agency for discharges of pollutants from *non-point sources* from forest operations, such as sediment from forest roads (OAR 340-042-0080(2)). The FPA contains rules that regulate harvest practices, road construction and maintenance, and the use of chemicals and other petroleum products on state forest lands to minimize the likelihood of management activities adversely affecting water quality. Forest operations are also subject to other laws and rules administered by state agencies to protect the beneficial uses of waters of the state.

Goal: Functional Aquatic and Riparian Habitat Resources

Protect, maintain, and enhance aquatic and riparian systems that support native aquatic and riparian species.

Strategy: Aquatic and Riparian Habitat Improvements

c. Limit management activities in RCAs as described in the WOSF HCP.

d. Plan forest management activities that protect, maintain, and enhance riparian habitat function.

e. Design aquatic habitat enhancement projects that restore in-stream habitat processes, features, and complexity.

f. Manage stream temperatures by planting trees and riparian plants as needed to improve stream shading.

g. Plant species favored by American beaver (*Castor canadensis*) in appropriate locations to promote dam construction that improves aquatic condition and function.

h. Control the introduction and establishment of non-native plant species.

Intent

The intention of this strategy is to promote properly functioning and resilient in-stream and riparian habitats for native fish and wildlife species. Riparian management strategies, detailed in the WOSF HCP, ensure ecosystem processes and resilience are maintained to support increased stream shading, contributions of organic matter, sediment trapping and chemical filtration, and bank stabilization. Biological and ecosystem responses resulting from riparian management strategies, such as moderating and reducing fluctuations in water temperatures, large wood inputs, reducing sediment delivery, and resilience to climate-driven stressors and disturbance events effectively improves water quality and creates suitable habitats for native fish and wildlife species.

Stream enhancement projects increase the quality and quantity of important habitat elements such as pools, spawning gravels, and off-channel habitats creating more productive rearing, spawning, and refugia habitats for aquatic species. Biological and ecosystem responses resulting from stream enhancement projects, such as increased growth and survival rates, reproductive success, and resilience to climate-driven stressors and disturbance events, increase overall aquatic species production in the planning area.

Strategy: Aquatic Organism Passage

Maintain and improve stream-crossing structures like culverts and bridges, to support native aquatic species, improve hydrologic processes, and increase stream connectivity.

a. Follow a prioritization process for stream-crossing upgrades based on physical and biological elements.

b. Identify and evaluate stream-crossing upgrades and end-of-life replacements as part of the IP process and/or in collaboration with local and regional partners.

c. Design and maintain all new and replacement fish passage projects to meet or exceed state and federal fish passage criteria.

Intent

The intent of this strategy is to ensure stream-crossing structures provide unimpeded upstream and downstream passage to maintain habitat connectivity for native resident and *anadromous* fish and other aquatic organisms while providing sufficient transport of expected flows, woody debris, and other materials. Reconnecting fragmented aquatic habitats allows fish to access previously blocked spawning and rearing habitat, promotes biodiversity and genetic flow, supports nutrient cycling, and acts as refugia from warmer downstream water temperatures and high-water events.

Strategy: Headwater Processes

Maintain the hydrologic, *geomorphic*, and ecological processes of *headwater* systems that shape the physical and biological communities of aquatic and riparian ecosystems.

d. Support the long-term addition of woody debris, coarse and fine sediment, nutrients, and other organic materials to aquatic and riparian ecosystems over time.

e. Minimize direct impacts from forest management activities.

f. Acquire greater scientific understanding of rare and *endemic species* occurrences and habitat use in headwater streams.

Intent

The intent of this strategy is to protect the critical ecological functions of headwater systems. Headwater streams comprise most of the overall length of the stream networks in the planning area. Their critical ecological functions include trapping sediments and pollutants, which result in improved water quality and sustain the health of the entire watershed. Headwater streams also capture large amounts of organic matter and nutrients, which support healthy microbial communities and populations of macroinvertebrates, which, in turn, support production of fish and wildlife species downstream. In most cases, headwaters are fed by groundwater, which provides unique cold-water refugia for many aquatic species.

Strategy: Landslide Processes

Protect landslide-prone areas to reduce the risk of landslides triggered by management activities and ensure that landslides that do occur contain large wood, in order to reduce adverse impacts of landslides on water quality and aquatic habitat and promote development of downstream physical habitat and biological communities of aquatic and riparian ecosystems.

a. Protect slope features that are potential sources of debris flows using the steep slope strategies detailed in the WOSF HCP.

b. Facilitate landslide processes that contribute to the development of complex aquatic and riparian habitats.

Intent

The intent of this strategy is avoid triggering landslides and to promote the delivery of woody debris, course sediment, and other organic materials to aquatic systems that facilitate the creation of complex habitats for aquatic species and recycle fresh minerals and nutrients back into the ecosystem where landslides occur. The assessment of slope hazards and the potential for delivery uses the best science, professional expertise, and field observations to assess risk of failure.

Strategy: Wetlands and Lakes

Maintain the ecological function and value of wetlands and lakes.

a. Avoid and minimize disturbances to soil conditions, bank stability, and drainage patterns during management activities.

b. Apply appropriate live tree, vegetation, and snag and downed wood retention measures consistent with the FPA.

Intent

The intent of this strategy is to protect and maintain the unique hydrological and habitat functions of wetlands and lakes such as sediment trapping, nutrient absorption, flow regulation, and groundwater recharge. Intact and functional wetlands and lakes provide vast amounts of resources for resident and migratory fish and wildlife species and are home to various endemic flora and fauna. Minimizing disturbances to vegetation, live trees, snags, and downed wood, and preventing the drainage or alteration of wetlands and lakes provides invaluable benefits to aquatic and terrestrial species that rely upon the functionality of these unique habitat features on the landscape.

Strategy: Threatened and Endangered Species and Other Species of Conservation Concern

Protect, maintain, and enhance habitat structure and function for threatened and endangered species and other *species of conservation concern*.

a. Comply with state and federal ESA requirements, recovery plans, and implementation of WOSF HCP conservation actions.

b. Adopt management approaches that contribute to the survival and recovery of threatened and endangered species and other species of conservation concern.

c. Conduct species assessments during IP development and related revisions to determine which species warrant special consideration and whether existing conservation measures are adequate.

d. Collaborate across ownership boundaries to meet common aquatic conservation goals.

Intent

The intent of this strategy is to contribute to the recovery and long-term persistence of threatened, endangered, and other species of conservation concern by complying with state and federal ESA requirements. Implementation of this strategy and conservation actions identified in the WOSF HCP ensure that aquatic and riparian habitats are managed in a way that meets all legal requirements and that listed and imperiled species persist in the planning area. Determining whether conservation actions, as described in the WOSF HCP, are contributing to species recovery is addressed through effectiveness monitoring. Staying informed about potential future ESA candidate species or other species of conservation concern helps plan for future habitat conservation requirements.

Strategy: Partnerships

Promote and support partnerships with state and federal government agencies, Tribal Partners, academic institutions, non-governmental organizations, adjacent landowners, and the forest industry to plan and implement aquatic and riparian habitat improvement and effectiveness monitoring projects.

a. Collaborate with local stakeholders and regional partners to develop and implement watershed planning initiatives and strategic action plans.

b. Implement conservation actions that benefit native aquatic and riparian habitats.

Intent

The intent of this strategy is to protect and enhance aquatic and riparian habitats through voluntary and mutually beneficial partnerships. Collaborative processes create greater alignment of each stakeholder's vision and responsibilities associated with planning and implementing complex ecological outcomes than those achieved by a single organization. Partnerships with stakeholders holding different regulatory authorities allow for more efficient navigation of multi-layered regulatory landscapes, improve compliance efficiency, and accelerate project timelines. Leveraging financial resources, promoting sound science and data sharing, and providing professional expertise and guidance provide partnerships the ability to enhance larger areas rather than fragmented patches across the planning area.

Goal: Water Quality and Quantity

Protect, maintain, and enhance water quality and quantity for native fish and wildlife species and permitted private and public domestic drinking water sources.

Strategy: Water Quality Standards

Ensure state and federal water quality standards support the beneficial uses of waters of the state.

a. Limit forest management activities in RCAs as detailed in the WOSF HCP.
b. Improve road and trail system drainage to avoid transporting fine sediments and contaminants from roads and trails to streams.
c. Establish measurable goals to meet state and federal water quality standards.
d. Support research and monitoring to better understand the interactions between forest vegetation conditions and water quality.

Intent

The intent of this strategy is to minimize adverse impacts on water quality through conservation actions detailed in the WOSF HCP. Management standards that are designed to maintain and improve water quality through reducing sediment inputs to streams, reducing stream temperatures, and reducing erosion support healthier ecosystems that contribute to high-quality aquatic habitats for fish and other species. Degraded water quality can have detrimental effects on metabolism and growth, reproduction, and disease resistance often resulting in reduced production and survival of aquatic organisms.

Strategy: Total Maximum Daily Loads

Ensure Total Maximum Daily Load (TMDL) standards are met to maintain and restore water quality.

a. Control water pollution and improve impaired waterways by limiting management in RCAs as detailed in the WOSF HCP and applying BMPs for transportation system and forest management.
b. Monitor forest management activities that have the potential to contribute pollutants to waterways and implement mitigative measures where necessary.

Intent

The intent of this strategy is to reduce non-point source pollution from waters of the state through reducing pollutants identified in TMDL IPs that direct management strategies. Conservation actions identified in the WOSF HCP protect and improve impaired waters of the state by reducing solar radiation and sediment inputs into streams, support in-stream enhancement projects, and adhere to BMPs and other pollutant control measures associated with forest management activities.

Strategy: Drinking Water

Protect forest drinking water sources for permitted private and public domestic drinking water use.

a. Ensure permitted domestic drinking water sources are integrated into planning forest management activities.
b. Limit forest management activities in RCAs.
c. Hydrologically disconnect road and trail systems from streams.

d. Ensure chemical application on state forests complies with the FPA and EPA labeling to prevent harm to human health, non-target vegetation, and other forest resources.

e. Engage with local community members to communicate drinking water protection approaches and provide information regarding planned forest management activities.

Intent

The intent of this strategy is to minimize sediment and pollutants from entering streams that overlap with permitted private and public domestic drinking water sources. Reducing organic and inorganic pollutants from entering streams and adversely affecting water quality is be achieved through conservation actions detailed in the WOSF HCP and Division 620 of the FPA reducing the costs associated with treatment and public safety risks.

3.2.12 Forest Resource 12: Wildlife

Blacktail deer near Roseburg, Oregon. Many species of wildlife are found in Oregon's state forest lands.
Credit: ODF.

Like aquatic and riparian resources, management of wildlife habitat contributes to resilient forest ecosystems and GPV. Protecting and enhancing wildlife habitat not only sustains the wildlife communities themselves but also the social and economic benefits derived from them. Abundant wildlife enhances recreation, subsistence, and cultural activities such as bird-watching and hunting. These activities contribute to the local tourism economy and tax revenues from licensing fees.

Habitat Condition

The amount and quality of habitat for different species results from interactions between natural processes and management history. Environmental gradients, underlying geology, species distributions, and natural disturbance have always provided for variability in vegetation types across state forest lands in western Oregon. Extensive disturbances, such as wildfire and windstorms, also influence habitats. Disturbances over smaller areas, such as insect and disease outbreaks, create spatial heterogeneity within and among individual forest stands.

As described in Section 3.1.1, *Forest Condition*, many of the state forest lands in western Oregon have a legacy of repeated, large wildfires or had been extensively logged prior to acquisition by the State. Managing the current landscape for multiple values including timber production, forest health, aquatic systems, and wildlife habitat has ultimately produced a complex mosaic of stand types and ages and within-stand habitat features. The variety of stand types resulting from ODF's management of state forest lands provide well-dispersed diverse habitat across the landscape at regional scales, and broad *connectivity* to and between older forests on federal lands, as well as habitats where comparatively little other public forest lands exist (e.g., on the North Coast including the Tillamook and Clatsop State Forests). Young stands and associated early-seral characteristics are important for diverse game and non-game wildlife species, including many species of state or federal concern (Swanson et al. 2014). Older stands foster and support a variety of late-seral associates, such as northern spotted owls (*Strix occidentalis caurina*), marbled murrelets (*Brachyramphus marmoratus*), and red tree voles (*Arborimus longicaudus*). Forests in mid-*seral stages* (e.g., 30–80 years old) provide habitat for most native forest species, including early and late-seral associates, and enhance broader landscape function (Swanson et al. 2014). Current ODF forest inventory data document the age class distribution of state forest lands and provide insight into the range of habitat types provided in them (Section 3.1.1, *Forest Condition*).

Additional variation in stand composition and structure due to stand development, management history, site productivity, topography, region, and numerous other factors contribute to diversity across spatial scales. For example, rare or unique habitats, such as talus slopes and caves, add to landscape diversity, the broader ecological function, and resilience. There is considerable variation both within and among districts in the relative proportions of tree age classes and associated habitat types on the landscape. Individual species use different stand types and habitat features at varying spatial scales. Thus, state forest lands provide for diverse habitat across the landscape. Recent harvest practices in young stands have promoted high-quality, complex early-seral habitat. This is important because complex early-seral habitats can support a diverse and unique array of wildlife species from insect pollinators and insect-eating songbirds, to hunting opportunities for forest raptors along *edges* adjacent to older forest stands. When adequate numbers of snags are retained in harvested units, young forest habitats can provide denning and nesting cavities for sensitive species, such as fisher (*Pekania pennanti*), ringtail (*Bassariscus astutus*), purple martin (*Progne subis*), and western bluebird (*Sialia mexicana*).

Large-diameter snag previously used as a black bear den, as evidenced by the numerous claw and bite marks surrounding the cavity's entrance.
Credit: ODF.

Mid-seral stands are highly variable in habitat structure and function depending on natural disturbance, management history, and other factors, but all provide some degree of habitat to meet various needs of native wildlife species; they also provide connectivity between other habitat types and across the landscape. Mid-seral habitat can provide for dispersal and foraging habitat for resident raptors, as well as cover and overall landscape connectivity for movement of forest carnivores and herbivores. Terrestrial salamanders can also be supported in early and mid-seral landscapes where adequate downed wood is retained (Kluber et al. 2008).

Late-seral habitats provide for associated wildlife when arranged in a manner that maximizes interior forest, reduces edge effects, and minimizes the distances between *patches* to maintain connectivity. The recruitment and retention of large-diameter snags and downed wood is key for all seral stages and patch sizes across the landscape.

ODF forest inventory data indicate a lack of habitat on state forests to support old forest-adapted species, such as northern spotted owls and marbled murrelets. Approximately 87% of state forest lands are less than 80 years old. In general, the districts in the central and southern Oregon Coast Range and the Santiam State Forest have a greater proportion of total acreage in older stands. The Tillamook and Clatsop State Forests have comparatively little older forest, largely because of the extensive fires and logging that occurred prior to state acquisition. Despite large improvements in habitat diversity and quality since then, the state forests' habitat story remains one of restoration, rehabilitation, and enhancement in a young forest landscape (Figure 3-1).

General Wildlife Species

Western Oregon state forest lands currently have habitat suitable for most native species found in forests of the Oregon Coast Range and Western Cascades. Vertebrate species known or suspected to be found on, adjacent to, or in some cases, downstream of, state forest lands in both aquatic and terrestrial environments include approximately 270 species, including 63 mammals, 147 birds, 32 amphibians and reptiles, and 28 fishes. This excludes the many species of marine fishes, birds, and mammals that may be found in the estuaries adjacent to state forest lands, unless they use state forest lands for some portion of their life.

Wide-ranging mammals such as deer (*Cervida*e), elk (*Cervus canadensis roosevelti*), American black bear (*Ursus americanus*), cougar (*Puma concolor*), and bobcat (*Lynx rufus*) use a variety of habitats in and near state forest lands to meet their needs. Forest stands are host to most native weasel species (*Mustelidae*), skunks (*Mephitidae*), squirrels (*Sciuridae*), voles (*Microtus*), mice (*Mus*), and other forest-floor small mammals. Native resident and migratory songbirds and raptors, including rare and sensitive species, are present on state forest lands. Upland game birds, such as grouse (*Tetraoninae*), quail (*Odontophoridae*), and Rio Grande wild turkeys (*Meleagris gallopavo intermedia*) are also present. Resident and migratory waterfowl and other aquatic birds depend on riparian, aquatic, and wetland habitats within state forest lands. Mammals such as river otters (*Lontra canadensis*) and American beavers make almost exclusive use of these habitats. Many amphibians are associated with aquatic habitats, such as tailed frog (*Ascaphus*) and torrent salamanders. Other amphibians use terrestrial habitats and are strongly tied to the abundance and quality of downed wood, such as plethodontid salamanders (Oregon slender salamander [*Batrachoseps wright*] and clouded salamander [*Aneides ferreus*]). Many birds, reptiles, and some mammals use rocky habitats (including caves or rock outcrops) for a variety of

Aquatic Habitat Modified by American Beaver Damming Activity Benefits a Multitude of Aquatic and Terrestrial Wildlife Species.
Credit: ODF.

their needs. Bats (*Chiroptera*) make use of many structures throughout the forest for roosting and hibernation and forage over nearby aquatic habitats.

Threats to wildlife on state forest lands include poaching, illegal dumping, habitat destruction and modification from management activities or public misuse, and extreme natural disturbances. Many of these issues can be addressed via forest planning and management in collaboration with other agencies and stakeholders. The long-term effects of climate change on wildlife are more difficult to assess and address by management. Changes in temperature, precipitation, and other aspects of climate are will likely to alter the quantity and quality of many species' habitats.

The overarching goal of ODF's strategies for wildlife is to protect, maintain, and enhance habitat for native wildlife species. Restoration and enhancement needs exist where fire and subsequent salvage logging or reforestation have reduced the extent or quality of habitat for some species (e.g., in the Tillamook Burn). Vegetation complexity and old forest features, in particular, take many decades to develop through both passive and active management. While moving the landscape toward more diverse habitat conditions, some individual species of conservation concern, and their habitats may require special consideration.

Species of Conservation Concern

Species of conservation concern are wildlife species whose long-term persistence is at risk due to declining populations, rarity, or other factors (e.g., having a limited range). There are many species of conservation concern that are not protected by federal or state ESAs including birds, bats, and aquatic amphibians. Habitat needs vary for each species; some of these species are associated with late-seral habitats, others (e.g., flycatchers and warblers) are associated more with complex early-seral habitats, and some (e.g., bats) are associated with more specific habitat elements like suitable roost structures or hibernacula. Some species, such as coastal marten and Pacific fisher, appear to be missing from forests in the region although habitat for the species seems to be present. State and federal managers and the public recognize the importance of conserving these species to aid in maintaining ecological integrity and biodiversity.

Numerous public and private entities designate wildlife species of conservation concern, from local to global scales. The U.S. Fish and Wildlife Service, U.S. Forest Service, and U.S. Bureau of Land Management publish relevant lists for the Oregon Coast Range and Cascade Mountains Districts. At the state level, ODFW and the Oregon Biodiversity Information Center (ORBIC) (formerly Oregon Natural Heritage Program) publish statewide and county lists. ODF's species of conservation concern list was developed with federal and state lists of threatened, endangered, and candidate species, as well as species not protected by federal or state ESAs but included in the *Oregon Conservation Strategy* (ODFW 2016) and ODFW's sensitive species list (ODFW 2021). These documents identify species that need immediate and focused conservation efforts. The list is a component of ODF's species of conservation concern operational policies and is updated semi-regularly and is captured in IPs as state and federal lists are updated or new data or scientific understanding become available.

There are many species of conservation concern that are not protected by federal or state ESAs including birds, bats, and aquatic amphibians. Habitat needs vary for each species; some of these species are associated with late-seral habitats, others (e.g., flycatchers and warblers) are associated more with complex early-seral habitats, and some (e.g., bats) are associated with more specific habitat elements like suitable roost structures or hibernacula. Species of conservation concern identified as part of this FMP's associated policies are currently present or have the potential to be present on state forest lands.

Threatened or Endangered Species

Forest management activities must comply with all federal and state laws, including those related to the protection and conservation of wildlife populations and their habitat (e.g., state and federal ESAs, federal Bald and Golden Eagle Protection Act, federal Migratory Bird Treaty Act, FPA). Although many laws apply to the management of state forest lands, legal requirements for protection of threatened or endangered species can have significant effects on planning and operations. The WOSF HCP describes the status and occurrence of three wildlife species listed under state and federal endangered species protection acts, and how management operations are conducted to protect them. These species include northern spotted owl, marbled murrelet, and coastal marten. Threatened or endangered fish species are discussed under *Forest Resource 11: Aquatic and Riparian Resources*.

Coastal marten captured with a wildlife camera on the southern Oregon coastline.
Credit: ODF.

ODF has an extensive survey history for ESA-*listed species* (i.e., northern spotted owls and marbled murrelets) and continues to monitor activity at known sites on an annual basis. ODF, in various capacities over time, has supported research related to habitat relationships of numerous species (e.g., deer, elk, owls, murrelets, early-seral birds, tree voles) and wildlife responses to forest management practices. (songbirds, small mammals, amphibians). Some species may be present that have not been detected or documented yet (e.g., coastal marten), while other listed species are not currently known to be present but could become re-established as a result of habitat improvements, regional population recovery, or potential re-introductions (e.g., Oregon spotted frog).

Goal: Wildlife

Maintain, protect, and enhance functional and resilient landscapes that provide the variety and quality of habitat types and features necessary for long-term persistence of all native wildlife species.

Strategy: Habitat Diversity

Manage for diverse habitats across the landscape and over time.

a. Manage for a diverse array of seral stages.

b. Protect, maintain, and enhance habitats that account for the range of forest types topography (slopes, aspects, elevations), and habitat features at the district level.

c. Identify and protect rare and unique habitats, particularly those that are fragile, sensitive, or potentially vulnerable to climate change.

Intent

The intent of this strategy is to conserve and enhance diversity as it promotes resilience and ecosystem function, which provides for many ecosystem services (e.g., pest control, pollination) and co-benefits (hunting, fishing, birding, existence value). Managing for diversity helps ensure the full suite of habitats for native wildlife persist on the landscape in spite of short-term disturbances or chronic perturbations.

HCAs provide the majority of late-seral stands and the total amount of late-seral forest increases therein over time. Early- and mid-seral stands exist both inside and outside of HCAs and contribute to the diversity of habitat types on the landscape. Treatment of 30,000 acres of SNC and hardwood-dominant stands over the first 30 years of the WOSF HCP permit provides a complex early-seral component in HCAs that is positioned to mature into diverse mid-seral habitat by the end of the WOSF HCP permit term. RCAs and leave-tree strategies provide for some older habitat components outside of HCAs. Operationally limited areas contribute to diversity and older age classes outside of HCAs. HCAs are designed to account for the range of forest types and topography and most habitat features at the district level. Rare, unique, and otherwise vulnerable habitat types and features outside of HCAs can be addressed with focused strategies (e.g., bat hibernacula) and other policies (e.g., wetlands).

This strategy is also intended to reduce threats to biodiversity by ensuring rare and unique habitats, which often occur in patchy and isolated locations on the landscape, are protected and continue to support the life history needs of vulnerable species. Protecting and maintaining the functionality of these habitats supports the delivery of ecosystem services across state forest lands by providing important resources for highly specialized species of conservation concern.

Strategy: Habitat Complexity

Manage for complex habitats of all ages and types.

a. Promote structural complexity, compositional diversity, and spatial heterogeneity at stand and landscape scales.

b. Adapt standards to regional and stand-level goals (e.g., habitat enhancement, forest restoration, fuels and fire risk, timber production, harvest age), and over time as stand and landscape conditions change.

c. Protect, maintain, and enhance legacy structures, including *old growth* trees, retained green trees, snags, and downed wood. Allow exceptions for hazard tree removal for public safety.

d. Promote vertical canopy layering where habitat restoration or enhancement are primary concerns.

Intent

The intent of this strategy is to conserve and manage for habitat complexity as it enhances function of many ecosystem processes and services. Complexity is a key feature of high-quality habitat at all spatial scales for many species of conservation concern and contributes to forest and habitat resiliency through time.

Stands in HCAs are the foundation for this strategy and provide the majority of complex stands of mid- to late-seral forest. Management in HCAs (variable retention harvests and regeneration harvest of SNC and alder) enhances complexity over time and provides for a complex early-seral component. Outside of HCAs, leave-tree strategies, RCAs, and operationally limited areas contribute to stand and landscape complexity. Multi-species plantings inside and outside of HCAs further promote complexity and resilience. Silvicultural prescriptions vary at the stand-level based on past management, current conditions, and desired stand goals (e.g., production-emphasis versus habitat emphasis, fuels reduction management needs). These also vary by district based on forest types, WOSF HCP covered species distribution, ownership patterns, and forest health concerns. Natural disturbances across the planning area introduce complexity and heterogeneity at stand, watershed, and landscape scales.

Strategy: Functional Landscapes

Manage for functional landscapes for native wildlife.

a. Create a variety of patch types, sizes, and arrangements over time.

b. Provide for adequate interior forest habitats.

c. Maintain connectivity between habitats and broad landscape permeability, to allow for dispersal and migration of diverse wildlife species including species of conservation concern.

d. Foster and maintain redundancy at various ecological scales (e.g., species, stand types).

e. Incorporate WOSF HCP conservation actions inside and outside of HCAs.

Intent

The intent of this strategy is to have functional patches and resource arrangements with redundancy to help ensure resilient, functioning ecosystems that persist to provide GPV as environmental conditions continue to change.

HCAs are designed to provide for functional landscapes for the covered species. As habitat develops therein, it promotes a variety of patch types, sizes, and arrangement, adequate interior forest habitat, and broadscale connectivity. Outside of HCAs, leave-tree strategies, RCAs, and inoperable areas further enhance landscape function, habitat distribution, and connectivity. Northern spotted owl dispersal habitat connectivity requirements further enhance the function of the areas outside of HCAs. Age class structure outside of HCAs contributes to the variety of patch types on the landscape. Redundancy occurs both inside and outside of HCAs and contributes to forest resilience.

Female northern spotted owl monitored at a known active site located inside an HCA. Maintaining dispersal habitat outside HCAs facilitates spotted owl movement across the landscape, supporting survival, reproduction, and successful colonization.
Credit: Turnstone Environmental Consultants Inc.

Strategy: Threatened and Endangered Wildlife Species and Other Species of Conservation Concern

Protect, maintain, and enhance habitat for threatened and endangered species and other species of conservation concern.

a. Comply with state and federal ESA requirements and adopt management approaches that contribute to the survival and recovery of threatened and endangered species and other species of conservation concern.

b. Implement the WOSF HCP and associated conservation actions targeted to benefit the species covered under the Incidental Take Permit.

c. Conduct species assessments during IP development and related revisions to determine which species warrant special consideration and whether existing conservation measures are adequate.

d. Collaborate across ownership boundaries to meet common wildlife conservation goals.

e. Support habitats beneficial to pollinator species (including invertebrates) by integrating alternative management practices, where appropriate.

Intent

Fine filters include creating suitable nesting structures like this snag patch in an open, upland meadow restoration site to aid long-term occupancy of purple martin. Artificial nest boxes were also installed to provide immediate nesting opportunities until woodpeckers excavate natural nesting cavities in the decaying wood.
Credit: ODF.

The intent of this strategy is to comply with state and federal ESA requirements and the HCP, while also managing for other species of conservation concern. Implementation of this strategy includes management approaches that contribute to the persistence of threatened and endangered wildlife species. Where appropriate, these approaches can also be applied to species of conservation concern not formally listed under state or federal ESA. Implementation ensures that wildlife habitats are managed in a way that meets all legal requirements and that listed and imperiled species persist on the landscape using the conservation actions specified in the HCP. While the HCP captures currently listed and some candidate species, ODF will continue to remain informed about any potential future candidate species and species listings.

Applying the above considerations to management approaches provides a *coarse filter–fine filter* approach to addressing species of conservation concern, while following the directions within the HCP ensures ESA compliance. Other species of conservation concern are determined through regular policy review with assessment of need for additional fine filter strategies beyond FMP and HCP commitments. This strategy ensures ODF is managing habitat for all native species as required under the GPV rule, while also working to prevent future listings.

HCP commitments provide the majority of conservation measures to achieve this goal. The HCAs, leave-tree standards, and northern spotted owl dispersal habitat outside of HCAs and RCAs are the primary coarse filters that address the needs of a variety of species of conservation concern at the landscape level. Additional fine filters are added during IP development and implementation to address species of conservation concern that have habitat requirements inadequately addressed by coarse filters. Fine filters are species- and site-specific, and generally of minor/minimal impact or complementary to operations. Examples include 1) protecting rock outcrops and caves of known use by Townsend's big-eared bats; 2) creating/retaining smaller-diameter, short snags on ridgetops in areas of known purple martin occupancy; and 3) implementing seasonal restrictions near known active peregrine falcon nests.

ODF considers pollinator habitat as part of wildlife habitat restoration efforts for species of conservation concern. Pollination is an important ecosystem service that benefits forest health and resiliency. Pollinators have more specialized habitat needs that can be pursued alongside other management objectives with small shifts in practices or in areas unsuitable for timber production (Buhl et al 2021). In general, pollinator abundance and diversity may benefit from more open forest canopies and from native plant communities (Hanula et al. 2016). Focus for these practices could be within HCAs and stewardship classes with a subclass designation of cultural resources, plants, research/monitoring, unique threatened or endangered plants, or wildlife subclasses. Where practices are implemented, pollinators would provide ecosystem services to adjacent stewardship areas and nearby agricultural lands (Rivers 2018).

3.2.13 Forest Resource 13: Sensitive Plants

State forest lands have hundreds of species of plants. Native plants fill many roles in the forest ecosystem. They provide organic matter to forest soils, influence temperature and moisture conditions of the surrounding area, support native pollinators, contribute to biodiversity, and are used as cover and forage by many animals. In addition to their ecological functions, some plant species are harvested commercially or for cultural uses. Commercial and cultural uses of understory plants are discussed in the *Special Forest Products* and *Cultural and Historic Resources* sections, respectively.

Coast Range fawn lily (*Erythronium elegans*). Sensitive and rare plants provide environmental and social benefits and are protected by the Oregon Department of Agriculture Native Plant Conservation Program.
Credit: ODF.

This section focuses on Oregon's ESA-listed threatened and endangered plant species administratively protected by the ODA Native Plant Conservation Program (ORS 564.105; OAR 603-073), and candidate plant species considered for ESA listing (collectively, *sensitive plants*).

Threats to sensitive plants on state forest lands include habitat loss and fragmentation from management activities, public misuse (i.e., illegal collection), and competition with invasive species. Many of these issues can be addressed via forest planning and management in collaboration with other agencies and stakeholders. The long-term effects of climate change on sensitive plants are more difficult to assess and address by management. Shifts in temperature, precipitation, and other aspects of climate that reduce water availability and disrupt growing seasons likely alter the habitats that support sensitive plants.

ORBIC provides a list of sensitive plants that may be found on state forest lands, as well as records of known locations. Many of these species occur in non-forested areas, such as open, high-elevation rocky areas; open meadows; bluffs; and coastal areas. Examples of currently known sensitive plant species on state forest lands include Coast Range fawn lily (*Erythronium elegans*), Nelson's checkermallow (*Sidalcea nelsoniana*), Saddle Mountain bittercress (*Cardamine pattersonii*), cold-water corydalis (*Corydalis casea*na ssp. *Aquae-gelida*e), Chambers' paintbrush (*Castilleja chambersii*), and frigid shootingstar (*Dodecatheon austrofrigidum*) (ORBIC 2023). ODF is not aware of any other sensitive plant species that are likely to occur on state forest lands.

ODF protects listed plant species in accordance with state and federal ESA requirements. ODF has identified ESA-listed species that occur, or are suspected to occur, on state forest lands and continues to update these lists in consultation with the ODA's Native Plant Conservation Program. During operations planning, the districts determine if ESA-listed species occur or are likely to occur on lands where management activities are planned. If so, the district then determines whether the proposed management activities are consistent with the conservation program for the ESA-listed species and whether specific protection or mitigation measures are needed.

Goal: Sensitive Plants

Ensure the long-term persistence of sensitive plant species.

Strategy: Sensitive Plants

Identify, protect, maintain, and enhance sensitive plant species populations.

a. During operations planning, determine if ESA-listed plant species occur or are likely to occur on lands where management activities are planned. Implement protection measures as needed.

b. Coordinate with ODA and other agencies as needed to identify sensitive plant occurrences during planning.

c. Coordinate with the Native Plant Conservation Program to remain informed concerning future candidate species and species listings.

Intent

The intent of the strategy is to comply with state and federal ESA requirements, while also managing for other sensitive species. Implementation of this strategy includes management approaches that contribute to the persistence of threatened and endangered plant species. Where appropriate, these approaches can also be applied to the conservation of sensitive species not formally listed under state or federal ESA. Conserving sensitive plant species where they occur on state forest lands promotes genetic diversity that is crucial for maintaining plant survival and adaptability to various environmental conditions. Supporting diverse sensitive plant populations is essential for maintaining the services and resilience of ecosystems.

This chapter described the forest resource conditions and laid out the forest resource management goals and strategies at a high level. Chapter 4, *Guidelines*, provides guidelines on how to implement the goals and strategies.

CHAPTER 4

Guidelines

Implementation of the *Western Oregon State Forests Management Plan* (FMP) is grounded in the themes established in Chapter 1, *Introduction*, including *greatest permanent value*[1] (GPV), consideration of and *engagement* with all Oregonians, climate *resilience*, *sustainability*, and *adaptive management*. The management approach in Chapter 2, *Management Approach*, together with the *goals* and *strategies* outlined in Chapter 3, *Forest Resources, Goals, and Strategies*, provide strategic direction for carrying out this work. This chapter provides actionable guidance that defines the processes, supporting plans, and engagement mechanisms necessary for asset management, effective implementation, and adaptive management. This guidance will help to ensure that management actions are aligned with the plan's intent, informed by ongoing *monitoring* and evaluation, and responsive to changing conditions.

4.1 Asset Management Guidelines

Assets, as they are discussed in this section, are the tangible resources and infrastructure (e.g., parcels of land, *forest products* and forest roads, trails, and campground facilities) on state forest lands. Maintaining or enhancing the value of the assets described in this plan is fundamental to long-term *sustainability* of benefits described in the GPV rule (Oregon Administrative Rules [OAR] 629-035-0020) such as forest products that generate *revenue, special forest products*, *aquatic* and wildlife *habitat*, and recreational uses. ODF developed asset management *guidelines* for this FMP in alignment with the Oregon Revised Statutes (ORS), OAR, and Oregon Department of Forestry (ODF) *policy*.

Implementation of the FMP consistent with the following asset management guidelines ensures that the asset value of the forest is maintained or enhanced.

- Conserve forest lands by maintaining the state forest land base.

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

- Maintain a land exchange and acquisition program to consolidate state forest lands for management efficiencies, economic values, or enhanced *stewardship*.
- Implement marketing strategies that increase the value of forest products.
- Prioritize and invest in *stand management* activities that increase the quality and quantity of timber and enhance other *ecosystem services*.
- Maintain, develop, and protect investments in infrastructure such as roads, bridges, and facilities, while recognizing that in some cases investments may need to be moved, removed, or decommissioned.
- Maintain existing assets that support recreation, education, and interpretation activities, while recognizing that in some cases investments may need to be moved, removed, or decommissioned.
- Maintain investments in forest inventory, *geographic information system* (GIS) technologies, and timber harvest-tracking technologies that support planning and implementation processes, contribute to *adaptive management*, and improve overall efficiency and transparency.
- Prioritize and undertake investments in research and monitoring consistent with Section 4.3, *Adaptive Management Guidelines*.
- Maintain budgeting and financial management system and practices that track *revenues* and expenses and aids in financial decision-making, and provide transparency to the public.
- Implement and maintain accountability strategies and systems to ensure anticipated financial and environmental benefits from the forest are tracked and reported accurately.

4.1.1 Investment Priorities

Funding levels for plan implementation vary with cyclical economic trends. FMP implementation is primarily funded through timber harvest revenues. There may be periods where revenues limit funding. Annual budget instructions for developing fiscal budgets reflect the *Forest Development Fund* (FDF) balance and the projected FDF balance. The highest level of implementation and investment occurs when the FDF balance exceeds 12 months of operating expenses, and the balance is forecast to be relatively steady or increasing. The lowest level occurs when the FDF balance has less than 6 months of operating expenses, and the balance is forecast to decrease (Table 4-1). To avoid service level decreases, ODF may seek external federal, state, and non-governmental organization funding sources, such as grants or legislative funding through policy option packages or legislative concepts. External opportunities will be considered at any investment level to diversify funding streams and reduce risk associated with poor timber markets. Table 4-1 shows the forest management investment levels based on the revenue forecast and FDF balance.

TABLE 4-1
Forest Management Investment-Level Guidance Based on Revenue Forecast and FDF Balance

	Increasing 3-Year Revenue Forecast	**Decreasing 3-Year Revenue Forecast**
FDF Contains Greater than 12 Months of Operating Expenses	Level 1: Maintain or expand existing investments and fund new strategic investments.	Level 2: Maintain or expand existing investments and explore additional strategic investments.
FDF Contains 6 to 12 Months of Operating Expenses	Level 2: Maintain or expand existing investments and explore additional strategic investments.	Level 3: Invest in deferred maintenance and maintain select strategic investments.
FDF Contains Less than 6 Months of Operating Expenses	Level 3: Invest in deferred maintenance and maintain select strategic investments.	Level 4: Maintain core business and meet legal obligations; no new investments.

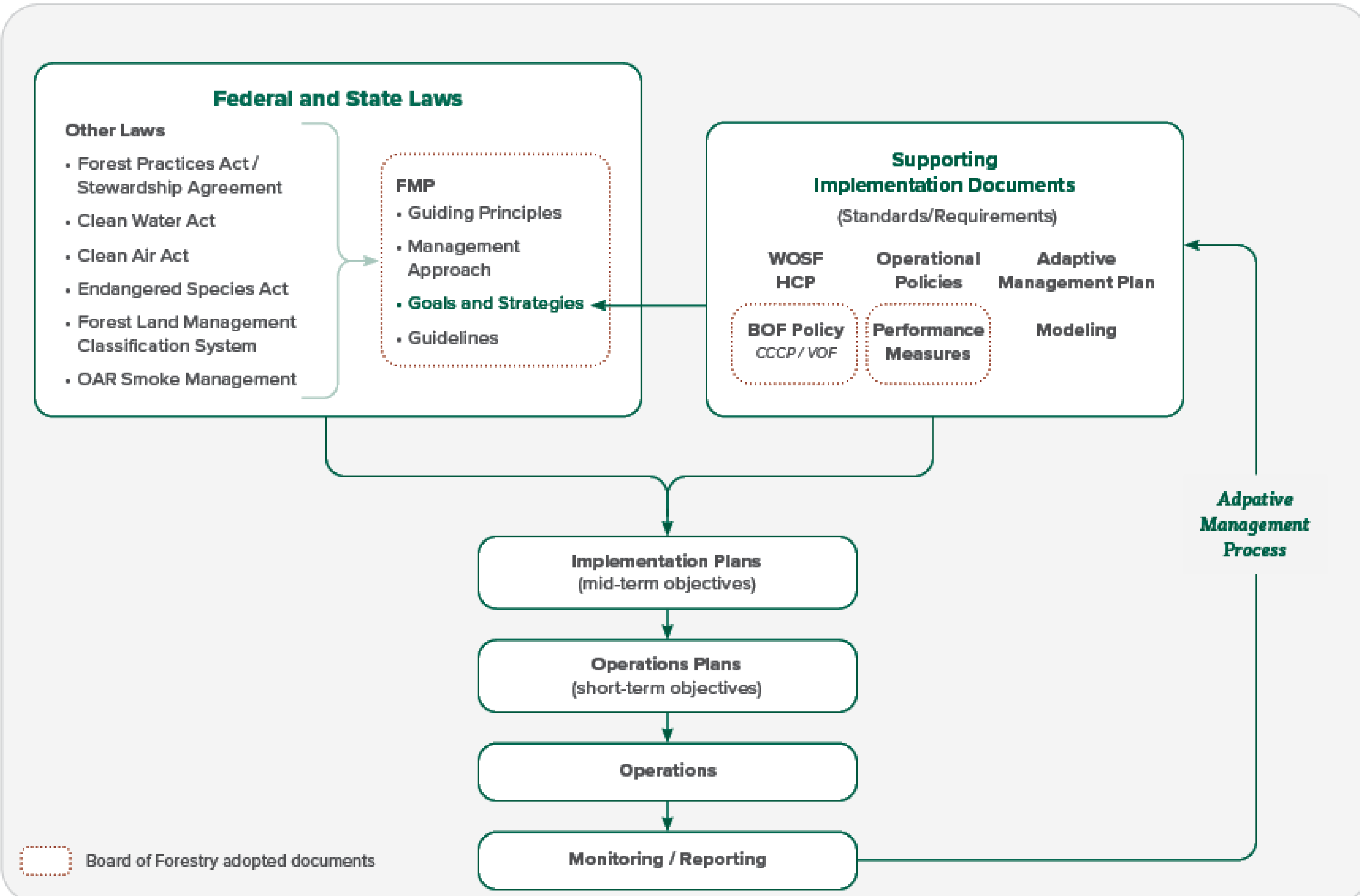
Note: Level 1 is the highest level of investment, while level 4 is the lowest.

4.2 Implementation Guidelines

FMP implementation is carried out through *Implementation Plans* (IPs) that set mid-term (typically 10-year) *objectives*, which are then achieved through on-the-ground management activities described in *Operations Plans* (OPs). Monitoring and reporting are incorporated into all planning levels to inform future planning cycles and practice adaptive management. The *standards,* requirements, and operational direction underpinning these plans are detailed in applicable laws and regulations, the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP), *Oregon Board of Forestry* (the BOF) policies (e.g., *Vision for Oregon's Forests* (VOF), *Climate Change and Carbon Plan* [CCCP]), *performance measures*, *operational policies*, the Forest Land Management Classification System (FLMCS), and other guidance. These tiered planning levels ensure consistent, compliant, and goal-driven implementation of the FMP across the landscape. Figure 4-1 shows the connections among these plans and the overall implementation process.

FIGURE 4-1

Links among the FMP, Major Example Laws, Other Plans, and Policy Guidance. This figure provides additional detail of the laws and supporting documents that inform the FMP and implementation.



Note: The other laws listed in this figure are an example subset of all applicable federal and state laws.

The following planning elements depicted in Figure 4-1 are key to development of the IPs and OPs, and inform monitoring, reporting, and the adaptive management process.

- ***Western Oregon State Forests Habitat Conservation Plan.*** The WOSF HCP enables ODF to comply with the federal *Endangered Species Act* for certain covered *species* while conducting land management activities on state forest lands west of the Cascade crest. The WOSF HCP biological goals and objectives will be implemented through IPs and OPs. The conservation actions within the WOSF HCP provide requirements and standards for a wide range of forest management activities such as retention of *biological legacies* (green trees, *snags,* and *downed wood*); *stream* buffers; steep slope protections; habitat *restoratio*n; and aquatic passage. These actions also promote forest diversity, complexity, and *connectivity* across the landscape, reinforcing ecological resilience, maintaining *ecosystem functions*, and contributing to the sustainable delivery of ecosystem services and GPV.
- **Operational policies.** The FMP establishes overall goals and strategies; however, the specific standards for resource protection are found in other documents that support implementation (Figure 4-1). Operational policies guide decisions within the range of options by outlining specific procedures and *best management practices* (BMPs) that allow for management flexibility, while ensuring sound management and resource protection. Operational policies include quantitative standards (e.g., *riparian* buffer widths, upland leave tree requirements) that align with laws and regulations, and FMP and WOSF HCP goals and strategies. These policies and standards enable forest managers to develop IPs and OPs and to evaluate *trade-offs* when a range of management options will achieve FMP goals. Operational policies are developed within the State Forests Division (Division) under the direction of the *State Forests Division Chief*.
- **Board of Forestry policies.** The BOF is mandated to supervise all matters of forest policy and management under state jurisdiction (ORS 526.016). In carrying out this duty, the BOF may establish policies to guide ODF decisions. These policies may have broader applicability and apply to multiple operational divisions (e.g., the VOF and CCCP) or be limited to one division.
- **Performance measures.** *Performance measures* are selected by the BOF, based on *metrics* that the BOF considers key to ensuring progress toward FMP resource management goals, maintaining accountability for management commitments, supporting the adaptive management process, and aligning with IP and WOSF HCP reporting timelines (Section 4.3, *Adaptive Management Guidelines*).
- **Forest Land Management Classification System.** As described in OAR 629-035-0050, the FLMCS is a method of mapping and describing the *management emphasis* of specific areas of state forest lands. The management emphasis provides context for management activities based on *forest resources* that are present in specific areas. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority as described by this FMP, the WOSF HCP, other laws or commitments, and policy choices. This information is used in the development of IPs and OPs.
- **Modeling.** Modeling is used as a decision-support tool to ensure sustainable harvest over time, evaluate management trade-offs, inform targets for forest resource goals at various spatial and temporal scales, and quantify the costs and outputs associated with management scenarios. Modeling aids forest managers in evaluating potential effects and making decisions about allocation of resources across the landscape.
- **Adaptive Management Plan.** The *Adaptive Management Plan* (AMP) describes the monitoring and reporting process that will ensure FMP resource goals are met during implementation of the FMP.

The AMP grounds monitoring and reporting within an adaptive management framework to inform management decisions and align with IP and WOSF HCP reporting timelines (Section 4.3, *Adaptive Management Guidelines*).

Most of these documents are publicly available on the ODF website.

4.2.1 Implementation Plans

IPs are mid-term (typically 10-year) plans that outline how the FMP strategies will be implemented at a *district* or multi-district scale. These plans integrate the strategies for forest resource goals described in Chapter 3, *Forest Resources, Goals, and Strategies*, and provide additional detail on objectives, management approaches, and activities that will be used. IPs integrate district operations and are used to develop annual OPs and budgets, and to assess progress toward meeting the goals identified in the FMP. Based on monitoring and reporting, IPs will be evaluated and revised to reflect key recommendations from the adaptive management process. IPs will be revised for the next implementation cycle, but may also be revised during a current IP cycle, depending on monitoring *outcomes* or unforeseen circumstances (e.g., large-scale *disturbance* events).

IPs will include the following information.

- Current condition of forest resources.
- Activity levels expressed as objectives to be achieved during the implementation period such as an average annual harvest volume of timber offered for sale.
- Some anticipated management activities are more difficult to quantify over the course of the IP, such as restoration thinning or cultural burning to improve habitat, because they are dependent on external partnerships or reliant on funding that is less certain.
- A description of specific monitoring activities over the course of the IP.

4.2.2 Operations Plans

OPs describe the specific projects and activities over the short term (e.g., 1 to 2 years) that align with fiscal budgets and are consistent with IP objectives. Planned activities and projects may include timber harvest operations; road construction, improvement, and vacating; *reforestation* and *young stand management*; aquatic habitat restoration; development or maintenance of recreational trails or facilities; or monitoring projects. OPs prioritize activities and investments in the forests based on investment levels as described in Section 4.1, *Asset Management Guidelines*.

4.2.3 Implementation Responsibilities

ODF implements the FMP and WOSF HCP through IPs and OPs. The State Forests Division Chief, *Area Directors, and District Foresters* review IPs, which are approved and signed by the *State Forester*. District Foresters implement the FMP and WOSF HCP within their districts through the approval and oversight of OPs. Table 4-2 describes the tasks and responsibilities for IP and OP approval and implementation.

TABLE 4-2
Roles and Responsibilities of Decision-Makers in the Implementation, Operations, and Revision Approval Process

Task	Responsible Party
Approves FMP and performance measures and requests and approve FMP/performance measure revisions	Board of Forestry
Approves IPs and major revisions to FLMCS	State Forester
Approves Operational Policies specific to the State Forests Division	State Forests Division Chief
Approves minor revisions to FLMCS	Area Director
Approves and implements OPs	District Forester

4.3 Adaptive Management Guidelines

Adaptive management is "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 (OAR 629-035-0000(2))."

Meeting the goals of the FMP in a changing environment requires "learning by doing," in which ODF assesses and updates the strategies, operational policies, and BMPs through adaptive management. The adaptive management approach directs the monitoring process to document legal and policy compliance, determines whether strategies are meeting FMP goals, and tests whether the assumptions used in the development of the FMP strategies remain valid under a changing climate. The process begins with IPs, which quantify specific, measurable resource objectives based on the FMP goals and strategies, that are achievable within the next 10 years. Monitoring assesses if IP targets are being met and if plans or operational policies could be improved to better meet the IP targets and achieve the goals in the FMP. The resulting information is used by the appropriate decision-makers to revise management plans (Section 4.4, *Decision Authority and Revision Guidelines*).

4.3.1 Performance Measures

Performance measures are a select set of metrics the BOF uses to direct the State Forester on expectations for management of state forests and to evaluate management outcomes to ensure that the FMP continues to provide GPV. The BOF defines the specific measured components that make up the performance measures. Although the BOF does not approve IPs, desired targets or trends expressed in performance measures will be used to guide ODF's implementation of the FMP. ODF monitors these components and reports the results to the BOF and the public via the BOF webpage. While performance measures do not encompass all aspects of ODF monitoring and reporting (Section 4.3.2, *Adaptive Management Plan*), their purpose is to provide an up-to-date dashboard for the BOF and the public to easily track management outcomes across a broad range of key ecosystem services provided by state forests. The BOF can evaluate and make recommendations based on the performance reports depending on the need (Section 4.4, *Decision Authority and Revision Guidelines*).

4.3.2 Adaptive Management Plan

The AMP is a separate document from the FMP that provides monitoring workflows and reporting requirements that support implementation of the FMP. The need for an AMP comes from the expanded scope of this FMP that includes adaptive management as a key theme, the WOSF HCP extensive monitoring requirements, and a commitment to accountability to the BOF and all Oregonians. Monitoring and reporting is updated in the AMP to enable timely management responses to new information. The schedule of specific monitoring and reporting varies, depending on the time frame required to detect change. Reports of monitoring results will be available on the ODF website.

Monitoring Approaches

ODF monitors the management of state forests for compliance and effectiveness. Compliance monitoring (i.e., *implementation monitoring*) involves gathering information to determine if the rules, regulations, and policies are being followed during implementation. *Effectiveness monitoring* assesses if the implementation of management actions produces the intended outcomes, such as measuring if forest treatments increase habitat quality or quantity over time for a *species of conservation concern*.

The WOSF HCP commitments guide much of the monitoring and span many FMP goals and strategies. Additional monitoring for adaptive management of FMP goals is tracked in the AMP, with prioritization of monitoring projects and expected outcomes developed alongside the IP.

Reporting

The AMP coordinates monitoring projects with their reporting commitments for different plans, such as annual, 5- and 10-year reports for the WOSF HCP, progress toward IP objectives, and performance measures reported to the BOF.

4.3.3 Research

Research in the context of the FMP is intended to generate reliable scientific information to guide management actions. New research performed by ODF is designed within an adaptive management framework. In addition, ODF supports and relies on several research cooperative partnerships to advance scientific understanding in strategic areas, such as planting tree species outside their normal range to account for forecast changes in climate, suitable forest *composition* for ecosystem service delivery, and improvements to landscape design to balance benefits across space and time. ODF offers planning support and special use permitting for research performed on state forest lands by scientists outside of the agency.

4.3.4 Process Improvement

ODF pursues process improvements to data collection, monitoring, and reporting to provide high-quality and accessible information to ODF staff, the BOF, and the public. This forms the basis for effective planning and assessing progress toward plan goals to ensure continued resilience of state forests in response to known and emerging stressors. Within the limits of budgetary constraints, ODF leverages new technologies to provide increasingly precise and accurate assessments of forest ecosystem conditions at multiple spatial and temporal scales to inform all levels of management, from site-specific operations to overarching policy.

4.4 Decision Authority and Revision Guidelines

As the environment changes, revisions to plans and processes may be necessary to implement adaptive management and incorporate new information. Different policy contexts and planning levels dictate the process involved, including appropriate authorities.

4.4.1 Forest Management Plan

The BOF reviews the FMP no less than every 10 years in light of current social, economic, scientific, and *silvicultural* considerations (OAR 629-035-0020). The BOF evaluates new information in the context of the *guiding principles*, goals, and strategies of the FMP. If implementation of the FMP is not achieving the BOF's desired results (e.g., indicated from monitoring and reporting of performance measures), the BOF may respond by directing the State Forester to change implementation of the FMP through revising operational policies or BMPs or adjusting implementation focus. The BOF may initiate an FMP revision if outcomes cannot be improved by implementation changes alone. The BOF and the State Forester engage county partners, Tribes, other federal and state agencies, stakeholders and the public to gather input on the proposed revision.

4.4.2 Habitat Conservation Plan

The WOSF HCP amendment process is described in the WOSF HCP document. Amendments to the WOSF HCP or *Incidental Take Permits* are expected to be rare and informed by the adaptive management process as outlined in the WOSF HCP. ODF, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service are key decision-makers in the modification process.

4.4.3 Implementation Plan

As new information becomes available through monitoring and reporting, the State Forester may revise IPs in response to changing or unforeseen conditions (e.g., large-scale disturbance events) or development of new or better approaches to implementation identified through adaptive management. Table 4-2 outlines the key decision-makers.

4.4.4 Operational Policy

The State Forester or State Forests Division Chief may change operational policies as needed, in response to information from the adaptive management process, changing laws or conditions, new technology, improved management strategies, or new direction from the BOF or ODF leadership. Specific approval authorities depend on the scope of the policy in question, with the State Forester approval of policies that apply broadly to the agency, and State Forests Division Chief approval of policies confined to the State Forests Division. Most operational policies related to the management of state forests under this FMP fall under the authority of the State Forests Division Chief.

4.4.5 Forest Land Management Classification System

Revisions may be needed to the FLMCS when there is a change to the management emphasis on an area of land. Examples of such changes include the development of a new campground, a new wild and *scenic river* designation, or the removal of a research area after completion of a project. The District Forester recommends revisions to the Area Director, who may approve minor revisions or review and recommend major revisions to the State Forester for approval. While revisions may take place at any time, major revisions are usually carried out during IP development, and minor revisions are typically applied during OP development. A complete description of the process, including public comment periods can be found in OAR 629-035-0060.

4.5 Engagement Guidelines

The goals for public involvement in forest land planning are outlined in OAR 629-035-0080 and include providing information, seeking insight, building understanding, and providing public comment opportunities. For tribal engagement, the goals and strategies are outlined in Chapter 3, *Forest Resources, Goals, and Strategies*, and implementation is described in the IPs and OPs.

The purpose of public engagement is to create a relationship that provides meaningful opportunities to contribute to planning decisions. Engagement is most beneficial during the IP process, when input can have the most influence on the types and location of planned management activities. Engagement opportunities for the IPs occur during the public comment period, which generally occurs during the IP development process, prior to final approval. Input may contribute to setting priorities and identifying general locations of management activities. For the OPs, engagement opportunities occur during the annual or biennial public comment period, where input typically focuses on specific operations or activities, minor changes, refinements, or clarification of the plan. Additional opportunities for public input occur through BOF meetings. Table 4-3 shows the engagement opportunities, forums, and frequency by plan level and provides examples of types of input received during past engagement.

TABLE 4-3
Engagement Opportunities and Examples

Plan Level Venue	**Engagement Areas**	**Topic**	**Example Comment**
FMP Performance Measures BOF meetings	• Performance measures adopted for the purpose of BOF assessment of the FMP • Reports on performance measure trends	Performance measures	• The best available science has changed the understanding of the *adaptive capacity* of forests. The BOF should change the way adaptive capacity is measured and reported by ODF.
		Performance measure trends	• The reported trend in *carbon sequestration* is insufficient. We think the BOF should adopt a carbon sequestration target for ODF.
IP Public comment period	• Harvest types, priorities, and general locations • Recreation, education, and interpretation development/activity levels, types, priorities, and general locations • Stream enhancement types, priorities, and general locations • Road assessments, project types, priorities, and general locations • Monitoring and adaptive management priorities	Management activity type and location	• I would like more mountain biking trails, preferably built inside habitat conservation areas to reduce potential conflicts with harvesting. • Harvest objectives need to be increased to provide better economic opportunities in rural communities. • I would like to see more species diversity in newly planted *stands* including hardwoods. • I think reducing road density within a certain *watershed* should be prioritized. • Harvests within habitat conservation areas should focus on young stand thinning. • I recommend managing for complex early-*seral* conditions after *regeneration harvest* in specific watersheds.
		Stream enhancement/road project priority and location	• I propose a specific watershed as a high priority for stream enhancement to align with work being done by a local Watershed Council in the next 5 years to replace non-fish-passable *culverts* and enhance 5 miles of a specific stream.

Plan Level Venue	**Engagement Areas**	**Topic**	**Example Comment**
OP Public comment period (annual or biannual)	• Ensured consistency with the IP and/or FMP • Improved efficiency or effectiveness • Clarified description of planned operations • Additional information or correction of an error • Solution-oriented comments to achieve GPV goals and objectives	Efficiency/ site-specific information	• The boundary of a specific timber sale could be extended to the southwest where the terrain flattens out. Extending the boundary would eliminate the need to work through young stands while harvesting the timber during future sales. • A specific sale has a potential culturally/historic significant site that requires certain protection measures.
		Clarification	• I don't understand the terminology being used in this plan. Can you include definitions for BA, shelterwood and MBF in the document? • I'm uncertain about what exactly the stream enhancement entails. Can you provide more details on the project?
		Solutions-oriented	• This sale area will affect approximately 1 mile of the existing trail. Is it possible to have trails open for use on the weekends? • I am concerned with the amount of dust that comes off the road during log hauling. Can you please use dust abatement measures on the gravel road in front of my house to limit the impact? • This sale includes a domestic water source. I recommend leaving additional leave trees around no-harvest buffers for additional protection. • I am concerned that the proposed timber harvest treatment will not improve habitat for covered species. I recommend increasing leave tree densities to meet specific habitat goals.

This chapter provided the overarching guidelines for implementing the FMP, evaluating whether the strategies are meeting the goals, and adapting the plans to better meet the goals. Details on how ODF engaged county partners, other state agencies, interested parties, the public, and the *nine federally recognized tribes in Oregon* in the development of the FMP can be found in Appendix A, *Engagement*. Maps of the planning area and district boundaries are found in Appendix B, *Maps*. Visually impaired readers can find descriptions of all FMP figures in Appendix C, *Alternative Text to Figures*. For additional information on supporting plans, policies, tiered planning documents, and reports, please visit the ODF website.

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List of Acronyms and Abbreviations

Acronym	Definition
AMP	Adaptive Management Plan
BMP	best management practice
the BOF	Oregon Board of Forestry
BOFL	Oregon Board of Forestry Lands
CCCP	Climate Change and Carbon Plan
CSFL	Common School Forest Lands
DEQ	Oregon Department of Environmental Quality
Division	State Forests Division
DOGAMI	Oregon Department of Geology and Mineral Industries
DSL	Oregon Department of State Lands
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDF	Forest Development Fund
FLMCS	Forest Land Management Classification System
FMP	Western Oregon State Forests Management Plan
FPA	Oregon Forest Practices Act
GIS	geographic information system
GPV	greatest permanent value
HCA	habitat conservation area
HUC	Hydrologic Unit Code
HVCA	High Value Conservation Area
IP	Implementation Plan
ITECK	Indigenous Traditional Ecological and Cultural Knowledge
NAAQS	National Ambient Air Quality Standards
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture

Acronym	Definition
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OHV	off-highway vehicle
OP	Operations Plan
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statutes
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
RCA	riparian conservation area
SB	Senate Bill
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SNC	Swiss needle cast
TMDL	Total Maximum Daily Load
VOF	Vision for Oregon's Forests
WOSF HCP	Western Oregon State Forests Habitat Conservation Plan

Glossary

A

Term	Definition
abiotic	Non-living components of an ecosystem.
active management, actively managed	Purposeful application of silvicultural prescriptions and other activities, like reforestation and young stand management, in accordance with the future objectives and current characteristics of forest stands. In contrast, see *passive management*.
adaptation silviculture, adaptive silviculture	Use of silvicultural techniques to increase the forest's ability to adapt to changing conditions and continue to deliver ecosystem services.
adaptive capacity (of ecosystems)	The ability of the system to sustain delivery of desirable ecosystem services under changed climate conditions and other disturbances via resistance and resilience to disturbance or transformative change to an acceptable new equilibrium. The Intergovernmental Panel on Climate Change defines adaptive capacity as the degree to which adjustments in practices, processes, or structures can moderate or offset the potential for damage or take advantage of opportunities created by a given change in climate.
adaptive management	A systematic and rigorous approach to learning from actions, improving management, and accommodating change. Adaptive management is defined as 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 (Oregon Administrative Rule [OAR] 629-035-0000).
Adaptive Management Plan (AMP)	Describes the monitoring and reporting process that will ensure Western Oregon State Forests Management Plan (FMP) resource goals are met during implementation of the FMP. The AMP grounds monitoring and reporting within an adaptive management framework to inform management decisions and align with Implementation Plan (IP) and *Western Oregon State Forests Habitat Conservation Plan* (HCP) reporting timelines.

Term	Definition
administrative site(s)	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 (OAR 629-035-0055 39(c)(B)(i).
aggregate	Sand and pebbles added to cement to make concrete, or that are used in road construction.
anadromous	Species, such as salmon, that are born in freshwater, migrate to the ocean to grow into adults, and return to freshwater to spawn.
aquatic	In or on the water; aquatic habitats are in streams or other bodies of water, as contrasted with riparian habitats, which are near water.
aquatic organism passage, passage, fish passage	Aquatic organism passage is the term for removal or improvement of structures that restrict the movement of aquatic animals, such as fish, turtles, amphibians, and insects within and between streams.
aquifer	A sand, gravel, or rock formation that is capable of storing or transporting water below the surface of the ground.
archaeological and/or historic object(s)	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).
archaeological and historic resource(s)	Sites, buildings, structures, and artifacts that possess material evidence of human life and culture of the prehistoric and historic past.
archaeological and historic site(s)	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 with biotic or geological remains or deposits (ORS 358.905). Specific types of sites, as defined in Oregon law: • Pre-historic archaeological site - Created and/or used by humans indigenous to the area before Euro-American inhabitance.

Term	Definition
	• Historic archaeological site - Created and/or used by humans since the time of Euro-American inhabitance; usually belowground and/or aboveground diminishing remains. • Historic Site - Created and/or used by humans since the time of Euro-American inhabitance; usually aboveground structurally intact remains. • Site of archaeological significance - Any archaeological site in, or eligible for inclusion in, 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).
Area Director(s)	Lead managers of the two administrative areas covered by this FMP: northwest and southern Oregon. The northwest Oregon area covers Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade Districts. The southern Oregon area covers the Western Lane district.
asset(s)	Tangible resources and infrastructure on state forest lands.

B

Term	Definition
basal area	Cross-sectional area of a standing tree bole at breast height. Basal area per acre of all trees in a stand is an important measure of stand density and is related to stand volume.
best management practices (BMPs)	Oregon Forest Practices Act (FPA) rules adopted by the Board of Forestry (BOF) to minimize the impact of forest operations on natural resources, such as water quality or air quality, or human safety, such as trail users.

Term	Definition
biochar	Charred forest material, such as slash or dead plants, which can improve soil productivity and water quality and sequester carbon. The practice of charring forest material and mixing it with soil was used for thousands of years by indigenous people in the Amazonian basin. The practice created rich soils, called "terra preta de Indio", in otherwise infertile soils. Modern technologies use pyrolysis to produce biochar. Pyrolysis prevents harmful emissions and produces valuable byproducts in addition to biochar. Pyrolysis is the thermal decomposition of plant material in the absence of oxygen, which prevents combustion (burning). By preventing combustion, the production process prevents the release of greenhouse gases, particulates, and other toxicants to the atmosphere and instead produces bio-oil and synthesis gas, which are captured and can be used as fuel or precursors to other chemical products. Like coal, biochar is a stable form of carbon that can store carbon in the soil for hundreds to thousands of years.
biodiversity, biological diversity	The genetic variation and the variety of microbial, fungal, plant, and animal life.
biotic	Any living aspect of the planet.
Board of Forestry (BOF)	The BOF is a seven-member citizen board appointed by the governor and confirmed by the Oregon State Senate. The BOF supervises all matters of forest policy in Oregon; adopts rules regulating forest practices; and provides general supervision of the state forester's management of the Oregon Department of Forestry (ODF). The BOF authorizes and directs the State Forester in the management of state forests.
Board of Forestry Lands (BOFL)	BOFL were acquired by the BOF under ORS 530.010–530.040. Most were transferred from counties to the BOF in exchange for a portion of future revenue from the lands. Some lands were acquired by direct purchase.

C

Term	Definition
candidate species	Species being considered by the Secretary of the Interior for listing under the Endangered Species Act as an endangered or a threatened species, but not yet the subject of a proposed rule.

Term	Definition
carbon pools	Categories of carbon reservoirs, such as soil, tree roots, aboveground tree boles, or harvested wood products, that have the capacity to both take in and release carbon.
carbon sequestration	The process of capturing atmospheric carbon dioxide, removing it from the atmosphere where it contributed to global warming. In the forest, sequestration is primarily measured in trees sequestering carbon in their wood through their use of carbon dioxide in photosynthesis
carbon storage	Sequestered carbon is a stable component of various carbon pools within the forest and in wood products, contributing to climate change mitigation by preventing carbon dioxide from being released into the atmosphere. See *carbon pools*.
Class I area(s)	National park lands and some wilderness areas are designated as federal mandatory Class I areas under the Clean Air Act.
Clean Air Act	Federal law passed in 1970 and amended several times since. The authority to implement the act is delegated to states. The Clean Air Act is implemented, in part, through a permit system.
Clean Water Act	Federal law was passed in 1948 under the Federal Water Pollution Control Act but was significantly reorganized and expanded in 1972 and has been known as the Clean Water Act since then. This act, which has been amended several times since 1972 as well, establishes the basic structure for regulating discharges of pollutants into the waters of the United States; states may have their own Clean Water Acts whose standards must meet or exceed the federal mandates.
climate change	Per the United Nations, involves long-term shifts in temperatures and weather patterns. Some shifts are natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping greenhouse gases that build up in the Earth's atmosphere, causing average temperatures around the globe to increase ("global warming").

Term	Definition
climate change mitigation	Reducing heat-trapping greenhouse gases added to the atmosphere by reducing production from sources (e.g., the burning of fossil fuels for electricity, heat, or transport) and/or sequestering these gases from the atmosphere, such as through tree growth.
climate-smart forestry	An extension of sustainable forest management developed to guide management of forests in ways specific to climate change adaptation and mitigation efforts and to support climate-affected communities. Climate-smart forestry principles can be enacted through climate-informed silviculture, which may include reforestation using alternative tree species; reforestation using alternative planting spacings and densities; reforestation using diverse species mix (bet hedging); and leaving legacy trees and downed wood to store carbon on the landscape.
coarse filter, fine filter	An operational approach for managing biological diversity. 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. Fine-filter management adds specific management actions for individual species or habitats that require special consideration, such as species with unique or limited distributions.
cohort	A group of trees regenerating after a single disturbance. The age range within a cohort may be as narrow as 1 year (typical with planting under active management) or as wide as several decades (with natural regeneration under passive management).
Common School Fund	A permanent fund or account managed to provide revenues to the common schools. The State Land Board (governor, secretary of state, and treasurer) is the trustee of the fund.

Term	Definition
Common School Forest Lands (CSFL)	Common School trust lands that have been listed by the State Land Board for the primary goal of managing these lands for 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	For an ecosystem, composition refers to the different species of plants and animals that live therein. The dynamic attributes of a forest ecosystem are composition, function, and structure. Composition is the proportion of various species. In contrast, *function* is the processes taking place in the system, while *structure* includes kinds and distribution of stand components such as trees, snags, and logs of various sizes and shape.
confidential	Limited to persons authorized or entrusted with the information.
conifer forest	These stands occupy most of the state forest lands. ODF classifies conifer stands as those in which conifer tree species compose 50 percent or more of the basal area. Although conifers are the principal species with economic value in these stands, the stands may also include substantial amounts of other vegetation types such as hardwoods, shrubs, grasses, and ferns, which contribute to a diverse forest ecosystem. These types are either intermixed with the conifers or are in clumps too small to map and inventory separately.
connectivity	A measure of how well different areas (patches) of a landscape are connected by linkages. For wildlife, habitat patches could be connected by corridors of forest used to move between patches. At a landscape level, the connectivity of ecosystem functions and processes is considered in addition to the connectivity of habitats, by the spatial arrangement and pacing of management activities.

Term	Definition
conservation area(s)	Designated land where conservation strategies are applied for the purpose of attaining specific conservation objectives such as maintaining or improving conditions for species of conservation concern. In State Forests, conservation areas include habitats used by northern spotted owls and marbled murrelets, riparian conservation areas, rare or unique habitats, and areas requiring special protection for other resource values. Habitat conservation areas and riparian conservation areas are defined below and dictated by the WOSF HCP.
cultural resource(s)	An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource may be tangible, a place or space, or a cultural practice. Tangible cultural resources are categorized as sites, buildings, structures, and objects for listing in the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. A cultural place or space may include areas containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures. Cultural practices may be associated with plant and animal communities or particular places, acknowledge past events or people, and have significant meaning to practitioners.
culvert(s)	Structure that channels water past an obstacle, under a roadway, or to a subterranean waterway. Typically surrounded by soil or road fill (embedded), a culvert may be made from a pipe, reinforced concrete, or other material.

D

Term	Definition
debris torrent, debris flow	Rapid movement of a large quantity of materials, including wood and sediment, down a stream channel. This generally occurs in smaller streams during storms or floods, which scours the streambed.

Term	Definition
degraded forest lands, degraded watersheds	Areas where the forest's biodiversity and ecological processes are diminished or severely constrained. These conditions may exist because of past management practices or large-scale disturbances such as fire, windstorms, floods, and outbreaks of insects or pathogens.
demographics	The collection and analysis of general characteristics about groups of people and populations, such as age, gender, and income.
demonstration forest(s)	Timberland managed for forestry education, research, and recreation. It demonstrates innovations in forest management, watershed protection and restoration, and environmentally sensitive timber harvesting techniques.
deposition	When rocks or particles of soil or silt are carried from one location and placed in another, usually by moving water or wind. The wind or water can physically pick up and carry small particles, and these particles are deposited when there is not enough energy to carry them any longer.
desired stand goal	A planning goal that describes the conditions land managers are attempting to achieve over a specified period of time in a given geographic area. In some cases, the land may already be in the desired condition and land managers would focus on maintaining those conditions. If the natural area is not currently in the desired condition, managers may take actions to encourage a different pattern of change over time to reach the desired stand goals. The desired stand goals describe the land or resource conditions of the forest given implementation of management direction contained in the plan if goals and objectives are fully achieved.
dispersal habitat	For northern spotted owls, can be conifer and mixed mature conifer-hardwood stands with a canopy cover greater than or equal to 40 percent but without suitable nesting habitat and contains understory features that inhibits foraging both through decreased visibility of prey (overgrown vegetation or high twig density) or inadequate understory vegetation to support prey species. (Habitat neither suitable for nesting nor foraging.)
dispersed recreation	Areas where camping and hiking are allowed in undeveloped areas, where there are no trail or camping facilities or infrastructure.

Term	Definition
dissected	A landscape that has been cut into hills and valleys by the process of erosion.
district(s)	The FMP planning area is organized into management districts. Northwest area districts are Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade. The Western Lane District includes all state forests in Lane County and southwest Oregon.
District Forester	The lead forester for an ODF management district.
disturbance(s)	A force that causes significant change in an ecosystem's structure and/or composition. Disturbance can be caused by natural events such as fires, floods, extreme winds, earthquakes, and insect or disease outbreaks, or by human activities.
domestic water use	The use of water for human consumption and other household human use.
dominant, co-dominant	The largest-sized trees in a stand with crowns in the forest canopy that receive direct sunlight. Co-dominant implies that multiple species contribute to the dominant canopy layer. Also used as a synonym for primary, for example, in describing the most common component of a stand or ecosystem process.
downed wood, woody debris	Fallen trees or pieces of trees on the forest floor or in the stream channel that provide many important functions such as nutrient cycling, maintenance of site productivity, natural forest regeneration (nurse logs), substrates for mycorrhizal fungal network formation, and diverse habitat elements for fish and wildlife species.

E

Term	Definition
ecological silviculture	Silvicultural practices that promote within-stand diversity and complexity found in unmanaged older forests by emulating the stand initiation and development processes that result from small-scale natural disturbances (e.g., windthrow, lightning, insects, disease).

Term	Definition
ecologically sustainable forest management	A management approach that focuses on the sustainable delivery of ecosystem services while maintaining the integrity and improving the resilience of the ecosystem.
ecology	The study of the interactions of organisms to one another and with their physical environment.
ecosystem(s)	A complex system comprising populations of organisms considered together with their physical environment and the interacting processes that exchange energy and matter between them (e.g., marsh, watershed, lake ecosystems). Ecosystems do not have boundaries fixed in time or space, or fixed biological or physical compositions, because the form and function of ecosystems change at various rates, depending on prevailing environmental factors and their resistance and resilience to disturbances.
ecosystem function(s) or functioning	The many, interacting biotic and abiotic processes that occur within an ecosystem (e.g., biogeochemical processes, nutrient cycling, decomposition, regeneration, and succession).
ecosystem goods and services	Goods produced by ecosystems such as water, food, medicine, fuel, construction materials; and services produced by ecosystems such as clean air, clean water, heat mitigation, flood risk mitigation, water storage, and erosion control.
edge(s)	The point where two different plant communities (different vegetation types, successional stages, or conditions) meet. Edges may be created by a soil or topographical feature of the site, or where short-term effects are created by natural or human-caused disturbances.
effectiveness monitoring	Monitoring designed to evaluate whether a given management action was effective in meeting a stated management objective. See definition for *monitoring*.
emphasis area(s)	Spatially explicit areas managed with an emphasis on certain resource goals or benefits, such as wildlife habitat improvement or timber production. See *Forest Land Management Classification System (FLMCS)* and Chapter 2 for how the designation, distribution, and management of emphasis areas contributes to ESFM.

Term	Definition
endangered species	As defined by the Endangered Species Act of 1973 (ESA), any species (including subspecies or qualifying population) that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species Act (ESA)	Federal and state laws that provide a framework to conserve and protect endangered and threatened species and their habitats both domestically and abroad.
endemic species	Species restricted to a geographic location and found nowhere else in the world.
engagement	The involvement and participatory actions of the public and Tribes in planning and decision-making processes.
engineering	The science or profession of developing and using nature's power and resources in ways that are useful to people (as in designing and building roads, bridges, dams, or machines and in creating new products).
environmental gradient	Changes in physical or chemical characteristics across space, such as elevation, soil characteristics, ground slope, air or stream temperature, soil moisture or humidity, average annual precipitation.
Equipment Restriction Zone (ERZ)	A 35-foot buffer within RCAs where ground disturbance and vegetation removal are minimized to project streambanks and aquatic habitat.
erosion	The geological process in which earthen materials are worn away and transported by natural forces such as wind or water.
ethnobotanical	The scientific study of the traditional knowledge and customs of a people concerning plants and their medical, religious, and other uses.

Term	Definition
Evolutionarily Significant Unit (ESU)	An ESU is 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. This term is used by the National Marine Fisheries Service (NMFS) as guidance for determining what constitutes a distinct population segment for the purposes of listing Pacific salmon species under the ESA. 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.

F

Term	Definition
financial viability	Achieved over the long term through continued protection and management of the forest asset; achieved over the short term with operational tools that ensure cash flow is available to ODF for sound management of state forest lands.
fine filter	See definition for *coarse filter, fine filter*.
fiscal conditions	Describes a government's ability to meet its financial and service obligations. If an agency is able to meet these obligations, it is in good fiscal condition; if not, it may experience fiscal stress.
fish passage	See definition for *aquatic organism passage*.
FMP area	See definition for *planning area*.
forest carbon	Atmospheric carbon dioxide that is sequestered and stored by trees and other vegetation through the process of photosynthesis and released during respiration and decomposition.
Forest Development Fund (FDF)	Revenue derived from BOFL that is retained by ODF and used as the operating fund for management of BOFL. Note that this fund is tracked independently within ODF's general operating funds but does not exist as a separate account.

Term	Definition
forest health, healthy forest landscapes	Forest condition where the severity, extent, and frequency of events causing injury or death of trees and other organisms is minimized; ability of forest to resist or recover from disturbances both natural and manmade.
Forest Land Management Classification System (FLMCS)	As codified in OAR 629-035-00550, a method of describing the management emphasis of parcels of state forest lands. The FLMCS is recorded as a geographic information system (GIS) layer. The management emphasis identifies the extent to which a parcel of land can be managed for a variety of forest resources. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority as designated by the FMP, the WOSF HCP, and other laws or commitments. State forest lands are classified as General Stewardship, Focused Stewardship, Special Use, or High Value Conservation Areas.
forest product(s)	Products that people take to market or use directly like timber or firewood, mushrooms, and medicinal plants. See *special forest products*.
forest resources	As defined by OAR 629-035-0000, include, but are 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.

Term	Definition
Forest Trust Lands Advisory Committee	An advisory group of elected county commissioners mandated by statute that advise the BOF and state forester on matters related to state forestland managed by ODF. The council represents the 15 counties with state forest lands on policy matters related to the management of the forestlands and distributions of revenues produced from those lands. The counties that receive revenues from these forestlands are Benton, Clackamas, Clatsop, Columbia, Coos, Douglas, Josephine, Klamath, Lane, Lincoln, Linn, Marion, Polk, Tillamook, and Washington. The committee's member roster is established during the middle of November each year when the Council of Forest Trust Land Counties elects their board of directors at the annual meeting of the Association of Oregon Counties.
forestry	The science and practice of establishing, managing, and conserving forests and associated resources in a sustainable manner to meet desired goals, needs, and values.
formation(s)	The action of forming or process of being formed. In geology, a formation is a group of strata, or layers, of the same sort of rock or mineral, or rock having common characteristics. A formation is usually defined distinctive enough in appearance that a geologic mapper can tell it apart from the surrounding rock layers.
fragmentation	Process of breaking up forest types or habitat patches into smaller areas and reducing connectivity by impeding the movement of organisms.
function(s), ecological function	An activity or process that occurs in an ecosystem; some typical functions are plant growth, animal reproduction, and decay of dead plants.

G

Term	Definition
geographic information system (GIS)	A system for management analysis and display of geographic knowledge that is represented using a series of information sets such as maps and globes, geographic data sets, processing and workflow models, data models, and metadata.
geology	The study of the earth's physical structure and substance, its history, and the processes that act on it.
geomorphic process	The physical and chemical interactions between Earth's surface and natural forces that shape landforms such as stream channels and floodplains over time. These processes are driven by tectonics and volcanism and weathering, erosion, and deposition by water, wind, and ice.
geothermal	Of or relating to the internal heat of the earth.
goals	A concise, broad statement of an organization's end or process that programs are designed to achieve. OAR 629-035-0030 requires that the FMP contain "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 (Greatest Permanent Value)."
greatest permanent value (GPV)	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 as defined in OAR 629-035-0020.
guidelines	A set of recommended or suggested methods or actions that should be followed in most circumstances to assist administrative and planning decisions, and their implementation in the field. They are provided as a broad framework of recommended actions to be taken and, thus, provide some flexibility for decision-making.
guiding principles	The overall rules, aims, and responsibilities that guide the planning process for the northwest Oregon state forests. Guiding principles are required elements for the FMP identified in the Forest Management Planning rule (OAR 629-035-0030).

H

Term	Definition
habitat	The resources, conditions, and factors necessary to support living organisms over space and through time. Improving habitat means improving the resources or conditions that support a species' health or the population's persistence.
habitat conservation area (HCA)	A protected area with boundaries established by the WOSF HCP intended to conserve, maintain, and enhance habitat for the terrestrial covered species.
habitat conservation plan (HCP)	A comprehensive planning document that is a mandatory component of an Incidental Take Permit (ITP) application pursuant to section 10(a)(2)(A) of the ESA. The WOSF HCP enables ODF to comply with the federal ESA for certain covered species while conducting land management activities on state forest lands west of the Cascade Crest.
hardwood stand(s)	Found on a minority of state forest lands. ODF classifies hardwood stands as those in which hardwood tree species comprise more than 50 percent of the stand's basal area.
harvest units	Delineated forest parcels that reflect potential harvest operation areas considering topography and access. A unit for silvicultural prescriptions such as regeneration and thinning harvests.
headwater	The source or uppermost tributaries and wetlands where larger streams begin, located at the higher elevations within a watershed
healthy forest landscapes	See *forest health*.

Term	Definition
historic or historical resources	Defined by state and federal law, these include artifacts, property, and sites: • Historic artifacts - Three-dimensional objects including furnishings, art objects, and items of personal property that have historic significance. Historic artifacts do not include paper, electronic media, or other media that are classified as public records (ORS 358.635). • Historic property - Real property that is 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. • Historic site - Sites created and/or used by humans since the time of Euro-American inhabitance; usually aboveground structural intact remains.
hydrologic processes	Describes how water is exchanged (cycled) through Earth's soil, geology, vegetation, and atmosphere through evaporation, transpiration, condensation, precipitation, infiltration, and subsurface flow. Hydrologic processes relate to how the landscape is shaped by water, for example how streams and floodplains form and change over time.
hydrology	The study of the properties, distribution, and effects of water on the landscape, under the surface, in the rocks, and in the atmosphere.

I

Term	Definition
implementation monitoring	Used to determine if objectives, standards, and management practices specified by law, regulation, policy, or the HCP are being implemented. Implementation monitoring is used to determine whether specified actions or criteria are being met. See definition for *monitoring*.
Implementation Plan (IP)	An ODF plan that describes the management approaches and activities designed to achieve the FMP goals and the WOSF HCP goals and objectives within a timeframe of approximately 10 years.

Term	Definition
Incidental Take Permit	A federal exemption to take prohibition of Section 9 of the ESA; the ITP is issued by the U.S. Fish and Wildlife Service pursuant to Section 10(a)(1)(B) of the ESA. An Incidental Take Permit is also referred to as a Section 10 Permit or Section 10(a)(1)(B) Permit. To take is to "... to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with regard to federally listed endangered species of wildlife (Section 3(18) of the ESA). Federal regulations provide the same taking prohibitions for threatened wildlife species (50 CFR 17.31(a)).
Indigenous Traditional Ecological and Cultural Knowledge (ITECK)	A body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes through interaction and experience with the environment. ITECK can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation. ITECK is grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. ITECK is inherently heterogeneous and unique to each Tribe, due to the cultural, geographic, and socioeconomic differences, as well as their history and the surrounding environment.
integrated pest management	A systematic approach that uses a variety of techniques to reduce pest damage or unwanted vegetation to economically and socially tolerable levels. Integrated pest management 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 resource management	The management of two or more resources in the same general area and period of time (e.g., water, soil, timber, grazing, fish, wildlife, and forests). Integrated resource management means that the design and application of management practices must consider the effects and benefits of all of the forest resources in such a way that those effects and benefits lead to achieving the goals in the FMP over time and across the landscape.

L

Term	Definition
landscape(s)	In ecological terms, an area of land containing a mosaic of different patches or ecosystems that interact through ecological processes and may change over time.
landscape context	Refers to the spatial relation of different patches (land management, habitat type, ecological processes, hydrological process, etc.) within the landscape and the values, constraints, or risks they impose on each other. See *landscape*.
landslide(s)	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 their cause and impact, such as shallow rapidly moving landslides and slow deep-seated landslides.
leave area	An area of standing timber retained among areas of logging activity to satisfy management objectives, such as providing seed sources or wildlife habitat.
leave trees	See *live trees*.
legacy structures, legacies, legacy retention, biological legacies	Structural components within a forest stand that are retained during harvest operations, and that provide habitat diversity in the future stand. Examples of legacy structure include live trees, snags, and downed wood.
lifeways	A traditional way of life reflecting customs, practices, and belief systems. This may include foods consumed, materials collected, religious practices.
listed, federally listed, or listed species	Species, including subspecies and distinct vertebrate populations, of fish, wildlife, or plants, listed at 50 CFR 17.11-17.12 as either endangered or threatened.
live trees, leave trees	Living trees that are retained to provide short-term habitat needs of wildlife species, to serve as a source of future snags and downed wood, and to provide legacy trees in future stands. This term also refers to living trees present in a stand that are legacies of a previous cohort of trees.

M

Term	Definition
management emphasis	See *emphasis areas*.
management prescription	The management practices and intensity selected and scheduled for application on a specific area to attain predefined goals and objectives.
mass wasting processes	Down slope movement of rock or soil due to the force of gravity. The four most common types of mass-wasting are falls, slides, flows, and creep. Falls are abrupt movements of rocks that have detached from steep slopes of cliffs. Slides are the movement of a mass of earth and rock from a mountain or cliff and can occur slowly or quickly. Examples of flow type are debris, mud, or earth. Creep (or soil creep) is a slow, long-term mass wasting process. The steeper the slope the faster the creep. Precipitation, chemical weathering, lithology (type of rock), and steepness of slope(s) contribute to mass wasting processes.
metrics	A quantifiable value, characteristic, or condition measured by monitoring programs. See *monitoring*.
monitoring	The measurement of metrics—to determine resource status or trends, document actions, or test research hypotheses with the goal of aiding adaptive management and decision-making.. • Implementation, or compliance, monitoring - Asks the question, “Did we do what we said we would do?” For example, did we leave the number of snags during a timber harvest required by law or policy? • Effectiveness monitoring - Asks the question, “Are the management practices producing the desired results?” For example, are snag retention practices resulting in improved habitat for a species of interest?

N

Term	Definition
native	Indigenous to Oregon and not introduced.
nine federally recognized Tribes in Oregon, Tribal Partners	Representatives of one or more of the nine federally recognized Tribes of Oregon. ORS 182.162–168 define state agencies' relations with federally recognized Tribes in Oregon when an agency develops or implements programs that may affect Tribes. The nine federally recognized Tribes of Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.
non-point 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 non-point source.
noxious weeds	Terrestrial, aquatic, or marine plants designated by the Oregon State Weed Board under ORS 569.615 as representing the greatest public menace and a top priority for action by weed-control programs.
nutrient cycling	Circulation or exchange of elements, such as nitrogen and carbon, between living and nonliving portions of the environment.

O

Term	Definition
objective(s)	A clear and specific statement of results to be achieved within a defined time period. An objective is measurable and implies precise time-phased steps to be taken and resources to be used, which, together, represent the basis for defining and controlling the work to be done.

Term	Definition
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 downed wood (such as fallen trees) on the ground. In western Oregon, old-growth characteristics begin to appear in unmanaged forests at 175–250 years of age.
operationally limited	By the FLMCS (OAR 629-035-0055), 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.
operational policy(ies)	Documented, specific standards and best practices for implementation and resource protection. Operational policies guide decisions within the range of options by outlining specific procedures and BMPs that allow for management flexibility, while ensuring sound management and resource protection. Operational policies include quantitative standards (e.g., riparian buffer widths, upland leave tree requirements) that align with laws and regulations, and FMP and WOSF HCP goals and strategies. Operational policies are developed within the State Forests Division under the direction of the State Forests Division Chief.
Operations Plan (OP)	Describes individual projects for achieving expected FMP and WOSF HCP outcomes, over the near term (for example 1–2 years), that align with fiscal budgets and IPs.
Oregon Conservation Strategy	Created by the Oregon Department of Fish and Wildlife to outline a set of priorities and recommendations for addressing Oregon's fish, wildlife, and habitat conservation needs. Strategy species in the Oregon Conservation Strategy are Oregon's species of greatest conservation need because they are experiencing population decline, habitat loss, and other issues that put them at risk.
outcomes	Projected or realized results of management activities conducted during IP and OP implementation.

P

Term	Definition
passive management	Typically allows resources to change over time with minimal human intervention. For example, forest stands could be allowed to grow and regenerate along their current successional trajectory—no reforestation, thinning, harvesting, site preparation or prescribed burning activities would be used.
patch(es)	A term fundamental to landscape ecology and silviculture, it is defined as a relatively homogeneous (same/similar) area of habitat or forest stand that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics.
pathogen(s)	A specific causative agent (such as a bacterium, fungus, or virus) of a disease.
performance measure(s)	A select set of metrics the BOF uses to evaluate management outcomes to ensure that the FMP continues to provide GPV. The performance measures have specific components set and monitored by the BOF with trends reported publicly.
planning area, plan area, or FMP area	Approximately 640,000 acres consisting of BOFL, Common School lands, and administrative sites west of the Cascade Crest.
policy	A definite, stated method or course of action adopted and pursued by an entity that guides and determines present and future decisions and actions. A policy establishes a commitment by which an entity is held accountable.
pollutant	A substance of such character and existing in such quantities as to degrade an environmental resource (i.e., water, air, or soil) by impairing its usefulness (including its ability to support living organisms).
population(s)	The organisms that constitute a particular group of a species, or that live in a particular habitat or area. A group of fish (e.g., Nehalem River fall chinook salmon) that spawn in a particular area at a particular time, and that 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 are considered a population (OAR, Division 7, 635-07-501(38)).

Term	Definition
prescribed burn/burning	Controlled fire burning under specified conditions to accomplish planned objectives; also called slash burning, as a frequent objective is to reduce the amount of slash left after logging. Objectives may include site preparation for planting and reduction of fire hazards or pest problems.
private and domestic drinking water	Systems serving three or fewer homes or connections with a water use permit issued by the Oregon Water Resources Department.
properly functioning aquatic habitat *or* condition	The range of diverse aquatic and riparian conditions over time and space that emulate the habitat conditions that resulted from natural disturbance regimes under which native species evolved.

R

Term	Definition
reciprocity	Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.
redundancy	The duplication of components or functions of a system with the intention of increasing the resilience of the system by assuring that some components remain intact even if a disturbance degrades a similar component elsewhere.
reforestation	Management to renew tree cover by planting and cultivating young trees. This can be accomplished by planting an area with trees or aerial seeding or passive natural regeneration.
refugia	Areas that remain unchanged while surrounding areas change markedly. The changes could be short term, such as wildfires, elevated stream temperatures, or human activity, or much longer term, such as periods of glaciation. Alternatively, refugia could refer to locations and habitats that support population of organisms that are limited to small fragments of their previous geographic range.
regeneration	The process of renewal of a forest or stand of trees, or young trees in a stand.

Term	Definition
regeneration harvest(s), regeneration harvesting	The removal of trees to make regeneration possible or to assist in the development of the established regeneration (young trees). Regeneration harvests can range from a clearcut to a retention cut. A clearcut removes almost all trees from a stand (see definition for *clearcut*) resulting in a new even-aged stand of trees. A retention cut retains more residual trees within the unit (between 33 and 80 square feet of basal area per acre), similar in look to a heavy thinning resulting in a stand with two distinct ages of trees following tree planting.
resilience, resiliency, resilient	Broadly, the ability of ecosystems to persist in response to pressure from episodic disturbances (e.g., wildfire) and chronic stress (e.g., warmer temperatures or prolonged drought from climate change). A resilient forest recovers the delivery of ecosystem services in response to multiple pressures.
resistance	The ability of a system to withstand disturbances.
restoration	Management actions taken to rehabilitate degraded forest lands to properly functioning condition such that lands are delivering ecosystem goods and services such as timber, fish and wildlife habitat, special forest products, carbon sequestration, and drinking water.
revenue(s)	The total income produced by an organization's operations, such as income generated by timber harvest operations.
riparian, 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 streambed or lakeshore.
riparian conservation area (RCA)	A protected area with boundaries established by the WOSF HCP; the width varies according to the stream classification or special protection needs. The purpose of an RCA is to protect the stream, aquatic resources, and riparian area. Aquatic resources include water quality, water temperature, fish, stream structure, and other resources. The WOSF HCP defines the rules that govern RCAs.

S

Term	Definition
salvage harvesting	The utilization of standing or downed trees that are dead, dying, or deteriorating, for whatever reason, before the timber values are lost.
scenic	Providing or relating to views of impressive or beautiful natural scenery.
scenic waterways, scenic river	A river, lake, or segment thereof, including related adjacent land and the airspace above, that has been so designated by or in accordance with the Scenic Waterways Act (ORS 390.805–390.925)
sensitive plants	Oregon's ESA listed threatened and endangered plant species administratively protected by the Oregon Department of Agriculture Native Plant Conservation Program (ORS 564.105; OAR 603-073), and candidate plant species considered for ESA listing.
seral, seral stages	Developmental stages that succeed each other as an ecosystem changes over time; specifically, the stages of ecological succession as a forest develops.
silvicultural, silviculture, silvicultural prescriptions	The practice of managing the establishment, composition, health, quality, and growth of the vegetation of forest stands and forest landscapes.
silviculturally capable	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).
site productivity	A measure of an area's relative capacity for producing timber or other vegetation. Forest site productivity is controlled by a complex relationship among topography, slope, aspect, soil depth, porosity, biology, and the availability of nutrients in the soil.
slash	Logging debris left in the forest after a harvest such as tree limbs and tops. Sometimes called logging residue.
slope stability	The degree to which a slope resists the downward pull of gravity. The more resistant, the more stable.
snag	A standing dead tree.

Term	Definition
Soil and Water Conservation Districts (SWCD)	The Oregon Department of Agriculture's SWCD Program provides services to the 45 Soil and Water Conservation Districts throughout Oregon. The districts work with local landowners and residents, natural resource organizations, natural resource users, and local, state, and federal governments to conserve natural resources, control and prevent soil erosion, conserve and develop water resources and water quality, preserve wildlife, conserve natural beauty, and promote collaborative conservation efforts to protect and enhance healthy watershed functions. The Oregon Department of Agriculture Soil and Water Conservation District Program offers trainings to help support district operations, directors, and staff. Their staff is also available to provide operational technical assistance by phone, email, or in person. SWCDs in Oregon are governed by an independently elected board of directors.
soil composition	The mixture of minerals, dead and living organisms (organic materials), air and water that make up soil. This mix of ingredients varies from place to place.
source areas	Areas in which a watershed is delivering water to a water system.
special forest products	Products, other than timber, collected for personal and commercial uses from forests.
species	Organisms of the same species share similar DNA, physical shape, form, and structure and are capable of producing fertile offspring.
species diversity	Diversity among species in an ecosystem. Species diversity accounts for the number of different species (species richness) and the relative abundance of each species (species evenness).
species of conservation concern	Those species included on federal or state ESA lists, state sensitive species, and the Oregon Department of Fish and Wildlife's Oregon Conservation Strategy species, which are currently present or have the potential to be present on state forest lands.
stand(s)	A contiguous group of trees or other vegetation in a specific area sufficiently uniform in composition, structure, age, size, or condition, such that it is distinguishable from adjacent areas for management purposes.

Term	Definition
stand density	In silviculture, measured as the amount of tree biomass per unit area of land. This can be measured as the number of trees, basal area, wood volume, or foliage cover.
stand initiation	Begins when new seedlings actively invade or sprout or are planted and begin to grow following 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.
Stand Level Inventory	Acquires and updates state forest vegetation information at the forest stand. This information is used for tactical and operational decision-making. The Stand Level Inventory includes vegetation sampling protocols, forest stand data arranged in a database, computer programs for managing and using the information, and documentation of inventory elements.
stand management	Silvicultural techniques to be applied at the stand level in pursuit of management objectives. See *silviculture*.
standard(s)	A working principle that establishes the measure of performance extent, values, quantity, or quality for a given activity or item.
State Forester	The Chief Executive Officer of the State Forestry Department and the Secretary to the BOF (ORS 526.031), nominated by the governor and confirmed by the State Senate.
State Forests Division Chief	The head of the State Forests Division.
State Historic Preservation Office	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.
State Land Board	Composed of the governor, secretary of state, and state treasurer. It was established under the Oregon Constitution to manage Common School Trust Lands and serve as trustee of the CSF.
stewardship	Responsible management of forest land to ensure its health, productivity, and biodiversity for current and future generations
stocking	A measure of the number of trees or basal area per acre in a stand.

Term	Definition
storied landscape	Within tribal contexts, refers to a multitude of intrinsically linked and deeply held understandings, relationships, and actions between indigenous cultures and the landscapes with which they interact throughout time, including but not limited to origin stories, landscape features, and wildlife attributes that signal hunting, gathering, planting, and other seasonal use patterns.
strategy(ies)	A carefully considered plan or method, more encompassing and on a larger scale than tactics, for achieving an objective. For the FMP, OAR 629-035-0030 requires "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."
stream	A water course having a distinct 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 because this type of flow does not have a defined channel.
stream classification	Used to apply stream protections. Streams are classified using a combination of FPA and WOSF HCP classifications.
stream reach	A section of a stream along which similar hydrologic conditions exist, such as channel gradient, form, or other physical parameters.
structure(s)	The physical parts of an ecosystem that can be seen and touched; typical structures in a forest are trees of various sizes, standing dead trees (snags), and fallen dead trees.
successional	A series of changes by which one group of organisms succeeds another group; a series of developmental stages in a plant community.

Term	Definition
sustainability, sustainable	Sustainability is the ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time. Sustainable forest management describes forest management regimes that maintain the productive and renewal capacities, as well as the genetic, species, and ecological diversity of forest ecosystems.
swale	Shallow, gently sloping, or depressed area of land that functions to capture and infiltrate runoff, that can collectively serve to reduce erosion and sustain streamflows.
Swiss needle cast (SNC)	A foliage disease specific to Douglas fir caused by the fungal pathogen *Nothophaeocryptopus gaeumannii*. SNC symptoms include yellow needles and decreased needle retention, resulting in sparse crowns and reduced diameter and height growth.

T

Term	Definition
tectonic	Resulting from changes in the Earth's crust.
threatened and endangered species	Endangered species are those plants and animals that have become so rare they are in danger of becoming extinct. Threatened species are plants and animals that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Federal and state agencies make formal classifications of wildlife species, according to standards set by federal and state ESAs.
trade-offs	An exchange of one thing for another. Understanding trade-offs is a critical part of decision-making and planning where maximizing benefits from all resources is not possible everywhere at the same time.

Term	Definition
Traditional Cultural Places	The National Historic Preservation Act and the 36 CFR 800 regulations implementing the act refer to "properties of traditional religious and cultural significance." These are geographic places prominent in a particular group's cultural practices, beliefs, or values, when those practices, beliefs or values: (i) are widely shared within the group, (ii) have been passed down through the generations, and (iii) have served a recognized role in maintaining the group's cultural identity for at least 50 years.
transformation	The process of an ecosystem changing to a condition that is different from historic structure, composition, or function. Both active and passive management can guide or allow transformation, respectively.
Travel Management Area(s)	Designated areas where it is restricted to operate or to be transported in a motor-propelled vehicle during certain dates as designated by the Oregon Department of Fish and Wildlife.
Tribal Partners, nine federally recognized Tribes of Oregon	Representatives of one or more of the nine federally recognized Tribes of Oregon. ORS 182.162–168 define state agencies' relations with federally recognized Tribes in Oregon when an agency develops or implements programs that may affect Tribes. The nine federally recognized Tribes of Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.

U

Term	Definition
understory	The layer of vegetation beneath the main canopy of a forest.
unimpeded access	Provides reasonable opportunity for access, considering human safety, infrastructure, and topographic constraints.
uplift (geologic)	The process by which Earth's surface slowly rises either due to an increasing upward force applied from below or decreasing downward force (weight) from above.

V

Term	Definition
variable retention harvest	Timber harvest that is a combination of thinned and unthinned areas with regeneration patch cuts to create openings intended to mimic small-scale natural disturbances.
viewshed(s)	An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point and often is considered valuable or worth preserving for aesthetic reasons.
visually sensitive corridor	The area within 150 feet (measured on the slope) of the outermost edge of the roadway along both sides of the highway.

W

Term	Definition
watershed(s)	An area within which all water that falls as rain or snow drains to the same stream or river. Watersheds can vary greatly in size, from that of a small stream to a larger waterbody.
watershed council(s)	Based in local communities across the state. While natural resource specialists lead the councils, their boards of directors are made up of local community members. They assess and monitor environmental conditions and conduct voluntary conservation projects to restore and enhance the waters and lands for native species and people. They work with local landowners, community members, companies, elected officials and agencies. The Oregon legislature encourages local governments to form watershed councils (ORS 541.910).
watershed restoration project(s)	Per the Oregon Watershed Enhancement Board, specifies involvement of an on-the-ground element such as riparian planting, fish habitat construction, wetland restoration, livestock grazing plans, and water conservation projects that support watershed processes, which support watershed health.
wetland(s)	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."

Term	Definition
windthrow	Trees felled by high winds.
working forest(s)	As defined by Oregon Forests Resources Institute, "forests where the sustainable production of timber is carefully balanced with protecting other important resources such as water quality and wildlife habitat are known as 'working forests.' After timber is harvested from these forests, they are replanted and harvested again in a sustainable process that may span decades, and even lifetimes."

Y

Term	Definition
young stand management	Activities that benefit growth of stands after regeneration harvest or natural disturbance and can include replanting, herbicide application to reduce competition, and precommercial thinning to enhance tree size and growth rate.

APPENDIX A

Public Engagement

The engagement process ensured that interested parties had opportunities to provide meaningful input on the development of the *Western Oregon State Forests Management Plan* (FMP). This appendix is a high-level summary of the stakeholder, public, and tribal engagement efforts, including the engagement approach, goals, and activities.

Goals, Methods, and Key Audiences

A comprehensive strategy for public engagement and communications was developed early in the FMP process. The goals of the stakeholder engagement process included the following items.

- Fully informing counties, Tribes, stakeholders, and the general public throughout the FMP development process.
- Providing counties, Tribes, stakeholders, and the public with opportunities to engage and offer input at multiple levels throughout the process.
- Obtaining a better understanding of what Oregonians care about when it comes to forest management.
- Ensuring state agencies are engaged as an integral part of the process and are supportive of the FMP outcomes.
- Providing clear expectations for how stakeholder and public input will be used and integrated into the FMP.
- Aligning engagement and outreach opportunities with related processes such as the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP) National Environmental Policy Act (NEPA) process and other Oregon Department of Forestry (ODF) processes.

ODF developed the FMP through a combination of content development by staff and technical experts and feedback from stakeholders and the public. The process for developing the FMP and integrating feedback from stakeholders and the public is listed below.

- **Internal content development**. ODF worked with staff and technical experts to develop draft content.
- **Internal review**. ODF distributed content to ODF leadership, field staff, executive sponsors, and state partners for review.
- **Internal revisions**. ODF staff and technical experts reviewed internal feedback and revised content.
- **Leadership review and approval**. ODF leadership reviewed revised content and requested additional edits or approved content for external sharing.
- **Shared content with the Board of Forestry and committees**. ODF shared content with the Oregon Board of Forestry (the BOF), Forest Trust Lands Advisory Committee, and State Forests Advisory Committee.
- **External review and input**. ODF shared content with the public and stakeholders for review.
- **Review of external feedback and revisions**. ODF reviewed external input and revised content accordingly.

Key Audiences

The engagement effort sought to involve all potentially affected and/or interested individuals, communities, and organizations. The process involved the following groups.

- The BOF
- Counties, including the Forest Trust Land Advisory Committee (FTLAC)
- Business and economic organizations
- Civic groups
- Conservation and wildlife groups
- Elected officials
- Existing ODF advisory groups, including the State Forests Advisory Committee
- Federal and state agencies
- General public
- Groups involved in forest management including foresters and fisheries
- Media
- ODF district staff
- Recreational users of the forest

- Small woodland, private forest landowners, and farm and agricultural interest groups
- Tribal representatives
- Timber and forest products industry

The following sections outline the key stakeholder and public engagement activities and include details on the convening interviews, surveys, FMP state agency meetings, meetings open to the public, and stakeholder meetings.

Interviews

County representatives and stakeholders provided their reflections from the past WOSF HCP engagement process, discussed ideas and suggestions for an effective FMP public engagement process, and expressed key interests and concerns related to FMP development. Thirteen virtual interviews took place with individuals of the following entities.

- FTLAC
- 350PDX
- Association of Oregon Counties
- Association of Oregon Loggers
- Cascadia Wildlands
- County Commissioners
- EcoTrust
- Hampton Lumber
- Oregon Forest Industries Council
- Oregon Wildlife Society
- Rasmussen Group
- State Forests Advisory Committee
- The Nature Conservancy
- Trout Unlimited
- Wild Salmon Center

Surveys

ODF developed two surveys to gather feedback from the public on draft goals and strategies. For the draft goals survey, participants were asked to rank support for each goal and provide general feedback. ODF then summarized the goals and posted them to the project website. For the draft strategies survey, participants were asked if the strategies were sufficient to meet their corresponding goal. Participants were also asked to share if the strategies were on the right track, if anything was missing, or if any modifications were needed. A feedback summary was posted to the website. The following is a summary of those results.

- The survey on the Draft FMP Goals was sent out in August 2021; 54 individuals responded, providing a total of 459 comments.
- The survey on the Draft FMP Strategies was sent out in December 2021; 1,344 individuals responded, providing a total of 3,322 comments.
- ODF also solicited email feedback from stakeholders and the public on the Draft FMP Strategies and received 318 email responses.

State Agency Meetings

ODF has continued to work with state agencies throughout the development of the FMP. The FMP state agencies include government agency representatives from the Oregon Department of Environmental Quality, Oregon Department of State Lands, and Oregon Department of Fish and Wildlife. Members have been meeting approximately monthly from June 2021 through spring 2026. Members voluntarily work together to provide advice on how the FMP can achieve a mutually acceptable outcome that satisfies, to the greatest degree possible, the interests of all participants. FMP state agencies also serve on the WOSF HCP Scoping Team, allowing for continuity between the two processes.

Meetings Open to the Public

ODF engaged the public early in the FMP development process, occurring between 2021 and 2023, and during the FMP rulemaking process, starting in 2025. During early FMP development, ODF held public meetings via webinars, because of COVID-19 pandemic concerns. Stakeholders and members of the public were invited to meetings open to the public using ODF's GovDelivery notification system. GovDelivery was also used to share links to materials, meeting recordings, and surveys.

Five western Oregon FMP meetings open to the public took place between May 2021 and February 2023. The meetings open to the public included updates on the FMP process, presentations, and question-and-answer discussions followed by informal discussions with meeting participants to discuss topics of most interest to participants. During meetings open to the public, ODF answered questions and received comments on the development of the FMP. Following the meetings, comments related to goals and strategies were provided to ODF to inform revisions.

ODF notification to inform stakeholders and the public about the meetings included the following methods.

- Email distributions to interested parties
- Posts on ODF social media including Facebook and Twitter

- Meeting notices via FlashAlert to media in areas that could be covered in the WOSF HCP (including Portland media)
- Posts on the ODF news site
- Posts on the WOSF HCP and FMP project webpages

The meetings open to the public received strong participation and engagement. Attendance ranged from approximately 40 to 90 participants (Table A-1).

TABLE A-1 Public Meetings

Open Public Meeting Date	Attendees	Meeting Purpose
May 6, 2021	Over 70 members of the public attended via webinar	• Provide an introduction to the FMP project and describe the engagement process for this effort. • Provide an update on the WOSF HCP and orientation to the Draft WOSF HCP on the ODF website. • Provide updates on the WOSF HCP NEPA process.
August 10, 2021	Over 70 members of the public attended via webinar	• Provide an update on the FMP project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.
October 12, 2021	40 members of the public attended via webinar	• Provide an update on the FMP and regional project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.

Open Public Meeting Date	Attendees	Meeting Purpose
December 7, 2021	Over 50 members of the public attended via webinar	• Provide an update on the FMP and regional project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.
February 7, 2023	Over 90 members of the public attended via webinar	• Provide an update on the WOSF FMP and describe the upcoming engagement process. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.

As part of the rulemaking process, ODF held two public comment periods. The first public comment period took place from November 1, 2025 through January 31, 2026. The second public comment period took place in June 2026. The first comment period included one virtual public hearing and three in-person public hearings—located in Forest Grove, Tillamook, Eugene—in January 2026. One virtual public hearing was held in June 2026, as part of the second public comment period. ODF revised the draft FMP in consideration of public comments.

Stakeholder Meetings

The project team conducted meetings with interested parties who expressed a cross-section of interests. The purpose of these meetings was to review and discuss FMP goals and strategies or topics as requested. The project team conducted three large meetings and several small meetings as requested. Stakeholder groups included conservation interests, industry representatives, and recreation interests.

ODF held several joint stakeholder meetings to discuss the development of the FMP (Table A-2). These meetings provided an opportunity for stakeholders to learn more about the FMP development process and to provide specific feedback on the draft and strategies of the FMP. Feedback from the meetings was captured in meeting summaries and shared with ODF to inform the FMP. Links to meeting summaries, recordings, and surveys were made available to participants via email.

TABLE A-2 Stakeholder Meetings

Meeting Date	Attendees	Meeting Purpose
Joint Stakeholders		
August 18, 2021	24 stakeholders attended the meeting, 71 comments received	• Review and discuss draft FMP goals.
December 9, 2021	42 stakeholders attended the meeting	• Review and discuss draft FMP strategies on climate change, carbon, drinking water, forest resilience, wildfire, and soil.
December 13, 2021	40 stakeholders attended the meeting	• Review and discuss draft FMP strategies on timber production, restoration, wildlife, aquatics and riparian, revenue, and recreation, education, and interpretation.
Conservation Interests		
June 24, 2021	Two stakeholders attended the meeting	• Discuss drinking water issues related to the FMP.
February 14, 2022	Three stakeholders attended the meeting	• Discuss FMP goals and strategies feedback.
Industry Representatives		
February 17, 2022	Three stakeholders attended the meeting	• Discuss FMP goals and strategies feedback.

ODF also engaged in several meetings and phone calls with individual stakeholders throughout the process to check in on the development of the FMP and to understand their interests, concerns, feedback, and suggestions as they relate to the FMP.

Forest Trust Land Advisory Committee

ODF provided updates on the FMP during the following FTLAC meetings.

- May 28, 2021
- August 27, 2021
- September 17, 2021
- October 8, 2021
- December 3, 2021

- February 18, 2022
- August 12, 2022
- February 24, 2023
- April 14, 2023
- August 11, 2023
- November 3, 2023
- February 23, 2024
- May 24, 2024
- November 15, 2024
- May 23, 2025
- November 7, 2025
- December 19, 2025

In fall 2024, the BOF, FTLAC, and State Forests Division (Division) staff discussed potential timber harvest scenarios the Division would model to demonstrate a range of possible trade-offs among resource goals under the proposed FMP and WOSF HCP governance framework. At the June 4, 2025 BOF meeting, Division staff shared the results of the modeled scenarios for discussion between the BOF, FTLAC, and Division staff to assess whether the range of potential outcomes under the proposed FMP could be sufficient to meet greatest permanent value (GPV). Informed by the discussion with FTLAC, the BOF provided feedback to guide the Division in developing subsequent harvest scenarios presented in fall 2025 and winter 2026, which inform future Implementation Planning and contribute to further defining measures for reporting to the BOF on FMP performance.

State Forests Advisory Committee

ODF provided updates on the FMP during the following State Forests Advisory Committee meetings.

- April 23, 2021
- June 11, 2021
- October 29, 2021
- April 8, 2022
- June 24, 2022
- October 27–28, 2022
- April 7, 2023
- June 1–2, 2023

- October 27, 2023
- March 8, 2024
- May 17, 2024
- October 25, 2024
- October 24, 2025
- March 20, 2026

Tribal Sovereign Nations' Coordination

ODF has engaged Tribal Partners in the government-to-government framework on the development of the cultural resources goals and strategies through six individual tribal workgroup meetings from August 2021 to March 2022. ODF will continue to work with Tribal Partners in this forum to integrate their interests in ODF's planning and implementation processes at every level.

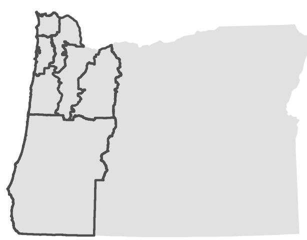
Tribal Partners include the following nine federally recognized Tribes of Oregon: Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.

Prior to entering the rulemaking process, ODF provided a revised FMP for comment from September 1, 2025 through January 31, 2026.

FIGURE B-1

Western Oregon FMP Planning Area

639,573 Acres Managed by ODF



District Boundary
City Limit

FMP Planning Area

Board of Forestry
Common School Lands
District Office
Tillamook Forest Center
Districts

N

0 25 50
Miles

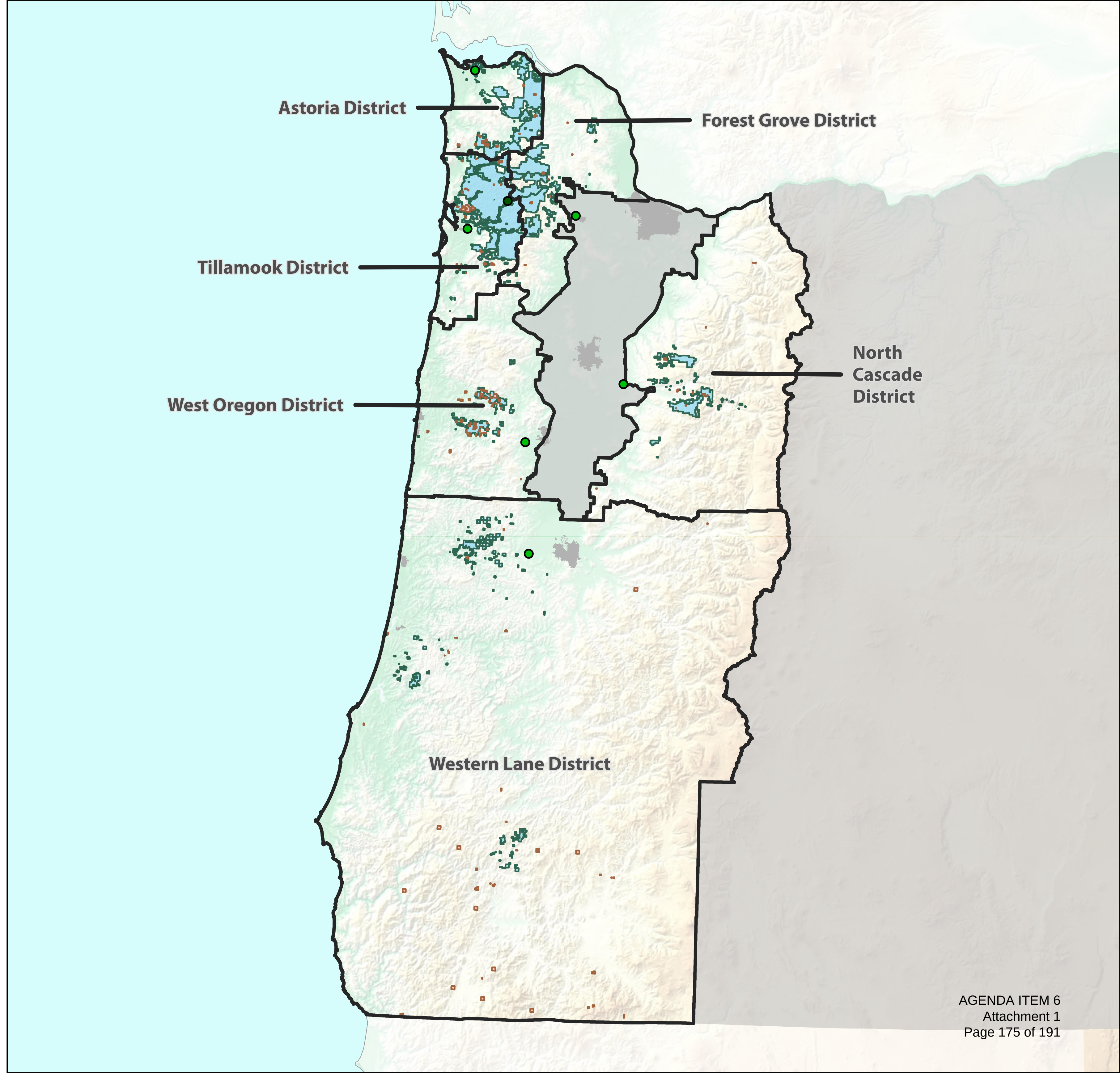


FIGURE B-2

Astoria District Planning Area

136,856 Acres Managed by ODF

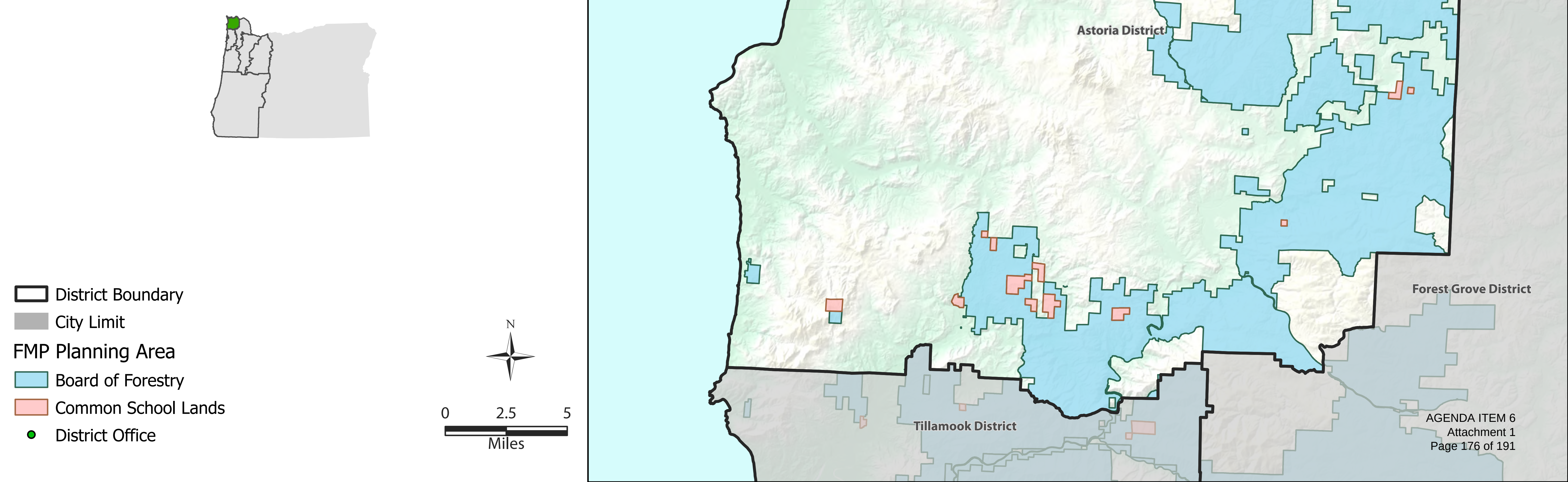
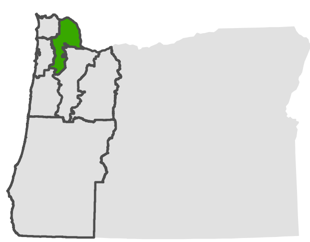


FIGURE B-3

Forest Grove District Planning Area

115,009 Acres Managed by ODF



District Boundary
City Limit

FMP Planning Area

Board of Forestry
Common School Lands
District Office
Tillamook Forest Center

N

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Miles

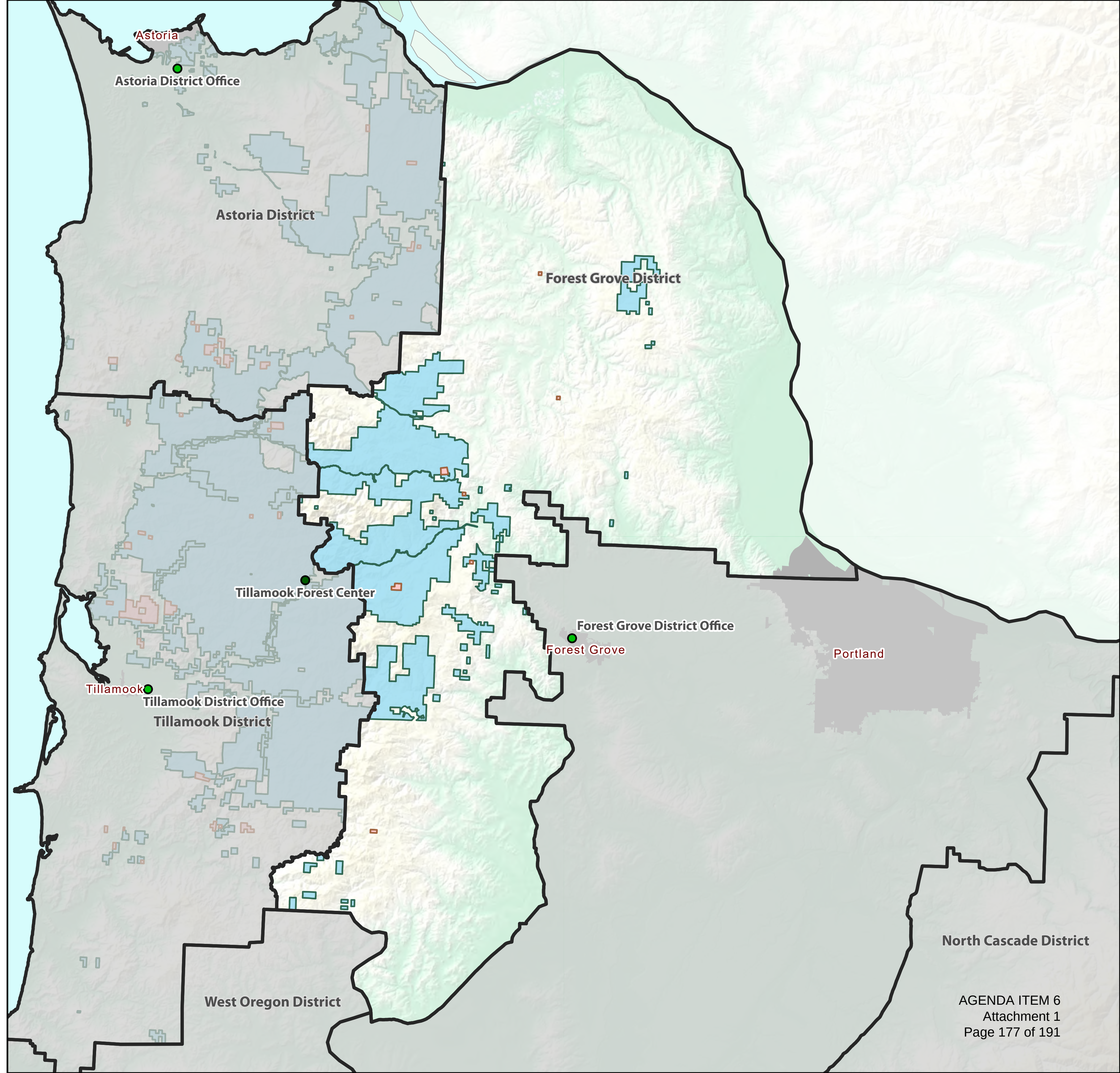
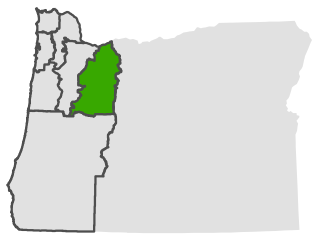


FIGURE B-4

North Cascade District Planning Area

47,475 Acres Managed by ODF



District Boundary

City Limit

FMP Planning Area

Board of Forestry

Common School Lands

District Office

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Miles

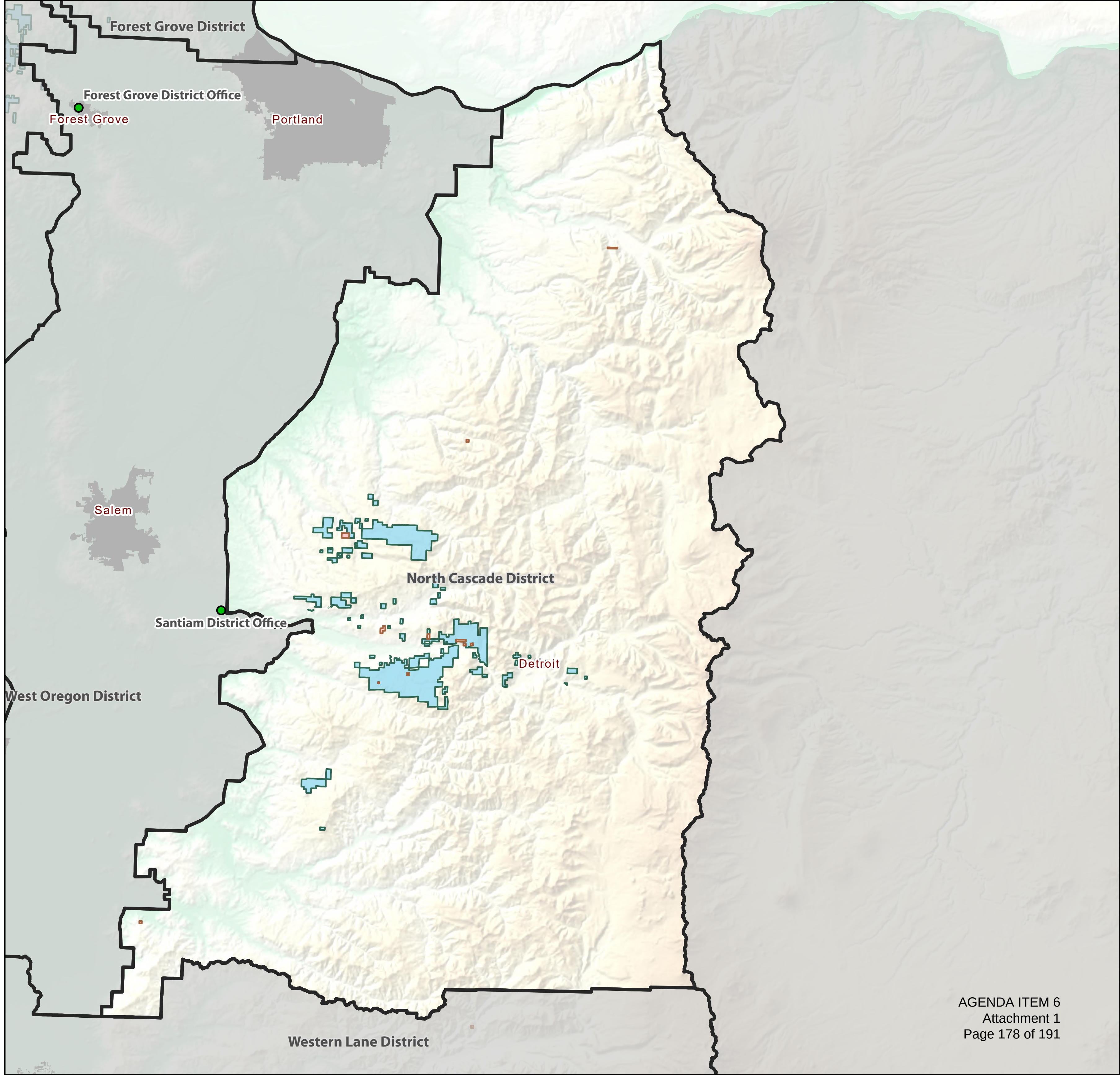
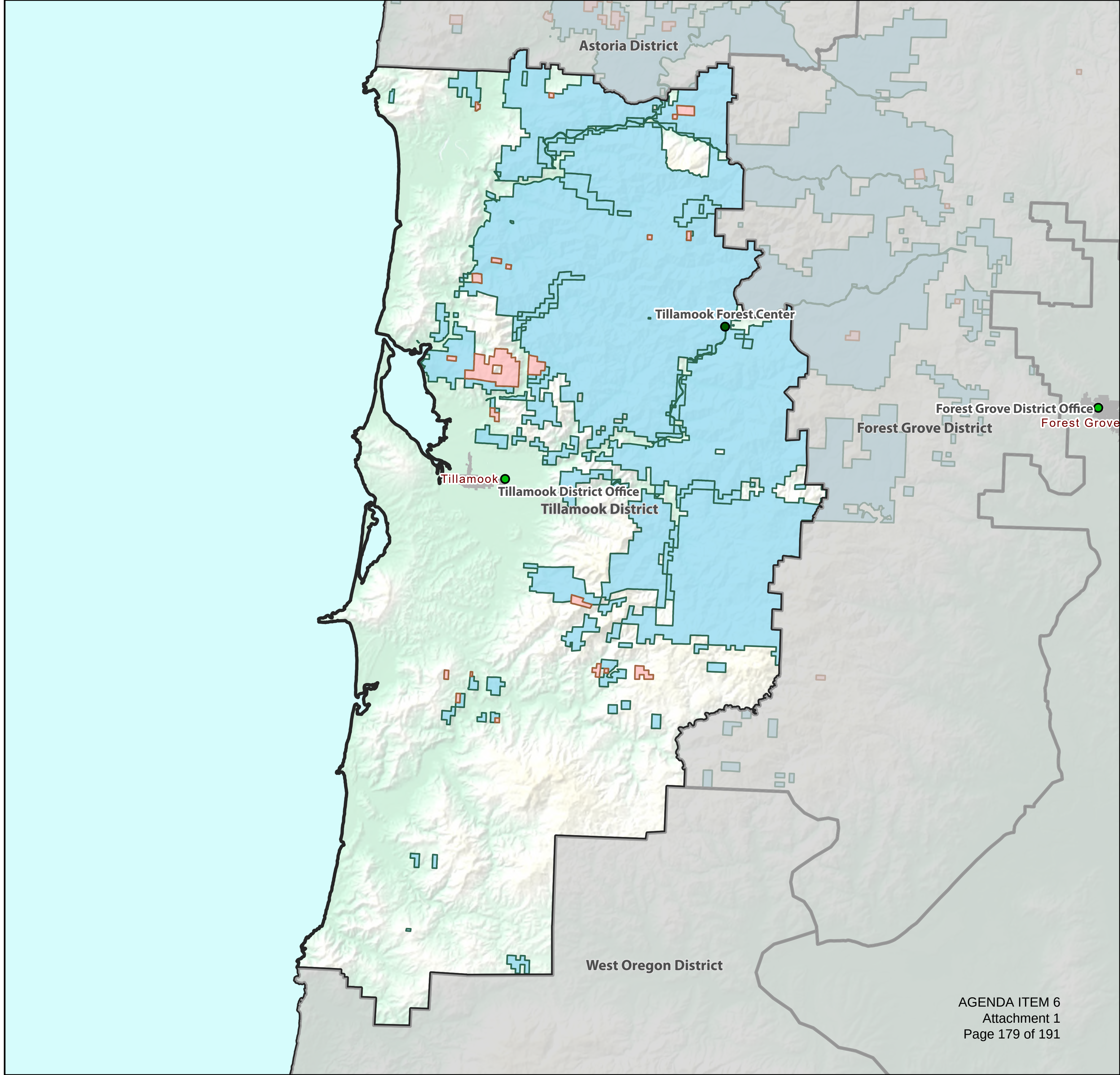
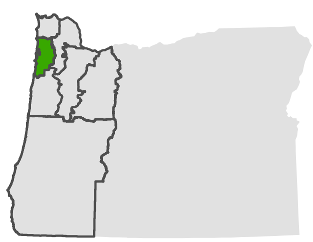


FIGURE B-5

Tillamook District Planning Area

250,589 Acres Managed by ODF





District Boundary
City Limit
FMP Planning Area
Board of Forestry
Common School Lands
District Office
Tillamook Forest Center

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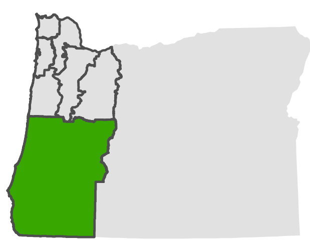
Miles

FIGURE B-6

Western Lane District Planning Area

53,031 Acres Managed by ODF



District Boundary
City Limit

FMP Planning Area

Board of Forestry
Common School Lands
District Office

N

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Miles

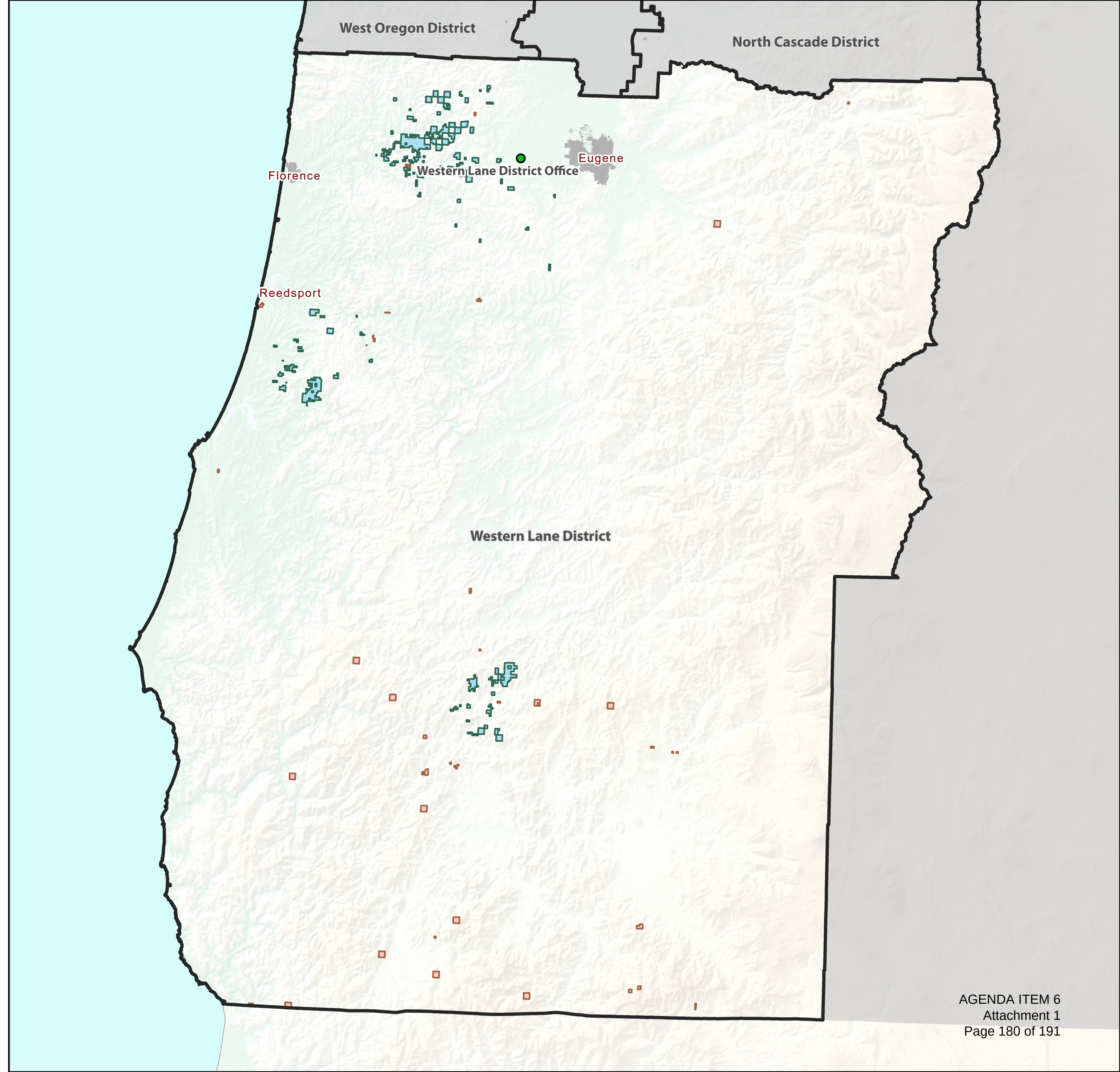
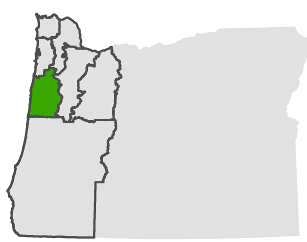
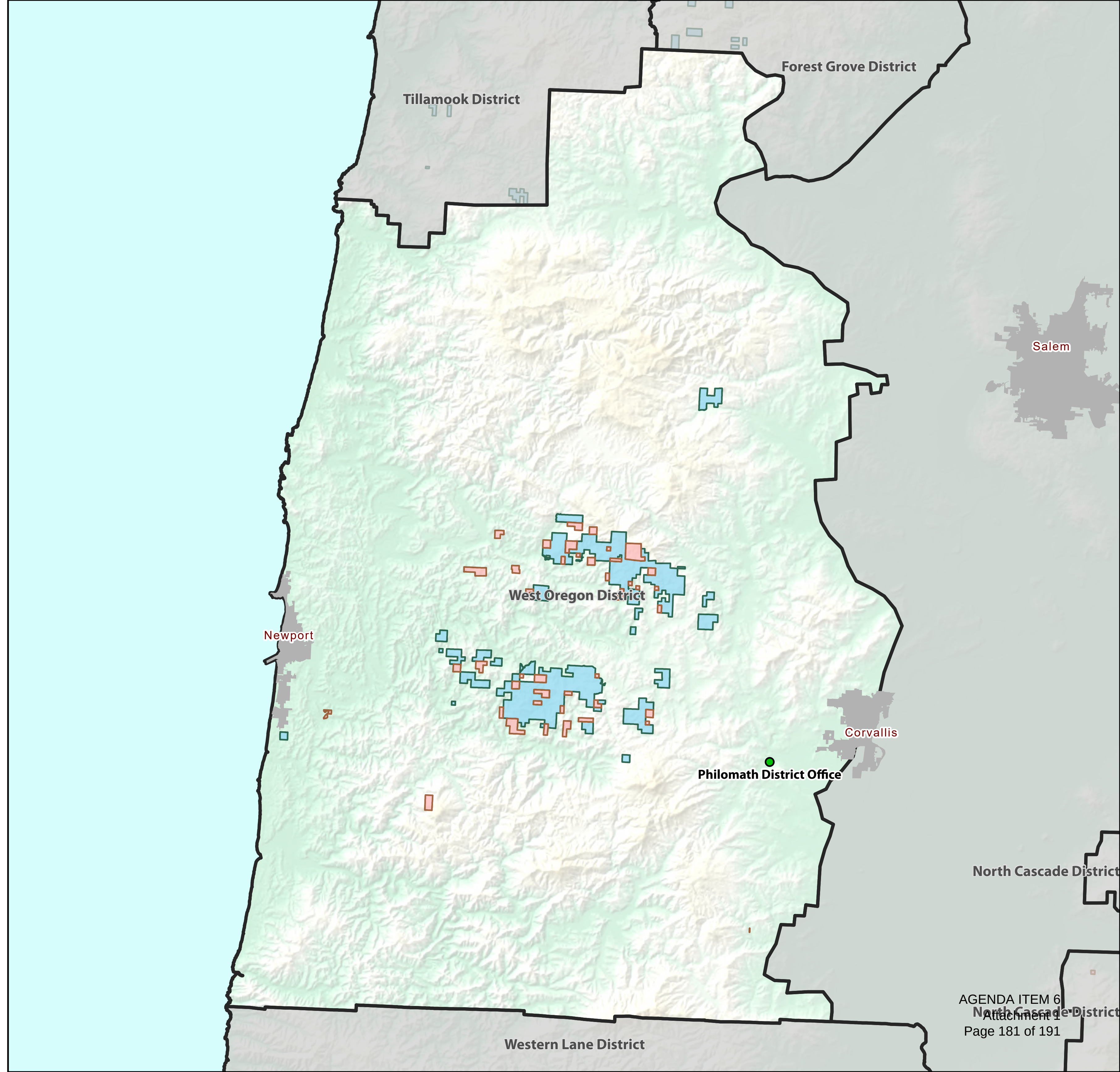


FIGURE B-7

West Oregon District Planning Area

36,613 Acres Managed by ODF





District Boundary
City Limit
FMP Planning Area
Board of Forestry
Common School Lands
District Office

N

0 5 10
Miles

Appendix C
Description of Figures

The Oregon Department of Forestry (ODF) makes every attempt to ensure our documents are accessible. Should you need additional assistance, please contact us at ODF.StateForestMP@ODF.oregon.gov for accessibility assistance.

Land Acknowledgement

No figures.

Chapter 1 Introduction

Figure Number	Figure Title	Description of Figure
1-1	**Greatest Permanent Value Categories and Icons.** GPV category icons are used throughout Chapter 3, *Forest Resources, Goals, and Strategies*, to indicate connections with social, economic, and environmental resources and concepts.	Examples of social connections include the protection of cultural resources; recreation, education, and interpretation opportunities; and opportunities to collect special forest products (e.g., firewood, edible fungi, and salal). Examples of economic connections include sustainable and predictable production of forest products that support local and regional economies, including revenue generation for local taxing districts and management of state forest lands. Examples of environmental connections are healthy, sustainable, resilient forests; properly functioning

Figure Number	Figure Title	Description of Figure
		aquatic habitats for native fish and aquatic life; habitat for native wildlife; and carbon sequestration and storage.
1-2	**Relationship with Other Supporting Plans and the Planning Process.** This figure provides additional detail about how federal and state laws and supporting implementation documents work in conjunction with the FMP to inform the tiered planning levels of implementation.	The FMP provides overall high-level forest management goals and strategies. It is based on federal and state law and the plan itself is a state law. Supporting documents provide additional standards or requirements to implement the FMP. Federal and state laws, including the FMP, as well as the supporting documents, guide IPs, IPs are sub-geographic plans with mid-level objectives, management approach, and activities. IPs guide OPs. OPs include operational and project-level detail. Monitoring and reports are the result of implemented OPs, and those results inform the adaptive management process. The adaptive management process is the process by which supporting documents may be adjusted.

Chapter 2 Management Approach

Figure Number	Figure Title	Description of Figure
2-1	**Social, Economic, and Environmental Reciprocity.** Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.	Figure 2-1 is a flowchart that depicts the connections between ecosystems, humans, and the reciprocity between ecosystem services and services to ecosystems. Ecosystem services provided by the ecosystem itself include provisioning services like timber products, food, and clean air and water; regulating services like carbon storage; cultural services like recreational and spiritual benefits; and supporting services like soil formation and pollination. Human actions that can serve ecosystems include protecting services like fish and wildlife habitat protection, enhancing services like thinning, restoring services like stream enhancement projects, and supporting services like natural resource stewardship practices.

Figure Number	Figure Title	Description of Figure
2-2	**Ecologically Sustainable Forest Management.** Practices that promote adaptive capacity to secure GPV.	Figure 2-2 is a flowchart of ecologically sustainable forest management that promotes adaptable, productive, sustainable ecosystems through designated emphasis areas, management of landscape conditions, and management of stands. Within emphasis areas, example practices include protection of wetlands and steep slopes. Within Landscapes, example practices include habitat connectivity and structural diversity. Within Stands, example practices include retention and reforestation with diverse or alternate species mixes. Ecologically sustainable forest management aims to provide social, economic, and environmental ecosystem services, such as cultural values, recreation, education, and interpretation opportunities; sustainable and predictable production of forest products that generate revenue and support the economy; properly functioning aquatic habitat for fish and aquatic life; habitats for native wildlife; clean air and water; and other important services.
Text Box	**Subclasses of the Forest Land Management Classification System.** Each area designated as focused, special, or high value conservation stewardship is categorized according to subclasses that denote the resource emphasis.	The text box lists the subclasses and their FLMCS stewardship class. Administrative sites are classified as Special Use stewardship. Agriculture, grazing, and wildlife forage areas can be classified as Focused Stewardship or Special Use. Aquatic and riparian habitat areas can be classified as Focused Stewardship or High Value Conservation Stewardship. County or Local Comprehensive Plan areas are classified as Special Use. Cultural resources areas are classified as Focused Stewardship or Special Use. Deeds are classified as Focused Stewardship or Special Use. Domestic water use areas are classified as Focused Stewardship or Special Use. Easements are classified as Focused Stewardship or Special Use. Energy and materials areas are classified as Focused Stewardship or Special Use. Operationally limited is classified as Special Use. Plant areas are classified as Focused Stewardship. Recreation areas are classified as Focused Stewardship or Special Use. Research and

Figure Number	Figure Title	Description of Figure
		Monitoring areas are classified as Focused Stewardship or Special Use. Transmission corridors are classified as Focused Stewardship or Special Use. Unique Threatened or Endangered Plant areas are classified as HVCAs. Areas with visual values are classified as Focused Stewardship or Special Use. Wildlife habitat areas are classified as Focused Stewardship, Special Use, or HVCAs.
2-3	**Landscape-Level Forest Stand Diversity Contributions to Ecosystem Function**. Management across the landscape supports diversity, connectivity, complexity, and redundancy, which, in turn, supports adaptive capacity of the forest for sustained ecosystem services delivery under changing conditions.	Figure 2-3 shows three pictures characterizing different contributions of seral stand conditions: young, middle-age, and older. Stand seral diversity contributes value to the ecosystem. The design of stand seral conditions across the landscape supports diversity, connectivity, complexity, and redundancy, which enhances function and improves adaptive capacity. Young forests (depicted by picture of a deer) are sunlight-filled and provide many wildlife species with abundant food resources, including berries, forbs, and grasses. Middle-age forests (depicted by picture of a salamander) are transitional forests contributing to wildlife habitat connectivity as they mature and develop stand characteristics found in older forests. Older forests (depicted by picture of an owl) contain multi-layered canopies, large trees, snags, and downed wood that provide wildlife nesting, roosting, and denning habitats.
2-4	**Examples of Emphasis Areas across the Landscape.** Active management is integrated across the landscape guided by resource management emphasis areas.	Figure 2-4 shows two aerial views of the same managed landscape highlighting how different timber harvest treatments may be applied in areas with different management emphasis by subclasses and stewardship classes. View A shows aquatic and riparian habitat and wildlife habitat subclasses around and near streams with the stewardship class being HVCAs. View B shows recreation subclass emphasis areas day use sites and the Tillamook Forest Center, where Special Use applies, and trails and dispersed campsites, where Focused Stewardship applies.

Chapter 3 Forest Resources, Goals, and Strategies

Figure Number	Figure Title	Description of Figure
3-1	**Distribution of Stand Ages as a Percentage of Area of Western Oregon State Forests.** Stands in the 60–89 year age bracket represent the plurality of stands, reflecting the management history of state forest lands. Reforestation following a period of salvage logging and a series of wildfires in the early 20th century resulted in a large number of stands in this age range.	Figure 3-1 is a bar graph showing the age distribution of stands in western Oregon state forests in percentages by 30-year-old age groups. The percent of acres with stands 0–29 years old is 24%, 30–59 years old is 24%, 60–89 years old is 40%, 90–119 years old is 10%, and 120 years or older is 2%.
3-2	**Tree Species Composition in Western Oregon State Forests.** Stand composition affects potential vulnerabilities or resilience to disturbances and stressors such as insect outbreaks, pathogens, fire, windthrow, drought, and climate change.	Figure 3-2 is a bar graph showing the percentage of acres of different tree species in western Oregon state forests. The dominant forests are mixed Douglas-fir at 42%, followed by homogenous Douglas-fir at 31%. Hemlock and mixed hemlock stands are approximately 9%. Hardwoods and mixed hardwoods are 14%. Other species and non-forested lands are at approximately 4%.
Text Box	**State Forests Revenue Disbursement**	The text box shows a pie chart of state forests revenue disbursement. 98% of State Forests Division revenue is generated from timber sales. 63.75% of state forest revenue is distributed to local counties and taxing districts for local services and schools. 36.25% of state forest revenue is retained by the State Forests Division for forest management and restoration.
3-3	**State Forest Roads by District.** There are approximately 4,500 miles of road on state forest lands; approximately 85% of these roads are surfaced (primarily graveled, though	Figure 3-3 is a bar chart showing the miles of state forest roads by district and what portion of those roads are unsurfaced. Astoria District has approximately 1,000 miles of roads of which 7% are unsurfaced, Forest Grove has approximately 800 miles of which 5% are unsurfaced. North Cascade has

Figure Number	Figure Title	Description of Figure
	some main travel routes are paved).	approximately 400 miles of which 16% are unsurfaced, Tillamook has almost 1,500 miles of which 18% are unsurfaced. West Oregon and Western Lane Districts each have approximately 350 miles of roads. Approximately 27% of roads for West Oregon and 44% for Western Lane are unsurfaced.
Text Box	**Tillamook Forest Center Annual Overview**	The text box shows average data from fiscal year 2024 and 2025. Approximately 62,700 people visited the Tillamook Forest Center. People gave approximately 3,070 volunteer hours. Approximately 2,700 people participated in education programs and 5,200 people participated in interpretive services.
3-4	**Scenic Waterways.** Scenic-designated segments of the Nestucca, Nehalem, and Rogue Rivers flow through the planning area.	Figure 3-4 is a four-panel map showing the scenic-designated segments of rivers within different districts of the planning area. One panel shows an overview of western Oregon state forest districts and the state's scenic-designated water ways. The other panels show details of which districts have sections of scenic waterways. A segment of the Nehalem River Scenic Waterway flows through the Astoria and Tillamook Districts. A segment of the Nestucca Scenic Waterway flows through both Tillamook and Forest Grove Districts. And a segment of the Rogue Scenic Waterway flows through Western Lane District.
3-5	**Slope Steepness across the Planning Area.** The highest percentage of steeper slopes in the planning area are in the Tillamook and Western Lane Districts.	Figure 3-5 is a bar graph showing acres of each district that are 0–30% slope, 30–60% slope, and >60% slope. Tillamook District has approximately 125,000 acres of the total district area of 250,000 acres that have slopes greater than 60%, the largest area of all districts.
3-6	**Forest Soils Developed on Marine Siltstones in Less Rugged Coastal Areas.** Soils formed on underlying marine sedimentary formations from deep weathering are predominantly silts, sands, and clays with minor amounts of	Figure 3-6 is an annotated photograph of a soil profile, showing the demarcation between underlying geologic formation of marine siltstone below the forest soils composed of silt, clay, and sand. A rock hammer is located in the center of the photo at the line indicating the border between soil and underlying marine silt stone to show scale.

Figure Number	Figure Title	Description of Figure
	gravel and can be wet most of the year.	
3-7	**Fine- and Coarse-Grained Soils by District.** The Tillamook District has the highest proportion of coarse-grained soils in the planning area.	Figure 3-7 is a bar graph showing acres of each district that are either fine- or coarse-grained soils. Astoria, West Oregon, and Western Lane Districts have predominantly fine-grained soils. Forest Grove, North Cascade, and Tillamook Districts have predominantly coarse-grained soils.
3-8	**Paths of the Forest Carbon Cycle.** Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils.	Figure 3-8 is a flow diagram showing carbon dioxide capture and emissions as part of a forest's carbon cycle. Carbon dioxide is removed from the atmosphere as forests grow and age. Carbon dioxide is released by fire, decomposition, biomass products like wood pellets, and short-term consumer products like paper. Long-lived products, like lumber, can sequester carbon until they start to decompose.
3-9	**Estimated Average Aboveground Carbon in Live Trees across ODF Districts**. Data are based on the 2022 Forest Inventory and Analysis estimate on western Oregon state forests.	Figure 3-9 is a bar graph of aboveground carbon in woody biomass measured by US tons per acre. The average aboveground carbon of all districts is 59.3. The aboveground carbon of individual districts are as follows: Astoria is 59.6, Forest Grove is 60.3, North Cascade is 57.6, Tillamook is 53.9, West Oregon is 54.0, and Western Lane is 86.6.
3-10	**Watersheds Overlapping with North Coast Districts and the Planning Area**. The median percentage of ODF-managed lands in northwest districts by HUC-12-sized sub-watersheds is 26% (range <1% to 100%).	Figure 3-10 is a map of the north coast districts within the planning area with Hydrologic Unit Code (HUC)-12 watersheds overlayed. HUC-12s are the smallest-sized watershed delineated by the U.S. Geological Survey.
3-11	**Watershed Enhancement Actions.** In-stream, riparian, road improvement, and donations tracked by OWEB, 1995–2025.	Figure 3-11 shows representative photographs of five types of watershed enhancement projects, along with quantities. ODF has implemented over 200 projects with over 200 miles of stream enhanced; donated over 8,000 trees for in-stream projects; improved over 350 road-stream crossings to enable aquatic organism access to over 300 miles of upstream habitat;

Figure Number	Figure Title	Description of Figure
		improved over 2,500 road-stream crossings on other streams to improve water quality; restored over 200 miles of riparian areas; closed or vacated over 175 miles of road; and donated over $50 million in-kind from ODF and $12 million from outside sources.

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Figure Number	Figure Title	Description of Figure
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No figures.

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No figures.

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Western Oregon State Forests Management Plan

DRAFT FINAL • ~~SEPTEMBER 2025~~ MAY 2026

~~2025~~2026

~~September~~May

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Land Acknowledgement[1]

Indigenous tribes and bands have been with the lands that we inhabit today throughout Oregon and the Northwest since time immemorial and continue to be a vibrant part of Oregon today. We would like to express our respect to the First Peoples of this land, the nine federally recognized Tribes of Oregon: Burns Paiute Tribe, Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians, Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Coquille Indian Tribe, Cow Creek Band of the Umpqua Tribe of Indians, and The Klamath Tribes. It is important that we recognize and honor the ongoing legal and spiritual relationship between the land, plants, animals, and people indigenous to this place we now call Oregon. The interconnectedness of the people, the land, and the natural environment cannot be overstated; the health of one is necessary for the health of all. We recognize the pre-existing and continued sovereignty of the nine federally recognized Tribes who have ties to this place and thank them for continuing to share their traditional ecological knowledge and perspective on how we might care for one another and the land, so it can take care of us. We commit to engaging in a respectful and successful partnership as stewards of these lands, and as we are obliged by state law and policy, we will uphold government-to-government relations to advance strong governance outcomes supportive of Tribal self-determination and sovereignty.

[1] Land acknowledgement provided by Legislative Commission on Indian Services

CHAPTER 1

Introduction

1.1 Purpose and Scope of the Forest Management Plan

The *Western Oregon State Forests Management Plan* (~~plan or~~ FMP) provides management direction for all *Board of Forestry* ~~*Lands*[1]~~*Lands*[1] (BOFL) and *Common School Forest Lands* (CSFL) managed by the Oregon Department of Forestry (ODF) west of the crest of the Cascade Range. The purpose of the FMP is to ensure ODF's management of these lands provides *greatest permanent value* (GPV) to all Oregonians. GPV means healthy, productive, and sustainable forest *ecosystems* that over time and across the *landscape* provide a full range of social, economic, and environmental benefits. While the FMP provides the guidance for forest management across western Oregon, mid-term implementation and annual project plans are written and released to the public on a 10-year and annual to biennial basis.

This plan supersedes and replaces the *2010 Northwest Oregon State Forests Management Plan*, the *2011 Elliott State Forest Management Plan*, and the *2010 Southwest Oregon State Forest Management Plan*. The *Board of Forestry* (the BOF) may review, modify, or terminate ~~a plan~~the FMP at any time; however, the BOF will review the ~~plan~~FMP no less than every 10 years (Oregon Administrative ~~Rule~~Rules [OAR] 629-035-0030).

As a BOF-adopted plan, this FMP is designed to support the priorities and *goals* of other BOF plans, specifically the *Vision for Oregon's Forests* (VOF)[2] and the *Climate Change and Carbon Plan* (CCCP), through goals and strategies that promote *resilient* forest ecosystems and communities in light of changing conditions exacerbated by *climate change*.

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

[2] All references are to direct the reader to another document that provides further information and are not intended nor should be construed as incorporating the cited or referred to document into the FMP.

The public and various organizations were involved in developing the FMP. For more information, see Appendix A, *Engagement*.

This chapter describes or provides the following.

- ~~Purpose and scope of the FMP, including~~The BOF's *guiding principles* ~~of~~for the ~~plan~~FMP, ownership and location of the lands governed by the ~~plan~~FMP, and history of the FMP.
- Plan themes: ~~*greatest permanent value* (~~GPV~~), *diversity, equity*, and *inclusion* (DEI),~~, considering and engaging all Oregonians, resilience to climate change*, sustainability,* and *adaptive management*.
- How the FMP relates to other plans and processes.
- An outline of the FMP chapters.

~~Definitions of italicized terms in this chapter and throughout the document are provided in the Glossary.~~

~~[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.~~

1.1.1 Guiding Principles

The Forest Management Planning rule for state forests (OAR 629-035-0030) identifies required elements for FMPs. Among these are “guiding principles that include legal mandates and Board of Forestry policies.” ~~Taken together,~~In addition to the VOF and ~~at the direction of~~CCCP, the BOF, provided the following guiding principles~~ directed~~, shown in italics, to direct the development of this FMP. The text that follows the principle explains the *policy* guidance and in some cases clarifies how the plan meets the principle.

Principle 1 – Greatest Permanent Value

The FMP will be grounded in the management mandates for BOFL as expressed in the GPV and Forest Management Planning OARs.

OAR ~~Chapter~~ 629~~, Division 35,~~ -035-0020, Greatest Permanent Value, and OAR 629-035-0030, Forest Management ~~of State Forest Lands, provides~~Planning, provide the foundation for the development of the FMP.[3] The Forest Management Planning rule requires the State Forester to create plans to manage state forests for ~~the BOF.~~GPV—balancing environmental, social, and economic benefits. GPV benefits include but are not limited to the following.

- Sustainable and predictable production of *forest products* that generate *revenues* for the benefit of the state, counties, and local taxing districts.
- Properly functioning *aquatic* habitats for salmonids, and other native fish and aquatic life.
- Habitats for native wildlife.
- Productive soil, and clean air and water.
- Protection against floods and *erosion*.
- Recreation.

The Forest Management Planning rule directs the FMP to include strategies that accomplish the following.

[3] Division 35 includes definitions, findings, and principles associated with acquired lands, language defining GPV, and direction for the development of FMPs.

~~GPV benefits include but are not limited to:~~

- ~~*Sustainable* and predictable timber harvest and *revenues*.~~
- ~~*Properly functioning aquatic habitats*.~~
- ~~Protection, maintenance, and enhancement of *habitat* for *native* wildlife.~~
- ~~Protection of soil, air, and water.~~
- ~~Provision of outdoor recreational activities.~~
- ~~Consideration of *landscape context*.~~

~~Also mentioned in the OARs are protection against floods and *erosion*; protection of water supplies; grazing, foraging, and browsing for domestic livestock; forest *administrative sites*; and mining leases and contracts.~~

~~The OARs direct that the FMP include strategies that accomplish the following.~~

- Contribute to *biological diversity* of forest stand types and *structures* at the landscape level and over time.
- Apply *silvicultural* techniques that provide a variety of forest conditions and resources.
- Conserve and maintain genetic diversity of forest tree *species*.
- Manage forest conditions to result in a high probability of maintaining and restoring properly functioning aquatic habitats.
- Protect, maintain, and enhance native wildlife habitats.
- Recognize that forests are dynamic.
- Provide for healthy forests by using an *integrated pest management* approach and appropriate genetic sources of seed.
- Maintain or enhance forest soil productivity.
- ~~Maintain and enhance forest productivity by producing~~Produce sustainable levels of timber~~.~~ consistent with protecting, maintaining, and enhancing other

forest resources.

- Apply management strategies that enhance timber yield and value while contributing to the diversity of habitats for native fish and wildlife.

~~OAR 629-035-0000 defines *active management* of state forest lands as~~The GPV and the Forest Management Planning rule OARs require the State Forester to actively manage lands and include strategies for actively managing forest lands in the FMP. *Active management* involves application of silvicultural prescriptions, such as thinning and *regeneration* harvest, reforestation, and *young stand management*. However, certain forest resource goals are best achieved through deliberate *passive management* such as allowing stands to develop without silvicultural intervention, or regenerate after natural *disturbances* without active reforestation. Site-specific management decisions are made considering the future *objectives* for, as well as current characteristics of, forest stands. Chapter 2, *Management Approach*, and Chapter 3, *Forest Resources, Goals, and Strategies*, describe passive management and active management techniques and considerations for their application, which are consistent with the OAR definition of active management: "applying practices over time and across the landscape to achieve site-specific forest resource goals using an integrated, science-based approach that promotes the compatibility of most forest uses and resources over time and across the landscape." ~~Site-specific forest resource *goals* can be achieved through deliberate *passive management*, as well as the active application of silvicultural prescriptions and other activities in accordance with the future *objectives* and current characteristics of forest stands.~~

~~The~~The GPV and Forest Management Planning rule OARs also direct that landscape context be considered. *Landscape* is defined as "a broad geographic area that may cover many acres and more than one ownership and may include a *watershed* or sub-watershed areas" (OAR 629-035-0000). Plans must contain "a description and assessment of the resources within the planning area and consideration of surrounding ownership in order to provide a landscape context" (OAR 629-035-0030).

Key to GPV, the State Forester is required to manage state forest lands in a manner to provide sustainable timber harvest within a broader management context through integrating and achieving a variety of forest resource management goals. Although the counties ~~also~~ have a recognizable interest~~. The OARs include~~ in revenue generated on state forests, OAR 629-035-0010 includes the following BOF finding~~:~~, which is consistent with GPV.

> 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 [of Forestry] 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 forests lands (OAR 629-035-0010).

~~The OARs also direct~~GPV and the Forest Management Planning rule also directs that the FMP be based on the best science available, use *monitoring* and research to generate new information, and use an adaptive management approach. Additional information on adaptive management is ~~defined as:~~found in Chapter 4, *Guidelines*.

> ~~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 (OAR 629-035-0000).~~

Principle 2 - Biological Diversity

State forest lands will be managed, conserved, and restored to provide overall biological diversity of state forest lands, including the variety of habitats for native fish and wildlife and accompanying ecological processes. The GPV and Forest Management Planning rules are the BOF's expression of providing conservation.

Biological diversity is the cornerstone for fostering resilient forest ecosystems. The GPV and Forest Management Planning ~~rule~~rules include references to attributes that are directly tied to providing a multitude of environmental, social, and economic co-benefits associated with *biodiversity* on BOFL. These references include, but are not limited to, providing and restoring properly functioning aquatic systems; protecting, maintaining, and enhancing native wildlife habitats; contributing to diversity of forest stand types and structures at the landscape level and over time; and conserving and maintaining genetic diversity of forest tree species.

Principle 3 - Revenue

The FMP will provide sufficient revenue to ensure ODF's ability to manage, conserve, and invest in the forest in order to provide GPV.

The FMP ~~will~~strives to provide sufficient revenue to support the stewardship of these forest lands and ~~achieve the blend of~~produce economic, social, and environmental benefits. *Financial viability* is achieved over the long term through continued protection and management of the forest *asset*, and it is achieved over the short term with operational tools that ensure cash flow is available to ODF for sound management of state forest lands.

In the current business model, 98% of revenue used to support ODF's management of state forests is derived from timber~~ sales and all BOF expenditures and revenues~~. Revenues derived from the management of BOFL are ~~managed~~shared with the counties and local taxing districts in ~~the *Forest Development Fund*;~~which the management activities take place: 63.75% of ~~BOF~~ revenues are distributed to local counties and taxing districts~~. The remaining~~ and 36.25% of revenue ~~from state forest lands pays for~~is retained by ODF to fund the management of ~~state forest lands. Revenue~~BOFL. Revenues from CSFL is ~~used to reimburse ODF for management costs and the remaining net operating income is~~ transferred to the Oregon Department of State Lands (DSL~~).~~) to be deposited in the state *Common School Fund*, and DSL reimburses ODF for expenses associated with management of CSFL.

Expanding and diversifying revenue sources to support public benefits ~~can~~may increase long-term financial stability. ~~While~~ Revenues are cyclical~~, financial viability is achieved over the long term with business strategies that align anticipated funding availability with services that are prioritized by GPV.~~ and subject to market forces beyond ODF's control, and the balance of social, economic and environmental co-benefits produced will vary over time in alignment with available operating funds (Chapter 4, Section 4.3, *Asset Management Guidelines*). Several tools are used~~, including business improvements, financial metrics to assess future investments, new marketing opportunities,~~ to ensure ongoing management of state forests under different revenue ~~projections, *Implementation Plans* (IPs), the FMP, and risk~~outlooks ensuring fiscally responsible management into the future.

Principle 4 – Social Benefits

The FMP will provide for a range of social benefits for all Oregonians, including direct and indirect financial contributions to local and state governments, opportunities for public access and recreational use, support for diverse local employment opportunities, and the inclusion of Oregonians and their broad range of perspectives.

State forest lands support multiple social benefits on a variety of scales and contribute to community well-being for all Oregonians. ~~They provide *ecosystem services* including~~These benefits include clean air, clean water, shade, ~~*carbon sequestration*~~hunting, fishing, foraging, and ~~*storage*,~~recreational opportunities, like birding and ~~wildlife habitat—services~~hiking, that draw in visitors, contribute to local and statewide tourism economies, and enhance the quality of life for all Oregonians. Other social benefits include various health factors such as improved mental and physical wellness, ~~in addition to~~mitigation of the negative impact of climate change, and enhance community cohesion around shared natural spaces. ODF provides opportunities for lasting and diverse outdoor recreation, education, and interpretive experiences that inspire visitors to enjoy, respect, and connect with Oregon's state forest lands. Active forest management provides revenue for counties, social services, and public education. It ~~builds~~supports communities by ~~supporting~~creating living-wage jobs and contributing to local, regional, and state economies.

Principle 5 – Forest and Watershed Restoration

The FMP will recognize that investments in forest and watershed restoration are necessary to achieve desired outcomes that align with the GPV policy direction for the BOF.

Restoration efforts are ~~considered~~essential to rehabilitate *degraded forest lands*~~.~~ and *degraded watersheds.* Degraded conditions may exist because of past management practices, changing climatic conditions, or natural *disturbances* such as ~~fire, windstorm~~fires, windstorms, floods, and outbreaks of ~~insect~~insects or ~~*pathogens*~~disease. Much of ~~the~~Oregon's state forest lands experienced significant degradation from repeated, large-scale wildfires and extensive logging in the first half of the 20th century prior to ODF management, and although most are they are now reforested, additional challenges remain where forests are underproductive or aquatic systems ~~lack key components.~~need to be rehabilitated. Restoration efforts are carried out with the goal of restoring properly functioning ecological conditions and ~~the ability of the forest~~resilient forests that continue to produce the benefits ~~required under~~of GPV.

Forest Restoration

Sole reliance on natural regeneration, as opposed to proactively planting trees, in the wake of large-scale disturbance events (e.g., ice storms, wind events, floods, and fires) can extend periods of ~~under-productive~~ underproductive forest conditions and susceptibility to insects and disease. More immediate action, such as salvage of dead and downed trees followed by reforestation may be required to mitigate additional fire or disease risks, improve *resilience*, and ~~productivity~~return the forest to ~~ensure~~ a ~~balance of GPV-related outcomes~~productive state in a reasonable timeframe.

The FMP recognizes these restoration needs and seeks creative funding mechanisms to implement them. Restoration efforts ~~will~~ contribute to diverse and *healthy forest landscapes* that allow for natural disturbance at different scales ~~within the context of a~~. This helps create working ~~*forest*~~forests that ~~will be~~are more resilient in the face of climate change, fire, or other disturbance events and stressors. Monitoring and adaptive management are key components of ~~the~~ restoration efforts.

Watershed Health

For over 20 years, ODF has made a concerted effort to conserve and improve rivers and watersheds throughout the state, with the direct involvement of local *Watershed Councils* and *Soil and Water Conservation Districts*. ODF's management plans and activities have been an important part of those efforts. The FMP ~~will continue to support~~supports the Oregon Watershed Enhancement Board's mission to "help protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies" and ~~emphasize~~emphasizes a continuing commitment to restoration activities. This commitment recognizes the vital contribution that these forests can make to the success of large-scale regional efforts like the *Oregon Plan for Salmon and Watersheds* (Oregon Watershed Enhancement Board 2006).

Principle 6 – Pace and Scale

The FMP will be developed and implemented on a scale and at a pace that ~~provide~~provides a geographic and temporal range of economic, social, and environmental benefits.

~~The geographic scale of plan *strategy* and implementation will have an effect on the spatial distribution of plan *outcomes*. Likewise, the temporal pace of strategy implementation and investments will have an effect on the distribution of environmental, social, and economic outcomes over time. These dynamics will be considered in creating and implementing a plan that provides a range of benefits across space and time.~~

~~The FMP will not individually optimize environmental, social, or economic outcomes at each geographic scale or for every time period but will strive for a geographical and temporal blend of environmental, social, and economic outcomes.~~

Not all benefits can be optimized at every spatial scale for every time period. Therefore, ODF shall strive to achieve a range of benefits across the landscape and over time. Chapter 2, *Management Approach*, of this FMP describes how state forests are managed at different spatial and temporal scales to achieve a range of benefits. ODF allocates state forest lands according to stewardship classes that translate into a specific emphasis on different areas. The layout of these *emphasis areas* is intentionally designed to provide benefits at the larger landscape scale, like clean water, timber revenue across counties, recreational and tribal access, and habitat *connectivity* for diverse species, including fish and game. At smaller scales, such as individual forest stands within emphasis areas, site-specific conditions guide prescriptive management elements. Management across these spatial scales, from emphasis areas to stand conditions, produces a range of benefits over time.

Principle 7 – Varying Levels of Outcomes

The FMP will provide varying levels of social, economic, and environmental outcomes over time as fiscal conditions change. While this approach will result in short-term trade-offs among specific goals, over the long term, GPV will be achieved.

Different GPV outcomes may be emphasized at different time periods, depending on *fiscal conditions*. For example, when fiscal conditions are favorable, increased investments may be made in aquatic and watershed restoration efforts and to ~~promote~~conduct forest ~~stand development for both commercial (stand investment) and habitat goals.~~management activities to increase resiliency that are cost prohibitive under poor market conditions. Fluctuating timber market conditions (rising markets versus recessions) may favor more or less ~~timber harvest~~active management during specific time periods. However, over the long term, the FMP ~~will provide~~provides a predictable and sustainable flow of timber~~.~~ and other management activities. Protection of native fish and wildlife habitats ~~will be~~is maintained consistent with the strategies established in this FMP and the *Western Oregon State Forests Habitat Conservation Plan* (~~HCP). Services associated with non-revenue-generating activities may fluctuate based on competing priorities and budgetary constraints.~~WOSF HCP).

Principle 8 – Legal and Regulatory Compliance

The FMP will comply with other state and federal laws and rules.

In addition to the management mandates specific to state forest lands, the FMP ~~will address~~addresses compliance with other state and federal laws and rules including, but not limited to, the state and federal *Endangered Species Acts* (ESAs), the federal *Clean Water Act*, the Oregon Forest Practices Act (FPA), Oregon *fish passage* laws, and *cultural resource* protection administered by the *State Historic Preservation Office* and coordinated with ~~*Tribal Nations*~~*the nine federally recognized Tribes in Oregon* (also known as *Tribal Partners*~~)[2]~~)[4] and the Oregon State Police.

Principle 9 – Tribal Outreach and Engagement

Reach out to and engage with the nine federally recognized Tribes ~~of~~in Oregon throughout the planning and implementation processes.

ODF acknowledges Tribes and ~~Confederation~~the Confederations of Tribes are the original stewards of the lands currently managed by ODF~~,~~ and ~~we recognize~~recognizes the value and importance of integrating tribal interests and perspectives into land management and implementation processes. ~~To the extent possible, and with the upmost respect, we will pursue~~ODF pursues opportunities to meet with tribal government executives and councils,

~~[2] Tribal Nations include the nine federally recognized Tribes of Oregon: Burns Paiute Tribe, Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians, Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Coquille Indian Tribe, Cow Creek Band of the Umpqua Tribe of Indians, and The Klamath Tribes.~~

members, practitioners, and staff to listen, learn, and seek opportunities to build collaborative relationships. Chapter 3, *Forest Resources, Goals, and Strategies*, provides additional context for outreach and *engagement* with the Tribes, and supporting plans may be developed in collaboration between the Tribes and ODF. Appendix A, *Engagement*, describes how ODF and Tribes worked together to develop the FMP cultural resources goals and strategies.

Principle 10 – Diverse Input

Seek diverse input from Oregonians.

Understanding, acceptance, and support from ~~interested parties~~a wide range of Oregonians contributes to long-term success in managing state forest lands. ODF is committed to open, equitable, and transparent engagement processes. Counties ~~within which~~containing BOFL ~~is managed~~ have a statutorily established relationship with the BOF through the *Forest Trust ~~Lands~~Land Advisory Committee*~~.~~ (FTLAC). Additionally~~, Tribes~~, the State Forest Advisory Committee, state and federal partners, and local communities provide input through public meetings and public comment periods. ODF provides accurate and timely information to ensure ~~the committee has the information it needs to ensure parties~~interested parties

[4] The nine federally recognized Tribes in Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and the Klamath Tribes.

have the information they need to ensure they can provide testimony and comment to the BOF and the State Forester.

Principle 11 – Cooperative Efforts

The FMP will achieve goals through cooperative efforts with other agencies and units of local government, user groups, and organizations.

Management objectives can often be achieved more effectively and efficiently through collaboration with others. Consultation and communication with ~~other~~state and federal agencies~~ and entities, including~~, counties~~,~~ ~~will be~~ and local governments, academic institutions, and non-governmental organizations, is important to ~~identify~~identifying areas where ODF's efforts intersect with other state initiatives.

Principle 12 – Managing for Climate Change

The FMP will be implemented to adapt to climate change and mitigate its impacts on the management of state forest lands. The FMP will also contribute to climate change mitigation and sequester carbon.

Temperature, precipitation, other climate variables, and *hydrologic processes* are changing, and they are likely to ~~alter~~increase the frequency and severity of disturbances, including insect ~~eruptions~~outbreaks, disease, severe windstorm events, wildfire, flood, and drought. ~~These disturbances are predicted to have a disproportionate effect on marginalized communities.~~ Within the context of ODF's adaptive management process~~,~~ and consistent with the ~~Oregon Climate Change and Carbon Plan (~~CCCP~~) goal for state forests,~~ (ODF 2021), the FMP ~~will contain~~contains forest management strategies intended to maintain~~ and~~, restore, and improve ecological processes and functional characteristics that promote resilient ~~forest conditions. Forest stands~~forests. Healthy and resilient forests sequester and ~~wood products derived from active management contribute to~~store carbon ~~sequestration~~from the atmosphere, a factor in mitigating global climate change. Wood products derived from working forests store carbon and are less carbon intensive than building materials such as concrete and steel. A focus on strategies that adapt to climate change ~~will increase the probability that ODF is able~~increases ODF's ability to provide GPV over the long term.

1.1.2 Land Ownership and Governance

State forest lands comprise 3% of Oregon's forested landscape. The ~~FMP~~ *planning area* for the FMP covers approximately 640,000 acres ~~of state forest lands~~ consisting of BOFL (614,000 acres) and CSFL~~,~~ (26,000 acres), two types of land that ~~were acquired by the state of Oregon in different ways. They~~ are owned by different state government entities. The BOF owns ~~most state forest lands~~BOFL, while the *State Land Board* owns CSFL. Each land ownership has its own set of legal and policy mandates. The locations of these lands are shown on the vicinity map (Appendix B, *District Maps*, Figure B-1). Lands are organized into management districts ~~called *field districts*~~ (Appendix B, *District Maps,* Figures B-1 through B-7).

Prior to state ownership, ~~a majority of the acquired state forest lands~~almost all BOFL had been owned and managed by private landowners. Most of these lands had been logged, or burned~~,~~ and salvage-logged, and abandoned without the implementation of modern *best management practices* (BMPs). Tax-delinquent and abandoned lands reverted to county ownership. The counties entered into an agreement with the state that was codified in statute and deeded the lands to the state. Those counties share in ~~all~~ revenues from these lands today (Oregon Revised Statutes [ORS] 530.110, 530.010–530.040). CSFL are a subset of Common School Lands that were granted to Oregon by the federal government upon statehood. The original configuration of both types of lands has changed somewhat over time due to land exchanges and acquisitions.

ODF recognizes that the lands covered by the FMP include ancestral lands of the nine federally recognized Tribes ~~of~~in Oregon. The people living and using the lands were displaced during federal and private land acquisition ~~and management~~, prior to the lands being deeded to the state. The ~~Tribal Nations~~nine federally recognized Tribes in Oregon were engaged in ~~the~~ development of ~~this FMP's cultural resources goals and strategies~~the FMP with the intention of integrating their interests and recognized historical claim in the management of lands that ODF currently manages.

1.1.3 Location

The ~~FMP~~ planning area is west of the crest of the Cascade Range~~. The planning area~~ and is distributed across 17 counties. The lands covered by this FMP include both large blocks and isolated smaller tracts of state forest lands. The three largest blocks are designated as the Tillamook State Forest, Clatsop State Forest, and Santiam State Forest. Smaller tracts of BOFL and CSFL are unnamed state forest lands, scattered throughout the planning area. ~~The smaller, isolated tracts are not referred to as state forest lands but are referenced as "scattered state forest lands."~~

The Clatsop State Forest and Tillamook State Forest are in the northern end of the Oregon Coast Range, roughly 25 miles northwest of Portland. They are managed by the Astoria District (Appendix B, *District Maps,* Figure B-2~~) and~~), Tillamook District (Appendix B, *District Maps*, Figure B-5), ~~respectively.~~and the Forest Grove District (Appendix B, *District Maps*, Figure B-3). The Pacific Coast is a few miles to the west and the Columbia River is to the north and east. ~~Local~~Local communities include Forest Grove to the east, Astoria to the northwest, and Tillamook to the west.

Dedication of Tillamook and Clatsop State Forests. Governor Tom McCall speaks at the formal dedication of the Tillamook and Clatsop State Forests on July 18, 1973. Today, these lands remain Oregon's largest state forests, with Tillamook encompassing 364,000 acres and Clatsop encompassing 154,000 acres.

~~communities include Forest Grove to the east, Astoria to the northwest, and Tillamook to the west.~~

~~At 364,000 acres, Tillamook is the largest state forest. It was dedicated in 1973 and is located in the Tillamook and Forest Grove Districts.~~

atsop State Forest is the second-largest state forest~~. It was~~ deeded to the state in 1937. ~~By~~In 1957, Clatsop County ~~s were formally dedicated to~~At 364,000 acres, Tillamook is ook and Forest Grove Districts. The Clatsop and Tillamook .

The Santiam State Forest is in the Cascade Range, roughly 25 miles southeast of Salem~~. It is~~, in the North Cascade District (Appendix B, *District Maps*, Figure B-4). Local communities include Detroit, Mill City, and Scotts Mills. Santiam is the third-largest state forest covered by this FMP. It was dedicated in 1974 ~~and is located in the North Cascade District~~.

Many scattered state forest lands are in the Coast Range between Newport and Corvallis (Appendix B, *District Maps*, Figure B-7). There are additional tracts between Florence and Eugene in the Coast Range, scattered in a checkerboard pattern, and some tracts between Reedsport and the California border (Appendix B, *District Maps*, Figure B-6).

1.1.4 History of the ~~Forest~~State Forests Management ~~Plan~~Plans

Dedication of Tillamook and Clatsop State Forests. Governor Tom McCall speaks at the formal dedication of the Tillamook and Clatsop State Forests on July 18, 1973. Today, these lands remain Oregon's largest state forests, with Tillamook encompassing 346,000 acres and Clatsop encompassing 154,000 acres.

Credit: Unknown

As with many public forests, goals and management plans for state forest lands have evolved over time in response to shifting public values, changes in environmental conditions, and better understanding of forest management effects on *ecosystem function* and biodiversity. The *Long-Range Timber Management Plan for Northwest Oregon* (ODF 1984) and *Long-Range Timber Management Plan for the Willamette Region* (ODF 1989) set sustainable timber volume targets as the objective for forest management while giving consideration to other forest resource values. By the mid-1990s, threatened and endangered species listings under the federal ~~Endangered Species Act~~ESA had raised significant public concern about how state forest lands were being managed and caused substantial reductions in timber harvest objectives. Growing recreational use of the Tillamook State Forest also demanded attention, and the *Tillamook State Forest Comprehensive Recreation Plan* was adopted in 1993.

The State Forester is mandated to manage state forest lands for multiple benefits including timber, recreation, and fish and wildlife habitats (ORS 530.050). In 1998, the BOF adopted a set of administrative rules (OAR 629-035) that were intended to provide clarity around the benefits that Oregonians derive from state forest lands. The rules were also intended to direct the State Forester to pursue management practices that promote "compatibility of forest uses over time" and "integrate and achieve a variety of forest resource management goals~~" (OAR 629-035).~~." The State Forester is required to develop FMPs, using best available science, that establish the general management framework for state forest lands, as well as *Implementation Plans* (IPs) and *Operations Plans* (OPs) that describe more specific, smaller-scale management activities. (OAR 629-035-0030(1)).

In response to these revised rules, in 2001, ODF adopted new Northwest and Southwest Oregon State Forests Management Plans. The plans took a much more comprehensive, multi-resource, ecosystem-based approach to forest management than previous long-range plans and used a system of *integrated resource management* and a landscape-level approach to achieve GPV. The ~~FMP~~FMPs underwent modifications in 2010 as part of decadal review and updates. The modifications included *species of* ~~*concern* strategies and revision of landscape design~~*conservation concern* strategies and revision of landscape design. This FMP is designed to use the WOSF HCP as its compliance mechanism with the federal ESA as well as be the foundation for supporting many of the forest resource goals. It replaces the 2010 FMPs for Northwest and Southwest Oregon, and the 2011 *Elliott State Forest Management Plan*, under which some BOFL are still managed.

~~The State Forester is mandated to manage State Forest lands for multiple benefits including timber, recreation, and fish and wildlife habitat (ORS 530.050). In 1998, the BOF adopted the Forest Management Planning rule (OAR 629-035-0030), which provides the following further direction for state forest management.~~

> ~~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.~~

Before and After. North Fork Kilchis in 1960 and fives decades later in 2012. CREDIT XXX

The North Fork Kilchis River Drainage recovery after wildfire and logging. Most state forest lands are recovering from logging or wildfire, salvage-logging, and abandonment that occurred prior to state ownership and without modern ~~best management practices (~~BMPs~~)~~.

1.2 Plan Themes

While the current FMP was developed to address all of the guiding principles, five fundamental themes emerged that form the core of the FMP: GPV, considering and engaging all Oregonians, climate change, sustainability, and adaptive management. These themes, and how the FMP will address them, are explained in the following subsections.

1.2.1 Greatest Permanent Value

The FMP is intended to achieve GPV for Oregonians through a comprehensive, multi-resource approach of integrated forest management. GPV 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 (OAR 629-035-0020).

> ~~GPV 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 (OAR 629-035-0020).~~

State forest lands in western Oregon are managed to create healthy, productive forest ecosystems that provide benefits from forest resources such as a reliable, sustainable and predictable source of timber, economic benefits to rural communities and schools, clean air and water, high-quality ~~habitat~~habitats for native fish and wildlife, and a diversity of educational and recreational opportunities for the people of Oregon.

Social, economic, and environmental goals have been developed for forest resources~~, and while all forest resources~~. GPV icons are ~~interrelated, each~~used throughout Chapter 3, *Forest Resources, Goals, and*

Strategies, to provide examples of these forest resource ~~and its related goal can generally be grouped into social, economic, or environmental~~goals by category. (Figure 1-1).

~~categories.~~WESTERN OREGON STATE FORESTS MANAGEMENT PLAN

FIGURE 1-1. Greatest Permanent Value Categories and Icons. GPV category icons are used throughout Chapter 3*, Forest Resources, Goals, and Strategies*, to indicate connections with social, economic, ~~or~~and environmental ~~resources and concepts (Figure 1-1).~~benefits.

~~**FIGURE 1-1**~~
~~Greatest Permanent Value Categories and Icons~~

Social	Economic	Environmental
		
Examples Include • Protection of cultural resources • Recreation, education, and interpretation opportunities • Opportunities to collect special forest products such as firewood, edible fungi, and salal	Examples Include • Sustainable and predictable production of forest products that support local and regional economies • Revenue generation for local taxing districts • Revenue generation for the management of state forest lands	Examples Include • Healthy, sustainable, resilient forests • Properly functioning aquatic habitats for native fish and aquatic life • Habitat for native wildlife • *Carbon sequestration* and storage

1.2.2 Considering and Engaging All Oregonians

l environmental benefits to the people of Oregon,
he diverse *demographics* of our state. The goals and
and are able to adapt to Oregon's changing

An essential element of the commitment to manage for GPV is to recognize Tribes as the original stewards of Oregon's state forest lands, as well as their continued

~~**Visitors to Tillamook Forest Center explore exhibits about the importance of woody debris for soil health and habitat. GPV calls for providing a full range of social, economic, and environmental benefits to the people of Oregon.**~~

contributions to these lands as sovereign nations with unique ancestral and local knowledge and stewardship since time immemorial. Further, we recognize humans—past, present, and future—are an integral part of state forests. ~~Oregonians benefit from ecosystem services that the~~

Oregonians benefit from *ecosystem services* that the forests provide, ~~but~~and our relationship with state forest lands is grounded in ~~one of~~ *reciprocity*—we care for the forests and the forests care for us and for our communities (Chapter 2, Figure 2-1).

~~The goals and strategies of the FMP are grounded in serving all Oregonians and are able to adapt to Oregon's changing demographics.~~

Visitors to Tillamook Forest Center explore exhibits about the importance of woody debris on the forest floor for soil health and wildlife habitat.

Photo credit: ODF

1.2.3 Resilience to Climate Change

Stressors associated with climate change ~~stresses~~adversely affect forest ~~resources~~ecosystem resiliency and ~~adversely affects~~ the delivery of GPV benefits ~~across GPV categories. Increased incidence of drought limits timber production,~~. Rising ambient air and water temperatures, extreme heat events, and increased incidences of drought can adversely affect aquatic and wildlife ~~habitat~~habitats, drinking water, ~~and some *special*~~ forest products~~. Increased air and water temperature increases the spread of insect and disease, which adversely affects fish and wildlife habitat, as well as timber production. Increasing~~ , and tree growth. These conditions can also influence the frequency and intensity of wildfire and ~~storms can increase~~ storm events, resulting in *landslides* ~~and~~, *debris flows*, and *windthrow* ~~and change *soil composition*,~~, which can adversely affect ~~timber production,~~ road and trail conditions, soil productivity, ~~and~~ water quality~~. The latter changes, in turn,~~, and the availability of merchantable timber. These disturbances may also adversely affect ~~road~~visitor safety, state revenue, future timber productivity, fish and wildlife habitat, ~~recreation,~~ and tribal access opportunities.

~~In response to these threats to resource conditions, and~~ In alignment with the VOF and CCCP, the FMP ~~guides ODF to mitigate climate change and~~provides goals and strategies to increase the forest's capacity to adapt to, and mitigate the effects of, climate change. Both adaptation and mitigation are key tenets of *climate-smart forestry*, in which forests are actively managed to achieve resource goals, prepare for climate change, offset carbon emissions, and support communities reliant on wood products.

Chapter 2, *Management Approach*, describes the elements of ~~*adaptive capacity*, how strategies for enhancing adaptive capacity are applied differently~~managing for more *resilient forests under a changing climate.* This management approach results in a range of activities across the landscape ~~depending on the resource emphasized~~by evaluating trade-offs in ~~a particular area, and how adaptive management allows ODF to respond according to~~the context of climate vulnerability factors, site-specific conditions, and goals for forest resources and considering specific emphasis area designations. Future changes in forest conditions and new research findings ~~in climate science.~~ will be incorporated through adaptive management.

Chapter 3, *Forest Resources, Goals, and Strategies*, describes management goals and strategies that increase ~~adaptive capacity.~~climate resilience across resources, including wildlife, aquatics, and timber production. One way climate adaptation is achieved is through climate-informed silviculture, in which *management prescriptions* are ~~set in line with *climate-smart forestry* objectives. For example, altering planting *density* or species to grow forests to be more resilient to drought or wildfire, which would, in turn, improve long-term outcomes for social and economic goals~~aligned with *climate-smart forestry* approaches.

The high productivity of forests in the Coast Range and Western Cascades ~~makes them ideal~~are well-suited for *climate change mitigation*~~. These forests~~ due to their ability to sequester and store ~~carbon to reduce~~large amounts of atmospheric ~~greenhouse gases and lessen the future impacts of climate change. Mitigation goals have~~carbon dioxide. The carbon sequestration and storage goal has co-benefits with other resource goals, such as increasing late seral habitat for wildlife species or producing timber that can store carbon in long-lived structures~~.~~ like housing. Carbon is sequestered and stored long term on the landscape in dedicated *conservation areas* while areas with a timber production focus contribute to carbon storage in long-lived forest products.

~~Both adaptation and mitigation are key tenets of climate-smart forestry, in which forests are actively managed in ways intended to achieve resource goals by preparing for climate change, reducing carbon emissions, and supporting communities reliant on wood products or negatively affected by climate change.~~

~~Introduction~~

1.2.4 Sustainability

Consistent with the guiding principles, the FMP is adopting an *ecologically sustainable forest management* approach. The ~~goal~~foundation of this approach to forest management is to ~~sustain and~~ support the health and *function* of forest ecosystems, thereby improving the long-term delivery of ecosystem services. ~~and thereby improve sustainable delivery of ecosystem services.~~ Healthy, diverse, productive, and resilient forests maintain ~~and enhance~~ ecosystem services and the benefits the public derives from them, including timber production~~, and~~. These services are the foundation upon which a sustainable managed ~~forests~~forest model is built (Spies et al. 2018).

Ecologically sustainable forest management views forest resources and benefits within the context of societal values. This approach anticipates change and uncertainty in forest development and disturbance regimes, societal values and demands, and future climate effects on forest productivity, species ranges, and ecological processes. To address change and uncertainty, land managers seek outcomes to reduce risk to forest resources, and increase future options by applying strategies that improve forest resilience in an adaptive management framework. Under ecologically sustainable forest management, specific areas on the landscape emphasize different ecosystem services and benefits ~~such that management incorporates a sound understanding of the underlying systems and processes that produce those services and benefits~~. The protection requirements outlined in the WOSF HCP ~~is~~are central in implementing the FMP habitat strategies by defining habitat emphasis areas ~~and strategies~~, which safeguard conservation values while generating regulatory certainty for timber production and other active management activities covered by the WOSF HCP.

~~Ecologically sustainable forest management views resources and benefits within the context of societal values and the forest ecosystem in alignment with the guiding principles and GPV. This approach anticipates change and uncertainty in forest development and disturbances, societal values and demands, and future climate scenarios and effects on forest productivity, species, and ecological processes. To address change and uncertainty, management seeks outcomes to reduce risks to resources and increase future options through applying adaptive capacity strategies and an adaptive management framework.~~ For more information, see Chapter 2, *Management Approach*.

The principles of ecologically sustainable forest management are reflected in Chapter 3, *Forest ~~Resource~~Resources, Goals, and Strategies*. Goals and strategies support the delivery of ecosystem services and the values articulated in the guiding principles. The ~~strategies~~goals emphasize the function of social, economic, and environmental systems and recognize that ~~specific approaches and the levels~~the application of ~~commitment depend on management~~strategies differs by emphasis ~~areas and economic goals and circumstances~~area, considers resource trade-offs, and adapts through time.

1.2.5 Adaptive Management

The FMP uses adaptive management to evaluate and learn from decisions and revise plans as changes occur in society, the economy, and the environment, as required by OAR 629-035-0020(3)(f) and 629-035-0030(3)(d). Adaptive management is a systematic and rigorous approach to learning from actions, improving management, and accommodating change. Chapter 2, *Management Approach*, describes how adaptive management is used to ~~achieve~~monitor and improve the sustainable delivery of ecosystem services. All strategies in Chapter 3, *Forest Resources, Goals, and Strategies*, are supported by adaptive management, which tests and monitors the assumptions and predictions ~~that the strategies achieve~~of the FMP goals. Chapter 4, *Guidelines*, describes how ~~it~~forest management is implemented at ODF.

1.3 Relationship with Other Plans and Planning Processes

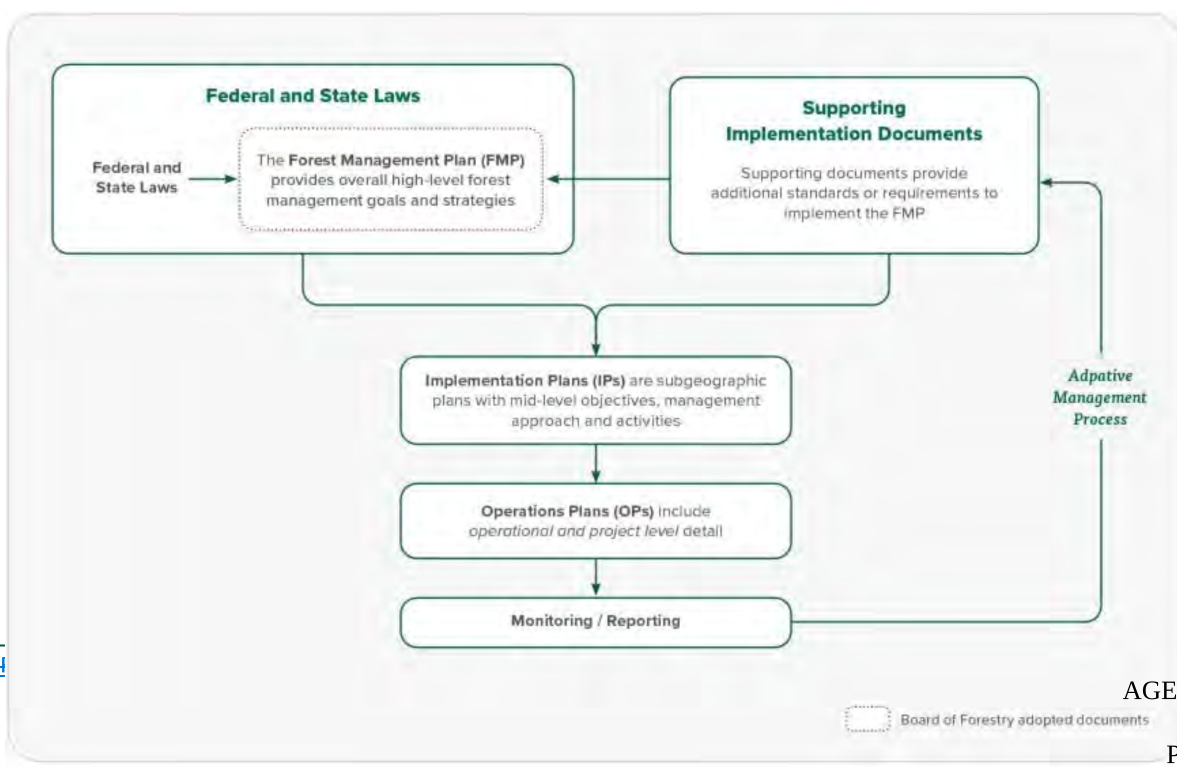
~~Management planning includes three planning levels,~~ This FMP provides the overarching framework for managing state forest lands, in alignment with the VOF and CCCP. The goals and strategies described in this FMP reflect priorities articulated in the VOF and CCCP as ~~well~~they are applied to management of state forest lands and the delivery of GPV.

The specific requirements and standards for implementing the goals and strategies, such as ~~fiscal and biennial budgeting. The FMP informs~~riparian buffers, soil protections, and green tree requirements, are detailed in supporting plans (e.g., the WOSF HCP), laws (e.g., the FPA), performance measures, operational policies, the Forest Land Management Classification System, and BMPs. The goals and strategies in the FMP, along with the requirements and standards outlined in these supporting documents (Chapter 2, Figure 2-1) will guide the development of IPs and plans for monitoring, reporting, and adaptive management.

The FMP and supporting plans inform all lower levels of planning ~~(Chapter 4,~~shown in Figure ~~4-~~1~~). Intermediate-level planning-~~2.FMP implementation is ~~conducted by ODF administrative and field districts and is documented in IPs. *Operations Plans* (~~carried out through IPs, which are then achieved through on-the-ground management activities described in OPs~~) and~~. IPs are shorter-term plans (typically 10-year) in which the FMP goals are distilled into more specific activities, objectives, and expected outcomes for smaller sections of land. Each new IP presents an opportunity to review previous performance and make adjustments as needed, leading to adaptive management. OPs detail specific planned operations, projects, and activities that will be used to support IP objectives and budgets (biennial and fiscal) ~~support IP objectives~~ over the short term (1 to 2 years).

~~The HCP, *Forest Land Management Classification System* (FLMCS), Recreation, Education, and Interpretation programs, Operational Policies and BMPs will be used to implement strategies and further guide the shorter-term plans, and the *Adaptive Management Plan* (AMP) supports *effectiveness monitoring* and decision-making. Additionally, ODF's CCCP is an agency-wide policy guiding document for climate-smart forestry in Oregon, which includes goals and supporting actions applicable to the State Forest Division. The CCCP is cited throughout the FMP, where the two plans specifically align.~~ For additional information, see Chapter 4, *Guidelines*.

FIGURE 1-2
Relationship with Other Supporting Plans and the Planning Process. This figure provides additional detail about how federal and state laws and supporting implementation documents work in conjunction with the FMP to inform the tiered planning levels of implementation.



1.4 Overview of the Forest Management Plan Chapters

In accordance with the Forest Management Planning rule, the following chapters are included in this FMP.

- **Chapter 2, *Management Approach*.** Chapter 2 provides ~~a~~the vision for forest management ~~and describes the need to adapt~~through an ecologically sustainable forest management ~~as new information becomes available~~framework that increases the ability of the forest to continue to ~~sustainably deliver a diverse array of benefits~~provide ecosystem services to Oregonians.
- **Chapter 3, *Forest Resources, Goals, and Strategies*.** Chapter 3 describes ~~the~~ forest resource conditions to provide context for management. The chapter also includes the FMP's goals and strategies. The goals are statements of what ODF intends to achieve for each forest resource in the planning area. Strategies describe how ODF ~~will manage~~manages the forest resources and ~~identify~~identifies management techniques the State Forester may use to achieve the plan's goals.
- **Chapter 4, *Guidelines*.** Chapter 4 states the general *guidelines* for asset management, implementation, adaptive management, plan revision, and public engagement. Asset management guidelines provide overall direction on investments, marketing, and expenses. Implementation guidelines ~~provide~~prescribe the process for implementing the FMP. Adaptive management~~, monitoring, and research~~ guidelines describe the approach for learning from management and applying new findings to adjust management to continue to meet GPV~~. Plan revision guidelines describe~~ as conditions change. Section 4.4, *Decision Authority and Revision Guidelines*, describes what causes plans to change and how plan changes are governed. Section 4.5, *Engagement Guidelines* ~~describe~~, describes the various levels of public ~~and Tribal~~ engagement required by plan level.

Additionally, the FMP includes a *Glossary*, *List of Acronyms*, and *References* as well as three appendices~~:~~. Appendix A, *Engagement*, summarizes tribal, public, and stakeholder~~, and Tribal~~ engagement efforts during FMP development; Appendix B, *District Maps*, shows the FMP planning area by ~~field~~management *district*; and Appendix C, *Description of Figures*, describes the content of all FMP figures for accessibility purposes.

CHAPTER 2
Management Approach

Chapter 2 describes the *Western Oregon State Forests Management Plan* (FMP) management approach. This FMP is grounded in the concept that all economic, social, and environmental benefits of the forest are derived from *properly functioning ecosystems*.[1] It is, therefore, essential for the management approach to reciprocate by managing the forest to support *ecological function*. Chapter 2 describes how to sustain ecological function by managing the land in alignment with management *emphasis areas*, in the context of the broader *landscape* conditions, and in accordance with *stand* conditions. This chapter also clarifies emphasis area design and layout, appropriate example management treatments and their aims, and approaches for supporting ecosystem function under climate change.

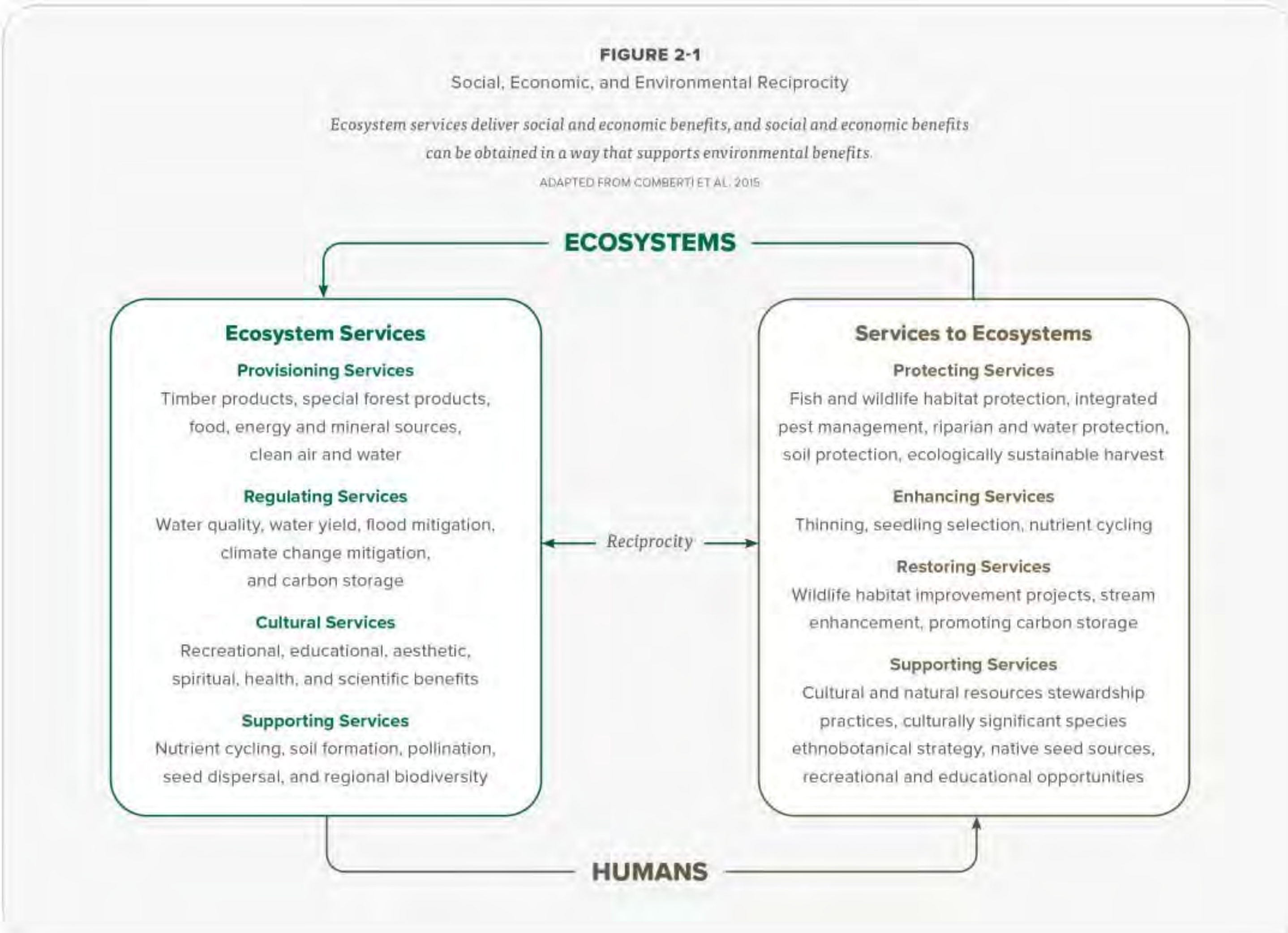
2.1 Sustainable Delivery of Ecosystem Services

~~For millennia, Oregon's forest *ecosystems*[1] have been a key part of Oregon's culture, history, and economy. Prior to European settlement, many bands of *Tribal Nations* inhabited Oregon's landscape for time immemorial. They managed the land to produce healthy and abundant *species* of plants and wildlife for sustenance, demonstrating the concept of *reciprocity*, where Tribal land preparations contributed to the *restoration* of natural resources while simultaneously providing healthy and *sustainable* ecosystems.~~ Although ~~the~~ forests have always provided for multiple uses and benefits, the Oregon Department of ~~Forestry's~~Forestry (ODF)'s understanding of these uses and how they are interrelated has deepened and evolved over time. ODF forest management plans have changed from a primary focus on production and harvest of wood products~~, other benefits (e.g., recreation) have been recently recognized that solicited (1) more~~ to a greater emphasis on ~~managing for~~1) integrating management actions to realize multiple ~~uses and their associated~~ co-benefits ~~and values (e.g.,~~such as clean water, rare *species* protections, diverse ~~recreation~~recreational opportunities~~) with varying levels of integration~~ and timber production; and ~~(2) a much broader recognition~~2) recognizing that forest uses ~~(i.e., goods~~ and ~~services) and their associated public values~~benefits are derived from intact, functioning forest ecosystems and ecological processes (Kline et al. 2013; Jaworski et al. 2018). ODF uses the framework of *ecosystem services* to identify how healthy forest ecosystems support social, economic, and environmental benefits, and conducts management activities in service to those ecosystems to support their functions (Figure 2-1).

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

FIGURE 2-1

Social, Economic, and Environmental Reciprocity. Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.



Adapted from Comberti et al. 2015.

Ecosystem services are the benefits provided by ecosystems to humans~~;~~. These services are categorized into the following four groups: provisioning, regulating, cultural, and supporting services (Millennium Ecosystem Assessment 2005).

- **Provisioning services.** Provisioning services are resources provided by forest ecosystems that include a sustainable and predictable supply of timber, wood products, and *special forest products*; food, energy and mineral sources; and clean air and water.

~~[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.~~

- **Regulating services.** Forests help regulate ~~resources and~~ ecosystem processes, for example through *carbon sequestration* and flood control.
- **Cultural services.** Forests provide sustenance; spiritual, recreational, aesthetic, and scientific benefits; and values as numerous and diverse as the people and cultures that use them.
- **Supporting services.** Forest ecosystems support regional *biodiversity* and the function of many systems including *nutrient cycling*, soil *formation*, pollination and seed dispersal~~, and regional *biodiversity*~~.

In addition to ~~identifying~~the many important *outcomes* that contribute to community well-being, the ~~concept~~concepts of ecosystem services ~~creates~~and *reciprocity* create a framework that recognizes how ~~social and economic~~human needs are supported by healthy ecosystems and how society, in turn, provides services to those ecosystems by supporting their functions (Figure 2-1).

~~The overall goal of *ecologically sustainable*~~ In this framework, management ~~is a functional ecosystem that sustainably delivers~~ activities can enhance the quality or quantity of ecosystem services~~. This approach to forest management is to sustain and support the ecological function and productivity of the forest, and thereby improve *resilience* or *adaptive capacity of ecosystems* to change over time, informed by ODF's Climate Change and Carbon Plan (CCCP) (Franklin et al. 2018; Lindenmayer et al. 2012; Palik et al. 2022). Healthy, diverse, productive, and resilient forests maintain and enhance ecosystem services and the varied benefits the public derives from them and are the foundation upon which sustainable working forests are built (Spies et al. 2018). In this framework, the ecosystem services provided by the forest are sustained across the *landscape* and through time (Figure 2-2).~~ while maintaining ecological integrity and resilience (Comberti et al.

~~Ecologically sustainable management anticipates change and uncertainty in forest conditions and disturbances, as well as societal values and demands, forest product markets, future climate scenarios, and effects of climate variability and change on forest ecosystem services. To address change and uncertainty, ecologically sustainable management seeks outcomes that reduce risk to resources and increase future options to provide ecosystem services through an *adaptive management* framework and a focus on increasing adaptive capacity. Adaptive management is a key tenet of ecologically sustainable forest management in a changing world and society, especially given uncertainty and risks associated with long-term planning (Millar et al. 2007). Adaptive capacity of State Forests is increased when actions are taken to facilitate or improve the ability of the system to respond to changes that result in the desired ecosystem services (Aplet and Mckinley 2017). Increases in adaptive capacity may be achieved by increasing *resistance* and resilience of existing *stands* to discrete disturbance events and chronic *climate change* (Puettmann et al. 2009; Aquilué et al. 2021) or by guiding or allowing areas to transform to a new state, such as a new species *composition*.~~

~~**FIGURE 2-1**~~

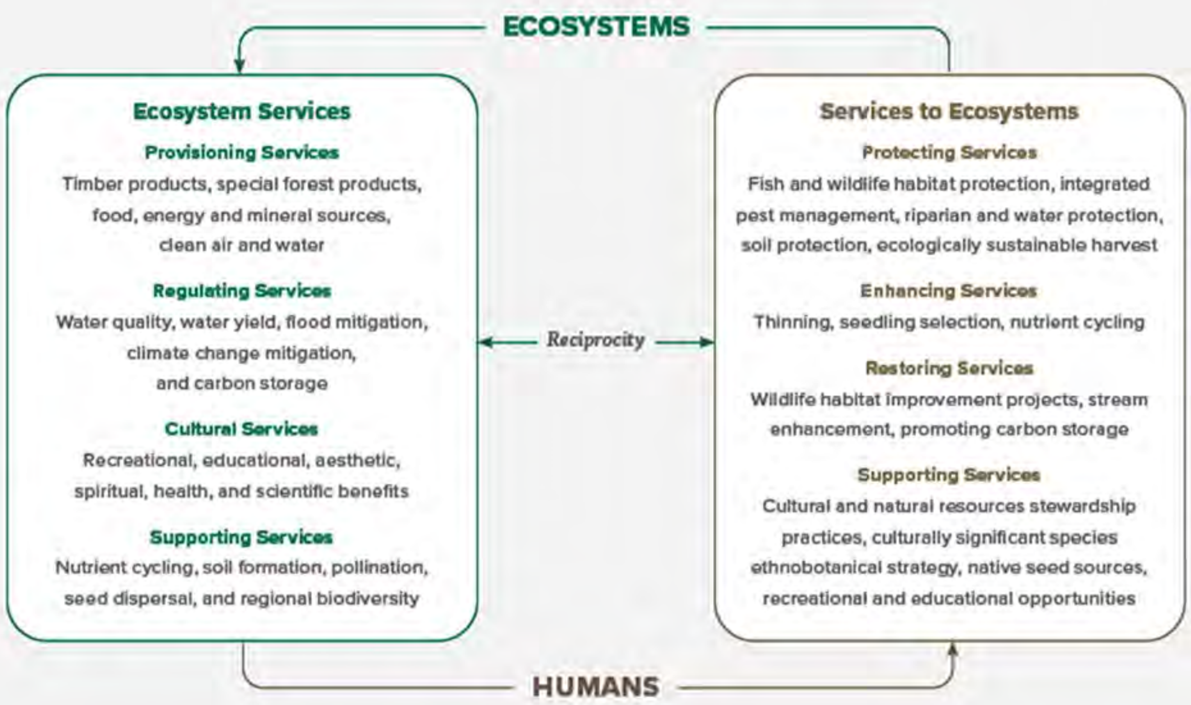
~~Social, Economic, and Environmental Reciprocity.~~ ~~Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.~~

FIGURE 2-1

Social, Economic, and Environmental Reciprocity

Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.

ADAPTED FROM COMBERTI ET AL. 2015 AND LINDENMAYER ET AL. 2012

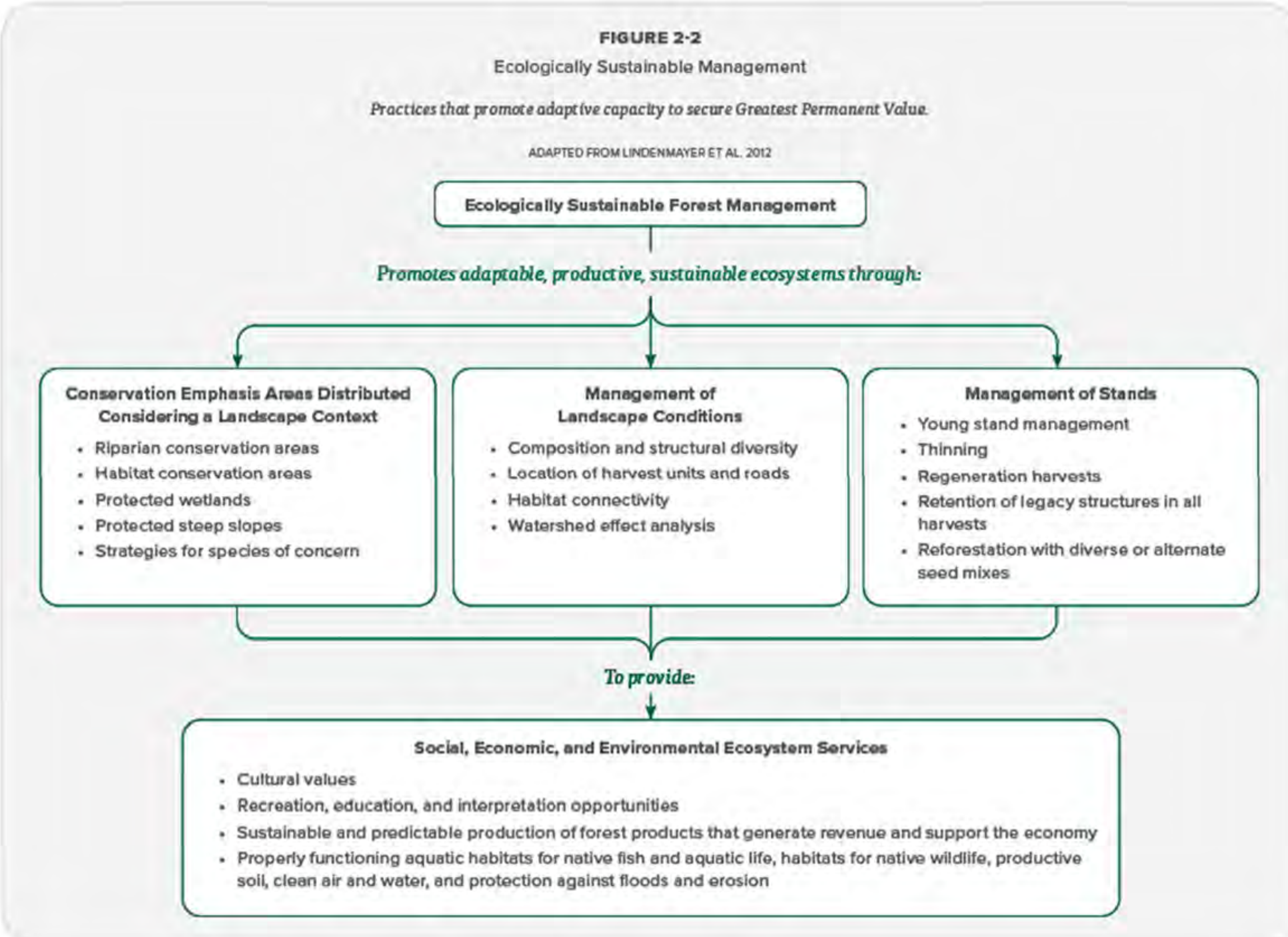


Rev.6-4-2023

~~Adapted from Comberti et al. 2015; Lindenmayer et al. 2012~~

~~**FIGURE 2-2**~~

Ecologically Sustainable Management. ~~Practices that promote adaptive capacity to secure GPV.~~



~~Adapted from Lindenmayer et al. 2012.~~

~~Resistance refers to the ability of a system to avoid a disturbance. Resilience refers to the ability to recover from a disturbance. *Transformation* refers to the emergence of a new ecosystem different from its historic structure, composition, or function. Both *active* and *passive management* techniques can increase adaptive capacity, guide transformations, or respond to transformations to sustain ecosystem services (Lynch et al. 2021).~~

~~The management approach reflects complex social and ecological systems that require integrated understanding of the relationships between resources distributed across space and time and their interacting processes (Fischer 2018; Thompson et al. 2021). This understanding informs decision-making to achieve the overall goal of sustaining ecosystem services. In this context, the forest is a system that collectively provides ecosystem services. The following sections describes how ODF applies ecologically sustainable management to state forest lands.~~

~~2.1 Ecologically Sustainable Management of State Forest Lands~~

~~Under ecologically sustainable management, ODF will manage state forest lands in western Oregon~~ 2015). Services to ecosystems can likewise be categorized into the following four groups: protecting, enhancing, restoring, and supporting services.

- **Protecting services.** Fish and wildlife *habitat* protections, *riparian* buffers, and water protection.
- **Enhancing services.** Forest growth management and development, species selection and translocation, and nutrient cycling.
- **Restoring services.** Wildlife habitat improvements, *stream* enhancements, and promoting carbon storage.
- **Supporting services.** Enhanced cultural and natural resource *stewardship* practices.

To support the delivery of ecosystem services into the future to provide *greatest permanent value* (GPV) to Oregonians~~. The following sections layout how~~, ODF manages state forest lands ~~for sustainability of~~ in western Oregon under an *ecologically sustainable* *forest* ~~ecosystem services~~*management* approach, as described in Section 2.2, *Ecologically Sustainable Forest Management of State Forest Lands*.

~~2.1.1 Emphasis Areas Integrate Ecosystem Services~~

~~GPV~~

2.2 Ecologically Sustainable Forest Management of State Forest Lands

Healthy, diverse, productive, and *resilient* forests maintain ecosystem services and are the foundation upon which sustainable working forests are built (Spies et al. 2018). The overall focus of ecologically sustainable forest management is the sustainable delivery of ecosystem services while maintaining the integrity of the ecosystem (Lindenmayer et al. 2012). This approach can be challenging because it requires an integrated ~~*resource management* such~~understanding of the relationships between *forest resources* that ~~the~~ are distributed across the landscape and change over time (Fischer 2018; Thompson et al. 2021). This understanding, while always incomplete, informs ODF's planning ~~*area* continues to produce benefits under the context of potentially transformative conditions driven by climate change. ODF's~~ , decision-making, and implementation.

Specific strategies for individual resource *goals* are considered (Chapter 3, *Forest Resources, Goals, and Strategies*), as well as integrated strategies across resource goals, which include the following considerations: resilient forests, *trade-offs* among resources, and *adaptive management* ~~approach achieves GPV by designing spatially explicit *emphasis areas* whose overlapping layout emphasizes~~. Forest managers are confronting a changing climate, chronic stressors, and disturbance regimes that are increasingly different ~~combinations of resource *goals* designed~~from historical norms. Localized forest *stand management*, along with landscape-level considerations, seeks to reduce the vulnerability of state forests to ~~complement each other to support long-term~~ ecosystem ~~*function*~~service disruption by increasing the diversity, complexity, and ~~increase~~ *adaptive capacity* ~~over time and across the landscape.~~of forests to tolerate, recover from, or adapt to disturbances. The focus on increasing resilience is informed by the Oregon Board of Forestry (the BOF) and ODF's shared *Vision for Oregon's Forests* (VOF) and ODF's *Climate Change and Carbon Plan* (CCCP).

To produce GPV, different resource outcomes are prioritized at different points in time or places leading to trade-offs among the many resource goals. ODF evaluates trade-offs among resource goals through a tiered planning framework that operates at multiple geographic and temporal scales. For instance, at the *policy* level, the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP) establishes overall biological goals and *objectives*, conservation actions, and the spatial design of conservation areas. At the *Implementation Plan* (IP) level, regional targets for activities and protections balance habitat, *watershed* function, social values, and sustainable timber *revenue* over the plan term. At the *Operations Plan* (OP) level, site-specific plans evaluate forest stand conditions, forest access, *best management practices* (BMPs), and resource protections to integrate co-benefits. Adaptive management links these planning levels by using *monitoring* and new information to adjust strategies and ensure long-term resilience and delivery of ecosystem services.

Adaptive management is a structured approach to learn from actions, monitor outcomes, and adjust management in response to ecological, economic, and societal changes. In ecologically sustainable forest management, ODF implements management, monitors performance relative to goals and targets, and updates plans or operations where needed. This iterative cycle links planning (FMP, WOSF HCP, IPs, OPs) to on-the-ground learning, ensuring strategies remain effective as conditions evolve. Adaptive management is one of the fundamental themes (Chapter 1, Section 1.2, *Plan Themes*) present throughout the FMP. Chapter 4, *Guidelines*, provides additional adaptive management *guidelines*.

2.3 Management Approaches within Ecologically Sustainable Forest Management

Ecologically sustainable forest management uses a combination of approaches at different scales and evaluates trade-offs among forest resources across the landscape to support ecological function and productivity. Management for diversity and complexity occurs at these various spatial scales (genes to ecosystems, individual trees to ecoregions) and timeframes (annual, decadal, plan term) in alignment with the management of each emphasis area. Approaches include management of emphasis areas, landscape conditions, and individual forest stands (Lindenmayer et al. 2012). Together, these three approaches deliver the ecosystem services to provide GPV (Figure 2-2). Each approach is described in more detail in the following sections.

2.3.1 Management of Emphasis Areas

Different types of management can be applied to different areas of the forest to balance trade-offs between resource goals and to deliver the desired ecosystem services most effectively. Emphasis areas may include lands designated for environmental protection, timber production, or multiple compatible uses (Burton 2025). ODF's ecologically sustainable forest management approach designates emphasis areas that guide management priorities and acknowledge the trade-offs between different forest uses on any single parcel of forestland. These emphasis areas are mapped using the *Forest Land Management Classification System (FLMCS*~~) is a method of describing~~*)*.

Forest Land Management Classification System

The FLMCS describes the *management emphasis* of ~~parcels~~specific areas of state forest lands and ~~has been~~is implemented in accordance with Oregon Administrative ~~Rule~~Rules (OAR) 629-035-0055. The ~~management emphasis of~~ FLMCS identifies the extent to which a parcel of land can be managed for a variety of forest resources. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority in its management. ~~The spatial locations of the emphasis areas are delineated by FLMCS. The resource objectives emphasized therein, and the rules governing management activities in them, are found in the~~ ~~*Western Oregon State Forests Habitat Conservation Plan*~~ ~~(HCP) (ODF 2022), operational policies, OARs, and other laws and regulations. The Western Oregon State Forests Management Plan (FMP) Integrated Goals and Strategies apply across the landscape but are more strongly emphasized in certain locations according to the particular area's combination of emphasis areas. Management activities in any particular area must be designed to emphasize the resource goals according to the emphasis areas that apply in that particular area~~The spatial locations of the emphasis areas are mapped according to the FLMCS classification criteria and are based on the requirements and *standards* found in supporting plans such as the WOSF HCP, laws, operational policies, and BMPs.

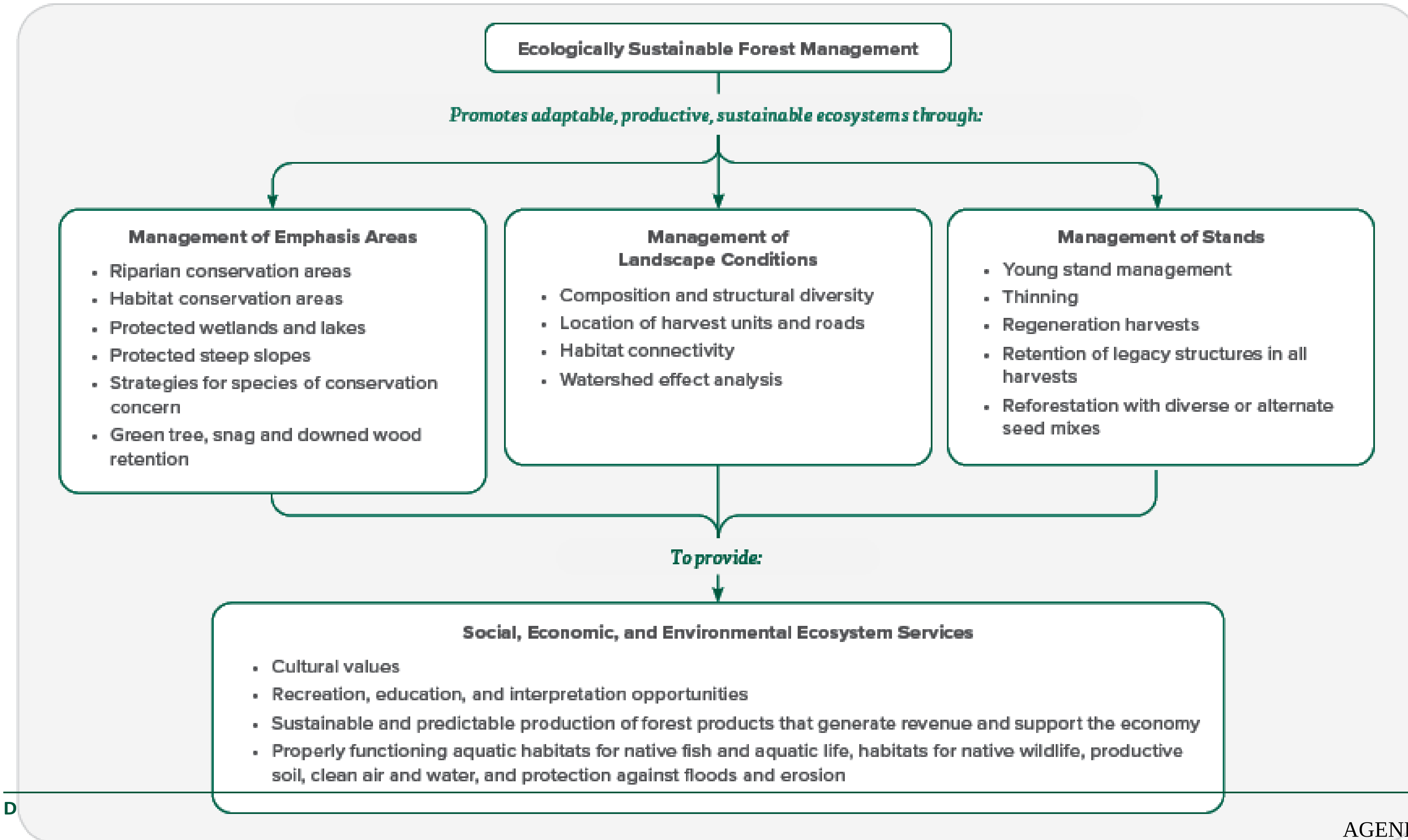
The FLMCS is made up of four land management stewardship classes: General Stewardship, Focused Stewardship, Special Use, and High Value Conservation Areas (HVCAs). Within the Focused Stewardship, Special Use, or HVCA Stewardship classes, the resource emphasis is defined in more detail with subclasses. In many instances there may be several forest resources in an area that result in overlapping subclasses and stewardship classifications. In other areas, these specific forest resources may be absent and are classified as General Stewardship. These classifications are not prescriptive in nature but provide a guide during implementation to the types and appropriate range of management activities, and the forest resource or resources that should be considered and prioritized for each area.

~~The spatial layout of emphasis areas is intentionally designed with ecosystem function and related processes in mind. In particular, the HCP's *habitat conservation area* (HCA) layout, as discussed in HCP Chapter 4, Section 4.7.6, *Conservation Action 6: Establish Habitat Conservation Areas*, is complemented by adjacent portions of the landscape that are more actively managed, an arrangement known as land sparing (Harris and Betts 2023). HCA layout provides late *seral habitat connectivity* and complexity, while more actively managed adjacent areas provide early and mid-seral stand diversity (Donato et al.~~

~~2012; Puettmann et al. 2016; Stokely et al. 2022). Forest stand and landscape diversity, complexity, and~~

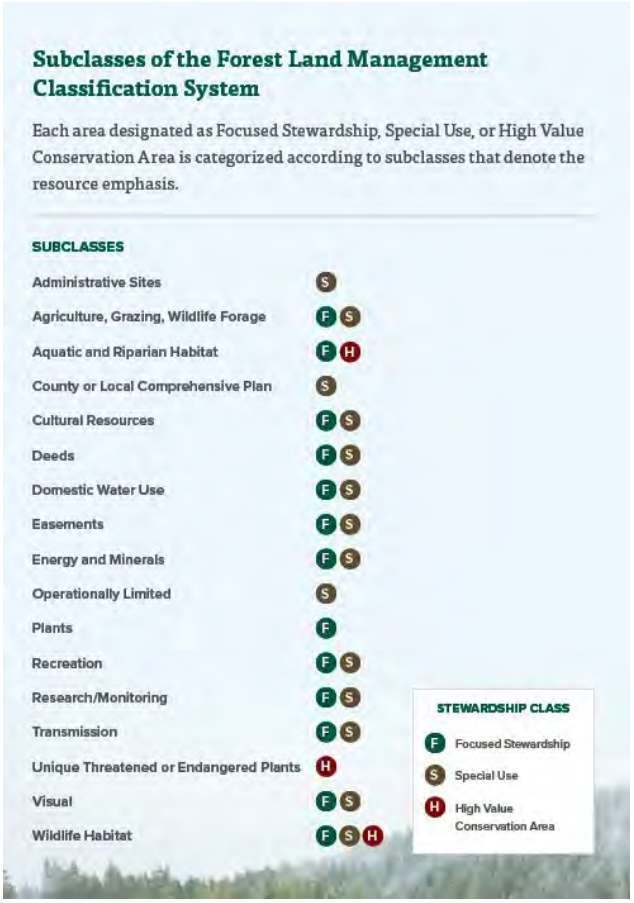
FIGURE 2-2

Ecologically Sustainable Forest Management. Practices that promote adaptive capacity to secure GPV.



Adapted from Lindenmayer et al. 2012.

General Stewardship



General Stewardship is a classification with the broadest range of potential management activities. General Stewardship lands that are designated as *silviculturally capable* under the Oregon Forests Practices Act are actively managed to meet the requirements of OAR 629-035-0020(2), which is to "provide sustainable timber harvest and revenues to the state, counties, and local taxing districts." Non-silviculturally capable lands in this classification are not managed for timber harvest, but are managed to meet the remaining goals of GPV (OAR 629-035-0055(4)(a)).

Focused Stewardship

Focused Stewardship lands contain these lands that require heightened or focused awareness, supplemental planning or modified management practices may be required to achieve the goals of the FMP, WOSF HCP, FPA, or other legal requirements (OAR 629-035-0055(4)(b)).

There are several resources within Focused Stewardship lands that are identified by specific subclasses, including areas with *cultural resources*, domestic water use, or recreational uses, where additional planning or management practices are considered to maintain and protect these resources.

Special Use

Special Use is a classification of lands that are "managed for a specific forest use. Integrated management is conducted on these lands to the extent possible without interfering with the management of the specific forest use" (OAR 629-035-0055(4)(c)). On lands classified as Special Use, a legal or contractual constraint, such as an administrative site or easement, dictates a clear priority and precludes the integrated management of all forest resources. These lands are committed to a specific use, and management activities are limited to those that are compatible with the specific use (OAR 629-035-0055(3)(c)). The Tillamook Forest Center and Smith Homestead day use area are examples of Special Use lands. In accordance with the governance documents for these sites, the forest is specifically managed for visitor and facility needs—such as access, recreation, education, interpretation, hazard mitigation, and maintenance and compliance with other laws.

High Value Conservation Areas

HVCAs are a classification of lands managed for a specific conservation value, where forest management activities are designed to promote specific conservation values, avoid long-term adverse impacts on those values, and are consistent with applicable legal requirements (OAR 629-035-0055 4(d)). *Habitat conservation areas* (HCAs) and *riparian conservation areas* (RCAs) are examples of HVCAs where specific wildlife or riparian needs are promoted by applying forest management activities according to the specifications set out in the WOSF HCP. Examples include limiting harvest in RCAs to improve stream shade, and thereby salmon habitat, and designing harvest in HCAs to improve habitat for covered species.

2.3.2 Management of Landscape Conditions

While applying different management approaches among emphasis areas increases the effective delivery of ecosystem services, the spatial arrangement of emphasis areas across the landscape can promote the resilience of ecosystem services to unpredictable changes. The spatial layout of emphasis areas and pacing of management activities are intentionally designed to support diversity, complexity, connectivity, and *redundancy* across the landscape and its ecosystem functions and processes. Decadal targets for management activities and outcomes are set in IPs and OPs prescribe specific spatially explicit annual management activities, in alignment with the IPs.

The distribution of stands of various ages and structural conditions affects a broad range of ecosystem services, such as availability of wildlife habitats (Figure 2-3) and timber over time. Sustainable timber production requires a balanced set of forest ages across districts in General Stewardship areas, while many wildlife species require specific habitat elements, *patches* of sufficient size and connectivity ~~support~~ among them allow for production and dispersal. Consideration of how management in one area affects the adjacent areas and, vice versa, how the surrounding forest influences management outcomes is critical for functional ~~systems.~~landscape design. Diverse landscape conditions are managed to increase connectivity of forests for wildlife dispersal and flow of ecosystem services like pollination. This, in turn, promotes ~~other elements of~~ biodiversity and related ecosystem processes, such as seed and fungal spore dispersal, soil and nutrient cycling, water quality, and aquatic habitat, which further enhances function~~. These positive feedback loops foster adaptive capacity and, thus, resistance and~~ and increases resilience to stochastic and chronic disturbance ~~within stands and across the landscape (Carey 2007; Franklin et al. 2018). Both HCAs, and more actively managed areas, individually and collectively are intended to adapt to change. Operational policies and *riparian conservation areas* (RCAs) further define and guide more actively managed areas to protect other resources where they benefit the most. In this way, all emphasis areas are integrated across the landscape, such that lands produce timber and protect other ecosystem services~~(Carey 2007; Franklin et al. 2018). Active management for diversity, while incorporating or emulating natural disturbance events, further increases the complex arrangement of stands and distributes flows of resources across the landscape and through time.

~~Figure 2-3 depicts how areas where timber is produced create younger forests, which supports different wildlife species than the older forests created by *conservation areas*. Together, adjacent timber production and conservation areas will be managed to support *species diversity* for multiple values, which improves GPV. Management for diversity occurs at various spatial (genes to ecosystems, individual trees to ecoregions) and temporal (annual, decadal, plan term) scales and within the context of each emphasis area.~~

~~Management strategies intended to increase adaptive capacity to climate change and other disturbances will vary across the landscape depending on how particular areas are designated by the FMP, HCP, and other laws or policies. FLMCS describes the type of management that will be applied to a particular area, the allowable range of activities in these areas, and the resources the classification is intended to address. The HCP designates lands for conservation and commits to conservation actions across the forest. Legal requirements and policies define requirements to protect resources. The FMP goals and strategies further define ecosystem benefits that will also guide management activities. For example, FMP cultural goals and strategies include provisions for Tribal access and culturally significant species. Additionally, FMP strategies include recreation, education, and interpretation considerations for highly used trail systems, or areas that have unique interpretive and educational qualities. The following sections describe the emphasis areas and how landscape-level systems, processes, and risk are managed.~~

The size and layout of HCAs and RCAs in relation to one another creates a connected network of conservation features across varied forest types, elevations, and climate zones. Even within a single type of emphasis area (i.e., HVCA), wildlife habitat reflects a diversity of climate conditions, disturbance history, and patch sizes. Connectivity is provided in part by RCAs that allow trees to grow old in long swaths alongside streams, traversing through a landscape of diverse age classes. Meanwhile, the network of HCA patches creates the opportunity to improve wildlife habitat connectivity throughout the forest uplands (Figure 2-4, View A). Distributing emphasis areas across the landscape builds redundancy in ecological functions and mitigates the risk of exposure to disturbances and climate stress.

Losses to ecosystem services in any one area are compensated through the abundance of similar features elsewhere on the landscape.

The size and layout of conservation areas among actively managed forest is intentional. Placing HCAs next to, and RCAs throughout, General Stewardship emphasis areas with active management, the landscape becomes a complex mix of habitat types and forest stages that provide diversity between forest stands and supports complementary ecosystem services that deliver multiple benefits. A complex landscape with diverse forest types can increase the resilience of the forest to threats, such as an insect or disease. The complex arrangement of forest types, tree ages, and emphasis areas can also provide a range of options for recovery or adaptation after disturbances (Burton 2025). For instance, a wildfire or ice storm that causes patchy areas of tree mortality could be followed by natural seed dispersal from nearby surviving trees that persisted because they were a less-susceptible age or on a sheltered landscape feature.

Emphasis areas of different types are integrated and overlaid across the forest to create a landscape of diverse uses and benefits (Figure 2-4, View B), which are managed for multiple values, improving GPV. In this way, emphasis areas work together to produce timber, provide social benefits such as public access, and protect a wide array of ecosystem services.

2.3.3 Management of Stands

Management of individual forest stands is based on site-specific resource goals. Management varies depending on existing tree conditions and can include *young stand management*, thinning older trees *regeneration harvests*, retention of biological *legacies*, and *reforestation*. Options for management approaches for forest stands are detailed in Chapter 3, Section 3.1.3, *Forest Resilience*. Within emphasis areas, stand management activities have similarities based on the common resource goals. However, even within emphasis areas, the site conditions and trade-offs among resources lead to different treatments. The emphasis areas found in FLMCS can generally be placed into the social, economic, and environmental categories that make up GPV. Descriptions provided in the following subsections give examples of how ODF management may vary at the forest stand level given the considerations of the emphasis areas.

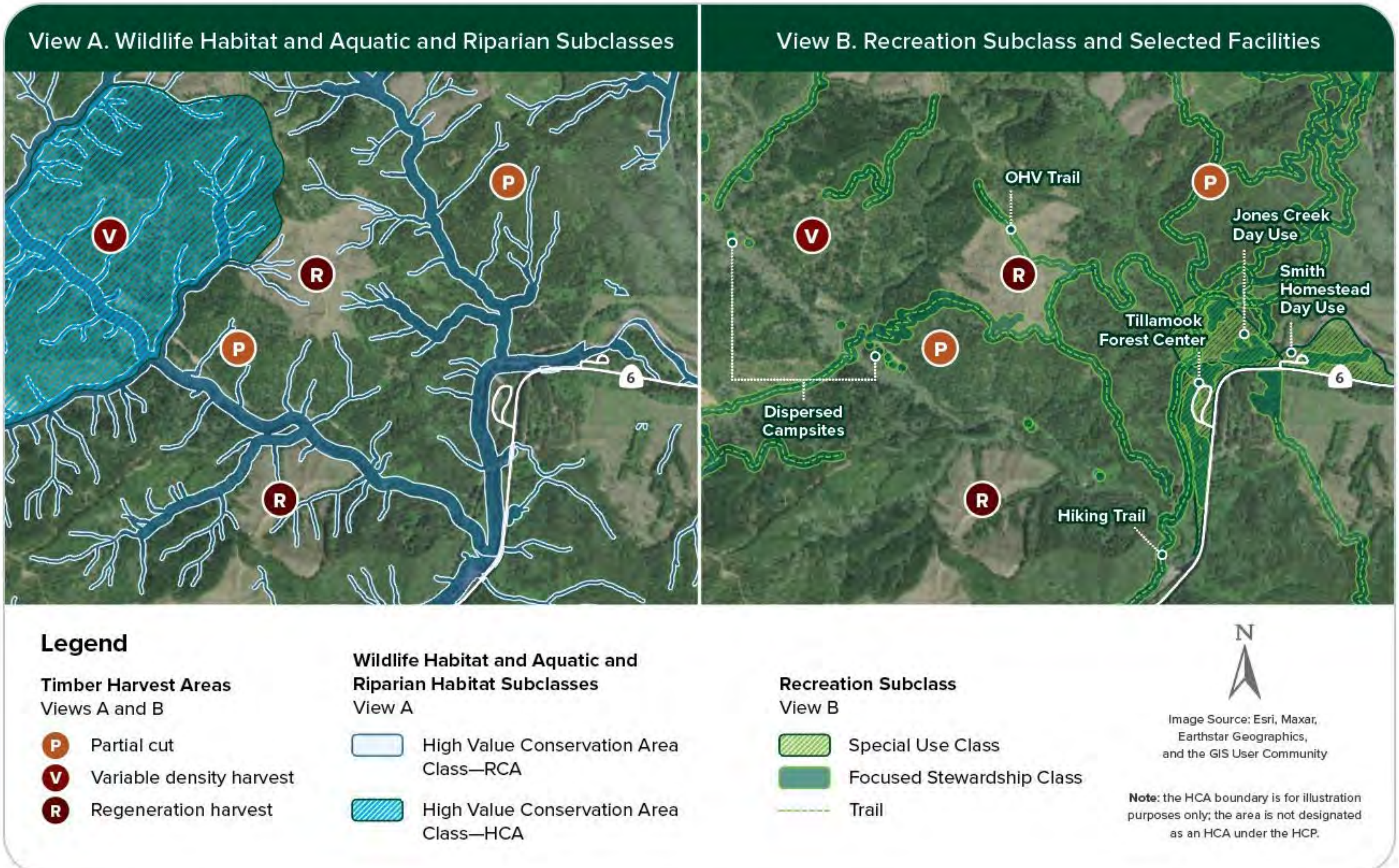
FIGURE 2-3

~~Emphasis Areas and Their Value to the~~Landscape-Level Forest Stand Diversity Contributions to Ecosystem~~. The design of emphasis areas~~ **Function.** Management across the landscape supports diversity, connectivity, complexity, and redundancy, which ~~support~~, in turn, supports adaptive capacity of the ~~ecosystem~~forest for sustained ecosystem services delivery under changing conditions.

Source: Oregon Forest Resources Institute 2022.

FIGURE 2-4

Examples of Emphasis Areas across the Landscape. Active management is integrated across the landscape guided by resource management emphasis areas.



Note: The HCA boundary is for illustration purposes only; the area is not designated as an HCA under the WOSF HCP.

~~Forest Land Management Classification System~~

~~The FLMCS framework places all state forest land within one of four land management classifications: General Stewardship, Focused Stewardship, Special Use, and High Value Conservation Areas (HVCAs). Subclasses are assigned for the specific forest resources that require a Focused Stewardship classification, Special Use classification, or HVCA classification (*for subclasses and stewardship classes, see box at right*).~~

~~General Stewardship lands will be primarily managed for sustainable and predictable supply of timber. Trees younger than the criteria used in the definition of old growth in the HCP are available for harvest.~~

Forest Land Management Classification System Subclasses

Each area designated as focused, special, or high value conservation stewardship is categorized according to subclasses that denote the resource emphasis.

SUBCLASSES

Administrative Sites S
Agriculture, Grazing, Wildlife Forage F S
Aquatic and Riparian Habitat F H
County or Local Comprehensive Plan S
Cultural Resources F S
Deeds F S
Domestic Water Use F S
Easements F S
Energy and Minerals F S
Operationally Limited Recreation S
Plants F
Recreation F S
Research/Monitoring F S
Transmission F S
Unique Threatened or Endangered Plants H
Visual F S
Wildlife Habitat F S H

STEWARDSHIP CLASS

F Focused Stewardship
S Special Use
H High Value Conservation Area

~~General Stewardship~~

Social Emphasis

State forests provide for a wide range of social bene and wildlife habitat for fishing and hunting, carbon opportunities, and revenue (Figure 2-4, View B). W emphasis areas, there are also specific areas manag highways and *scenic waterways*; public access throu opportunities including hiking, motorized trails, an services. The cultural goals and strategies outlined i *Strategies*, provide for tribal access, opportunities f species, and protection of cultural resources.

Management within social emphasis areas also inte example, planning and construction of new trails fo stream-crossing design, and hydrological connectiv may be required to implement trash management p marbled murrelets. Stand management may occur i benefits, such as thinning in campgrounds or on lan enhance scenic qualities or remove safety hazards. incidental benefits, such as economic revenue, this

Economic Emphasis

On state forest lands, timber revenue funds the majority of management activities, including habitat *restoration*, fuels reduction ~~management~~, recreation ~~and education~~, educational programs, and infrastructure~~.~~ development and maintenance. These funds are also the primary vehicle for providing economic benefits to rural communities ~~across the state.~~and public services. Emphasis on timber-production goals and related *silvicultural* strategies ~~will, therefore, take priority~~are prioritized on a significant portion of the landscape~~.~~

> ~~Production of timber will be the primary objective of~~, especially on General Stewardship lands. ~~These~~Although economics is the emphasis of General Stewardship lands ~~will~~, these lands are managed to continue to provide a suite of additional ecosystem services such as clean water, *carbon sequestration* and *storage*, and ~~early seral wildlife habitat (Stokely et al. 2022).~~habitat for many different wildlife species associated with early- and mid-*seral* forest types (Figure 2-3). Environmental and social goals and strategies in Chapter 3, *Forest Resources, Goals, and Strategies*, apply during management of General Stewardship lands.

~~According to the OAR, General Stewardship lands shall be actively 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" (OAR 629-035-0055(4)(a)).~~

~~General Stewardship lands provide more opportunities for harvest operations relative to other land classifications. Each harvest entry provides opportunities to increase the subsequent stand's adaptive capacity by actively resisting or directing climate change effects through planting species mix, adjusting planting densities, and other factors to maintain productivity and diversity. Retention of biological *legacies* (old growth, *standing live and dead trees*, *downed wood*) provide for additional structure, function, and diversity in regenerating stands (Lindenmayer et al. 2012). General Stewardship lands may also employ fuels reduction management to reduce the risk of ignition and spread of wildfire, while maintaining the *standards* set forth in the HCP, and seek alternative revenue sources, such as *biochar* and small-diameter wood products. Careful *salvage* harvest of damaged stands will ensure recovery of economic values and allow new stands to be established with the species mix and planting strategies that are best suited for production under evolving conditions. Environmental goals and strategies in Chapter 3, *Forest Resources, Goals, and Strategies*, guide ODF to protect, maintain, and enhance soils, aquatic, and wildlife resources during management of General Stewardship lands.~~

> ~~The practice of charring forest material and mixing it with soil, to create biochar, was used for thousands of years by indigenous people in the Amazonian basin. The practice created rich soils, called "terra preta de Indio," in otherwise infertile soils.~~
>
> ~~Modern technologies use pyrolysis to produce biochar. Pyrolysis prevents harmful emissions and produces valuable byproducts in addition to biochar. Pyrolysis is the thermal decomposition of plant material in the absence of oxygen, which prevents combustion (burning). By preventing combustion, the production process prevents the release of greenhouse gases, particulates, and other toxicants to the atmosphere and instead produces bio-oil and synthesis gas, which are captured and can be used as fuel or precursors to other chemical products. Like coal, biochar is a stable form of carbon that can store carbon in the soil for hundreds to thousands of years.~~

~~*Focused Stewardship*~~

~~"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." (OAR 629-035-0055(3)(b)) "Because one or more specific forest resources on these lands require 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." (OAR 629-035-0055(4)(b))~~

~~There are several subclassifications of Focused Stewardship lands, including areas with *cultural resources* or recreation use, where additional management strategies are designed to maintain and protect these resources. These additional strategies are considered through supplemental planning process (OAR 629-035-0055(3)(b)), described in ODF operational policies and state and federal regulations.~~

~~Special Use~~

~~Special Use areas shall be "managed for a specific forest use. Integrated management is conducted on these lands to the extent possible without interfering with the management of the specific forest use" (OAR 629-035-0055(4)(c)).~~

~~On lands classified as Special Use, "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; lands are committed to a specific use and management activities are limited to those that are compatible with the specific use" (OAR 629-035-0055(3)(c)).~~ With an economic emphasis, silvicultural practices in forest stands consider the long-term resilience of tree growth and production of wood products under climate change. To moderate the uncertain impacts of future climate conditions, stand management may vary by the anticipated vulnerability of the stand (e.g., based on its aspect, elevation, precipitation, and species mix). Diversifying management strategies at the stand level provides risk management across the General Stewardship lands. Options include increasing the number of species used or adjusting planting density, different thinning types, and timing of cutting activities. Some approaches may perform better or worse in the future compared to what is currently optimal, but preserving a range of options for future management provides some assurance of maintaining long-term timber *sustainability* under an adaptive management approach (Puettmann 2011).

Management activities are reviewed during individual project planning to ensure alignment with FMP goals and strategies. For example, harvest operations on General Stewardship lands are planned with the management emphasis of revenue and timber production.

Other co-benefits are realized from these operations.

- Domestic water intakes in or adjacent to a harvest area and are protected according to applicable rules and policies.
- RCAs and leave tree and downed wood requirements (defined in WOSF HCP Chapter 4, *Conservation Strategy*) retained within the *harvest unit* contribute to fish and wildlife habitat, clean water, and carbon storage.
- Harvested timber contributes to carbon storage in manufactured wood products.
- Policies and BMPs may be used to minimize impacts on a recreation trail located within a harvest area.

Figure 2-4 shows how forest and social resources protections and considerations and active management are integrated across the landscape.

Environmental Emphasis

Environmental benefits are found throughout the forest from healthy stands with productive soils, fish and wildlife habitat, and clean air and water. Areas with an environmental emphasis include *wetlands*, meadows, lakes, and larger conservation areas to provide habitat to a multitude of species. These conservation areas also provide extensive carbon storage, maintain large portions of continuous tree cover within *viewsheds*, and support recreation through trails, camping, and other outdoor activities. While treatments and management actions in these areas are designed to increase the quantity and quality of certain habitats, these actions also generate economic and social co-benefits.

The ~~Tillamook Forest Center and Smith Homestead day use area are examples of Special Use lands.~~

~~*High Value Conservation Areas*~~

~~HVCAs will be managed for a specific conservation value. "Forest management may be conducted to the extent that forest management activities promote the conservation values and are consistent with applicable legal requirements and will avoid long-term adverse impacts to the specified conservation value" (OAR 629-035-0055 4(d)). HCAs and RCAs are examples of HVCAs.~~

WOSF HCP ~~Conservation Areas~~

~~HCP Chapter 4, *Conservation Strategy*~~ defines ~~the~~ two types of conservation areas: HCAs and RCAs. ~~They are delineated and guided by the requirements described in the HCP.~~ A mix of *passive management* and *active management* in HCAs ~~will maintain~~maintains and ~~develop late-seral~~develops, structurally complex ~~stands~~forests as they relate to specific habitat needs for ~~covered~~*native* wildlife species that rely on them. Predominantly passive management in RCAs ~~will improve~~improves habitat for ~~covered~~native aquatic and riparian-dependent species and ~~increase~~increases resilience by buffering ecological function against changes in streamflow and temperatures resulting from climate change.

~~Within HCAs and RCAs, opportunities to increase adaptive capacity through silvicultural activities are more limited than they are for General Stewardship lands. However, certain conservation actions to promote habitat enhancement will provide specific opportunities to promote adaptive capacity or guide transformation. For example, *stream* restoration and *culvert* replacement are allowed~~

Active management in ~~RCAs, which can increase resilience~~a portion of ~~streams and resistance of roads to floods and *landslides*. Management of HCAs will promote~~the HCAs promotes habitat development and adaptive capacity ~~with the following approach. Management of HCAs will incorporate~~by incorporating principles of *ecological silviculture* and *adaptation silviculture* (Palik et al. 2020~~,~~; D'Amato and Palik 2020). Ecological silviculture is based on the spatial heterogeneity and historical range of variation found in unmanaged old forests and seeks to emulate *stand initiation* and development processes that result from small-scale natural disturbances (e.g., *windthrow*, lightning, insects, disease) to promote within-stand diversity and complexity. Natural history (forest development, dynamics, species, and *structures*) is a model for management and provides insight into potential pathways, trajectories, limitations, risks, and options. Natural forest development principles (e.g., disturbance, succession) inform management strategies and prescriptions related to stand initiation and development, forest maintenance ~~of forests~~, retention of biological legacies, and landscape mosaics (Carey 2007). However, management based on historical conditions may become less relevant with climate change, leading to greater use of ~~adaptation~~adaptative silviculture that increases the forest's ability to adapt to changing conditions and continue to deliver ecosystem services~~.~~ (Nagel et al. 2017). The outcomes of ecological silviculture—stands with greater diversity and complexity—remain relevant to adapting to novel conditions (D'Amato and Palik 2020). Habitat conditions and ecosystem services ~~will be continually~~are assessed in HCAs in light of novel conditions to determine when to modify management principles.

~~At the stand level, species composition, structural complexity, and function may increase adaptive capacity (Franklin et al. 2018). Management activities will seek to create, restore, and maintain structurally complex and biologically rich stands, considering local forest types and other site-specific conditions. Prescriptions should provide complex and diverse forests of all types and stages, and activities should be timed appropriately within the context of natural forest development (Carey 2007; Puettmann et al. 2016).~~

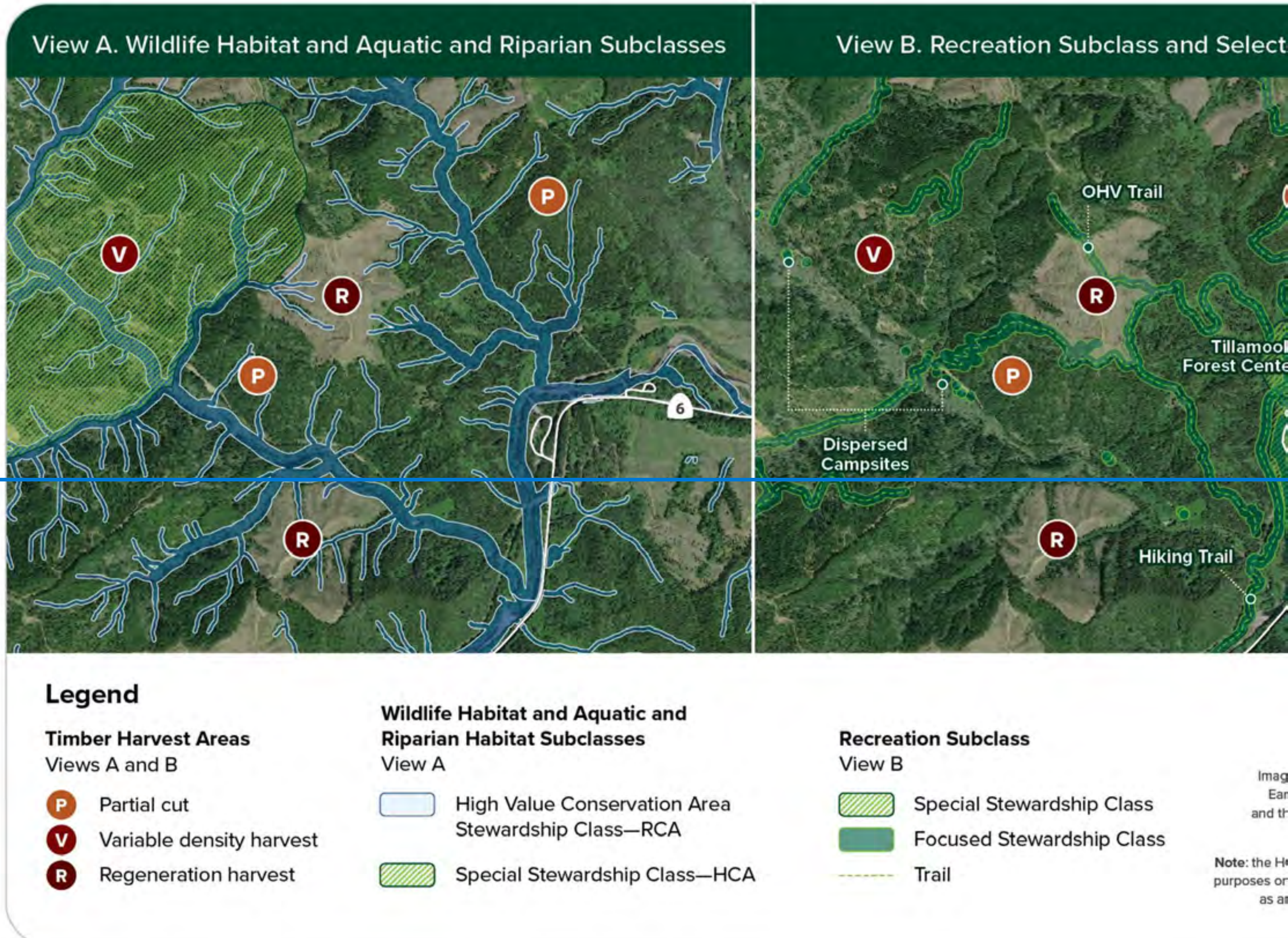
Both active and passive management can be used to promote complex stands ~~and heterogeneous landscapes~~ that enhance adaptive capacity and ~~have co-benefits for habitat development~~produce resilient, heterogeneous landscapes. For example, active management can reduce *stand density* in young stands to encourage trees more likely to withstand wind (Mitchell 2000; Moore et al. 2003). The location of ~~limited~~ treatments in HCAs can also be a factor to help build *resistance* to disturbance. ~~Fuels can be managed in portions of HCAs identified as high fire risk, using~~ Variable-retention harvest or variable-density thinning~~ that also~~ creates spatial heterogeneity for habitat development purposes (e.g., robust shrub and forb communities) in closed-canopy, homogeneous stands~~.~~ (e.g., Berrill et al. 2018; Willis et al. 2021) and may also reduce fuels to mitigate fire risk depending on site conditions (Prichard et al. 2021). Conifer restoration actions in *Swiss needle cast* ~~(SNC)~~-infected stands and some *hardwood*~~-dominated~~ *stands*, ~~although limited in HCAs, will be~~are implemented to guide stand development to resilient stands with more desirable long-term habitat quality~~.~~ and improved carbon sequestration. Reforestation ~~will use a~~using diverse tree species ~~mix~~mixes, with limited site preparation and young stand management, ~~introducing~~introduces complexity early in stand development~~. Variable density thinning will also promote spatial heterogeneity, complexity, and diversity (e.g., robust shrub and forb communities) in closed-canopy, simple stands. While treatments and management actions in HCAs will be designed to increase habitat quantity and quality, some of these treatments will result in timber revenue~~.

~~Allowing for passive~~Where current stand development ~~of~~ is expected to achieve long-term objectives for fish and wildlife habitat, passive management to promote complex older stands may ~~also~~be the optimum approach to increase adaptive capacity (Nagel et al. 2017). Passive management ~~retains~~promotes development and recruitment of biological legacies ~~on the landscape~~ and accommodates small-scale disturbances followed by natural *regeneration*. In some cases, the existing components within a stand are well adapted to the site and have persisted through previous disturbances, providing long-term *refugia* and habitat types on the landscape (Krawchuk et al. 2020). High genetic diversity within stands increases adaptive capacity when natural regeneration is allowed to occur and well-adapted and diverse seedlings grow after disturbances. Forests managed passively in RCAs produce increasingly complex and resilient riparian conditions over time, as shade increases to maintain water temperature and large wood increases habitat complexity in streams as trees fall.

Both active and passive management can facilitate transformative change, e.g., by actively introducing ~~warm~~future-adapted tree stocks ~~or~~and a diverse species mix during reforestation or allowing transformation over time to ~~warm~~future-adapted species or *populations* within the existing plant community~~.~~, if present.

Whether to enable transformative changes after disturbances and under climate change ~~will be~~in conservation areas is assessed under an adaptive management framework with regard to habitat requirements for WOSF HCP-covered species~~ under an adaptive management framework.~~. The varied sizes and distribution of HCAs~~ across the landscape~~, coupled with more regular distribution of RCAs, is intended to create a functional network of habitat *patches* across the plan area, ~~which supports resilience. RCAs will produce increasingly complex and resilient *riparian* conditions over time. Figure 2-4 shows how RCAs, recreation, and timber harvest activities are integrated across the landscape~~that provide opportunities for diversity of trajectories and redundancy, which supports resilience.

~~**FIGURE 2-4**~~
~~**Examples of Emphasis Areas across the Landscape.** Active management is integrated across the landscape guided by resource management emphasis areas.~~



~~Note: the HCA boundary is for illustration purposes only; the area is not designated as an HCA under the HCP.~~

~~2.1.2 Implementation Considerations across the Landscape~~

~~HCP conservation strategies, FMP strategies, and the planning process are intended to integrate management of ecosystem services across the landscape. Planning and operations work together across the landscape to provide~~ Ecologically sustainable forest management integrates emphasis areas, landscape conditions, and stand management to sustain social, economic, and environmental benefits. ~~During the planning process, management activities are reviewed to ensure alignment with goals and strategies. Important habitat types and ecological features are identified and managed according to the HCP and FMP. Consideration is given to recommendations, *Implementation Plan* (IP) targets, *best management practices* (BMPs), and operational policies to achieve GPV. The resulting landscape provides a range of integrated social, economic, and environmental benefits.~~

~~For example, harvest operations on General Stewardship lands are planned with the emphasis of revenue and timber production. Other values are integrated into these operations. Harvested timber contributes to carbon storage in manufactured wood products. RCAs, in addition to leave tree and downed wood requirements, defined in HCP Chapter 4, *Conservation Strategy*, contribute to carbon storage on the landscape, fish and wildlife habitat, and clean water. A special stewardship-designated campground adjacent to a harvest area may be considered a visual buffer per the FMP strategies. A special stewardship domestic water intake may be in or adjacent to a harvest area and is protected according to applicable rules and policies.~~

~~2.1.3 Adaptive Capacity, Landscape Context, and Adaptive Management~~

~~To provide GPV, state forest lands management must sustain interrelated social, economic, and environmental benefits while continuing to promote the ecosystem services that support their delivery and the adaptive capacity of the system in the face of change and uncertainty. Resources change~~ over time~~, economic cycles produce swings in the value of timber harvested, species move across the landscape, disturbance events alter conditions, public use patterns change, and ecosystems undergo transformation. Regional and global conditions such as climate change create uncertainty around future forest productivity and health, species distributions and biodiversity, the severity and frequency of disturbance patterns, and the potential for ecosystem transformation. To deliver ecosystem services in the face of change and uncertainty, the management approach focuses on building adaptive capacity, evaluates *trade-offs* between ecosystem services across the landscape, and leverages adaptive management to address uncertainty and change over time, in alignment with the CCCP.~~

~~Adaptive Capacity~~

~~Maintaining or increasing adaptive capacity across the landscape reduces risk associated with change and uncertainty. Increasing resistance reduces the likelihood of impacts, increasing~~. By designing a functional landscape, applying stand-level practices that build resilience ~~reduces the degree of consequences, and transformation allows for change. Examples of management actions that promote resistance to disturbance include fuels reduction management and establishment of fuel breaks prior to a fire event that can reduce the likelihood of fire spread and severe burn. Examples of management options that promote resilience to disturbance include reforesting with diverse tree~~

~~species that can reduce the extent of insect and disease on timber inventory or enhancing stream habitat conditions throughout a *watershed* to ensure sufficient aquatic resources are available to accommodate increasing fluctuations in streamflow over time. Examples of increasing transformation include allowing an HCA to follow natural fire recovery processes. In general, species diversity, structural complexity in HCAs and RCAs, and spatial heterogeneity contribute to adaptive capacity—the ability of the forest to accommodate changes from both discrete events and gradual change.~~

~~Evaluating Trade-offs in a Landscape Context~~

~~Evaluating trade-offs associated with provision of different ecosystem services is paramount to evaluation and revision of desired conditions and related strategies (Bradford and D'Amato 2012; Burton et al. 2014; Franklin et al. 2018). Trade-offs include but are not limited to management emphasis (e.g., timber, aquatic and riparian function, biological diversity and conservation, *scenic*, recreation), *desired future condition*, integration of resources, applicable *policy* restrictions, *landscape context*, and revenue.~~

~~Trade-offs are considered at every level of planning. For example, at the HCP level, they were considered in the designation of HCAs and RCAs and the development of conservation goals and objectives. At the IP level, they are considered in deciding the type and amount of activities that will occur over the life of the IP in a particular region. Site-specific trade-offs are considered during Operations Plan (OP) development, which designates operations in shorter time periods to achieve the IP. At the adaptive management level, trade-offs are evaluated prior to making any changes to IPs, FMPs, or the HCP. Additional details are provided in Chapter 4, *Guidelines*.~~

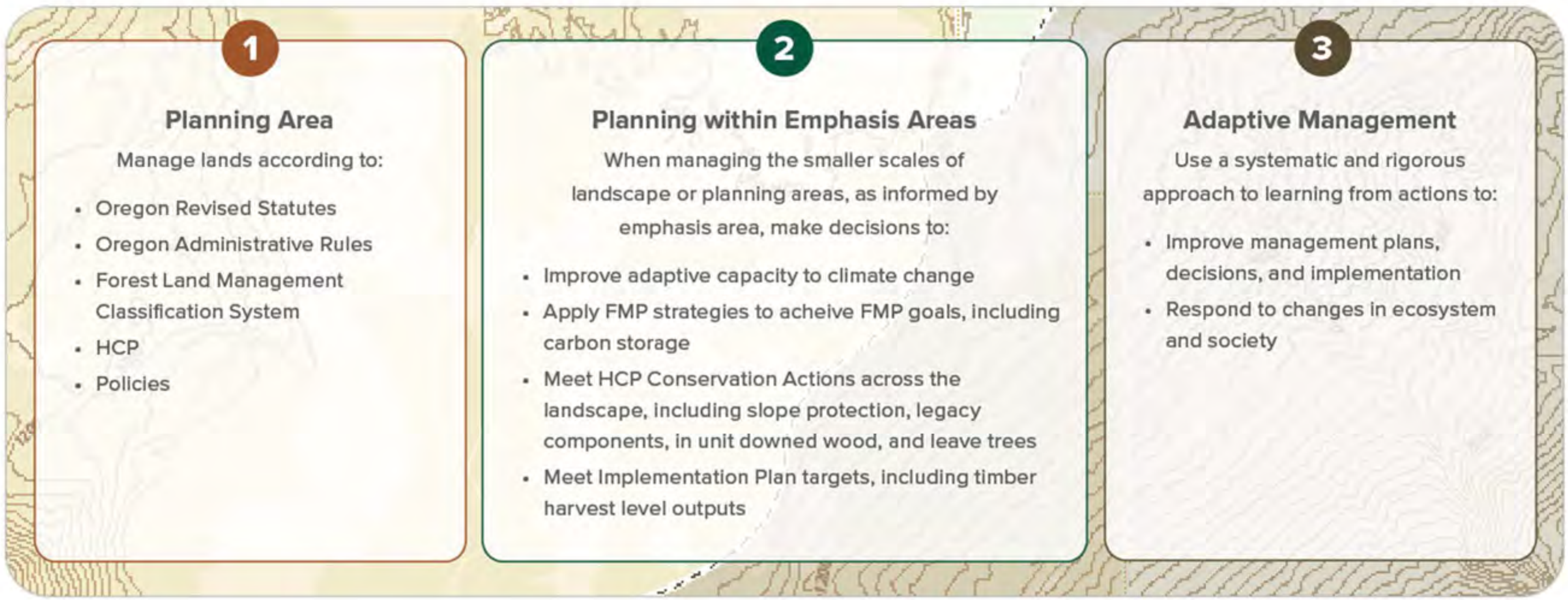
~~Adaptive Management~~

~~Adaptive management is a systematic and rigorous approach to learning from actions, improving management~~, and evaluating ~~decisions in response to changes in ecosystems and society (Millar et al. 2007). FMP and HCP strategies are expected to sustain delivery of specific ecosystem services over time. Adaptive management is structured within a clear decision-making~~ trade-offs through a transparent planning and adaptive-management framework ~~that connects the evaluation of management alternatives relative to important resources and values with subsequent decision points that provide the opportunities to change management approaches (Gregory et al. 2012). With an adaptive approach to management, long-term targets and modeling may require more frequent revision and adjustment based on *monitoring* to achieve the FMP goals and better understand trade-offs in~~ , ODF maintains ecosystem integrity while delivering ~~ecosystem services. Adaptive management is incorporated into different levels of planning to respond to changes in the ecosystem and society. For the FMP, monitoring assesses the effectiveness of strategies for meeting forest resource goals. At the HCP level, monitoring assesses whether biological goals and objectives are being met. Investments in monitoring projects for adaptive management are prioritized during IP planning while on-the-ground monitoring operations are included in OP development. ODF's decision-making framework acknowledges the different values that~~ GPV to Oregonians ~~present to forest management when assessing tradeoffs between management alternatives, including those affected by these decisions. Additional details of this decision framework are presented in Chapter 4, *Guidelines*. Figure 2-5 shows the process from planning area implementation, to learning and adapting actions to meet GPV.~~

~~DRAFT FINAL – September 2025~~

~~**FIGURE 2-5**~~

Application of Ecologically Sustainable Management to Deliver Ecosystem Services. ~~The emphasis areas, policies, and strategies are applied across the planning area to support decision-makers as they strive to further improve conditions, adapt plans to respond to change, and improve performance over time.~~



Rev 3-3-2023

~~2.2 Strategy Integration for Ecosystem Services Delivery~~

~~The~~ . The principles of ecologically sustainable forest management are reflected in Chapter 3, *Forest Resources, Goals, and Strategies*. Each goal represents a forest resource, and management strategies are designed to foster resilient forests that deliver multiple ecosystem services~~: cultural values; timber production; fish and wildlife habitat enhancement; special forest products; soil processes; water quality; recreational, educational and interpretive opportunities; and carbon storage~~. Chapter 4, *Guidelines*, provides implementation guidance and decision processes that link monitoring to management adjustments.

~~Consistent with the CCCP goal for state forests, the strategies address climate change and other disturbance effects by adaptively managing for resistance, resilience, and directed or accepted change of ecosystems to sustainably deliver benefits. While HCAs and RCAs will receive less active management, and General Stewardship lands will have a timber-production focus, the entire forest functions as a whole; therefore, management considers the dependencies among ecosystem services to provide sustainability over time. The primary goals of the emphasis areas will guide their management.~~

~~The FMP strategies support rural economies and public services by aiming to produce a sustainable and predictable timber supply. The strategies emphasize the function of economic systems that support forest management and recognize that specific approaches and the levels of commitment depend on economic goals and circumstances. Maintaining economic benefits is key to supporting implementation of all plan activities and maintaining public trust in ODF's ability to deliver plan outcomes. Chapter 3, *Forest Resources, Goals, and Strategies*, and Chapter 4, *Guidelines*, describes the methods for implementation, operations, and adaptive management.~~

CHAPTER 3

Forest Resources, Goals, and Strategies

~~OAR 629-035-0030 requires that the *Western Oregon State Forests Management Plan* (FMP) contain "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 (Greatest Permanent Value)" and "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."~~

Chapter 3 describes the types and conditions of *forest resources*, how they ~~reflect~~ contribute to *greatest permanent value* (GPV), ~~and what management of~~ the long-term *goals* for each resource ~~is intended to achieve and how. There are 16 forest resource *goals* and 40~~, and high-level *strategies* ~~for accomplishing~~ the Oregon Department of Forestry (ODF) uses to achieve those goals. The resource description, goals, and strategies described in this chapter reflect the five plan themes ~~(~~described in Chapter 1, Section 1.2, *Plan Themes*~~) and the management approach (~~. ODF does not optimize any one goal across the entire *landscape* but applies the strategies using the principles described in Chapter 2, *Management Approach*~~).~~

~~*Performance measures* are specific measures reported to the *Board*~~, to produce a blend of ~~*Forestry*[1]~~

~~(BOF)~~outcomes for forest resources that ~~track the accomplishment of select FMP goals. Review of performance measures is the pathway for feedback and adjustment in the decision-making framework for *Adaptive Management Plans* (AMPs) and policies described in Chapter 4, *Guidelines*, and shown in Figure 4-1.~~

~~[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter~~meets GPV.

3.1 Forest Condition

~~State forests comprise different species of trees at different ages. The distribution of dominant tree cohort age and species has important implications for future management, particularly in the development of silvicultural pathways aimed at improving adaptive capacity of ecosystem processes to deliver GPV.~~

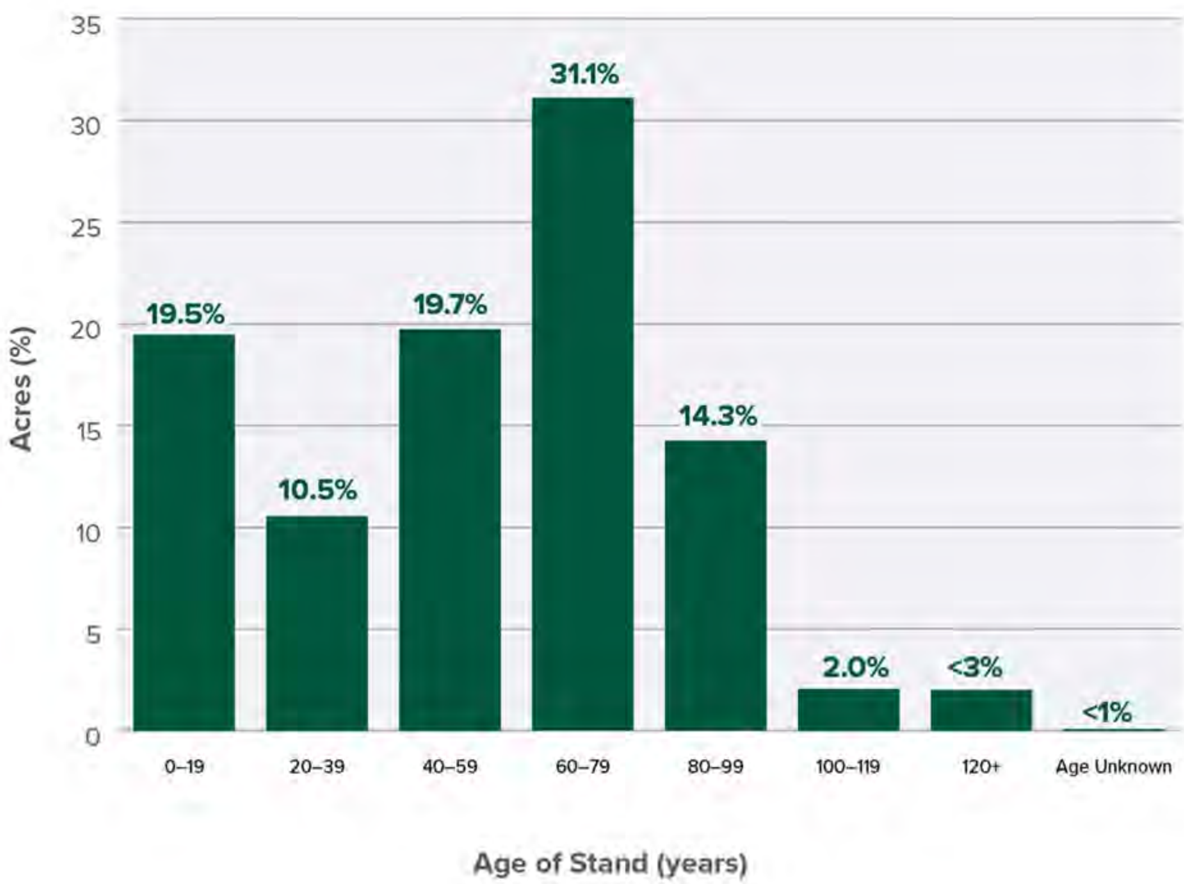
To better understand and provide context for the resource goals and strategies, this section details the current state forest condition~~ is detailed here.~~. Forests are complex *ecosystems* with numerous *biotic* and interactions. ~~Trees~~State forests managed under the *Western Oregon State Forests Management Plan* (FMP) are distributed from the ~~dominant group of plants on state~~ California border to the Columbia River, and from the coast to the crest of the Western (Old) Cascades. The diversity of forest ~~lands~~types and plant communities reflect much of the variation in environmental gradients (precipitation, temperature, elevation) across western Oregon as well as local geology, disturbance history, and past management. Many state forest lands were affected by repeated, large wildfires or were extensively logged prior to acquisition by the State in the first half of the 20th century. *Reforestation* and *restoration* efforts were implemented across state forest lands to replant burned or harvested lands after the State took ~~ownership. The age and *species* distribution of state forests lands reflects the history of large fires, salvage logging, and reforestation (Figures 3-1 and 3-2).~~ ownership. The age and *species* distribution of ~~dominant tree age on~~state forests reflect this history of large fires, salvage logging, and reforestation (Figures 3-1 and 3-2).

Forest types vary across the geographic range of state forests. Species composition and age class distribution have important implications for future management.

Credit: ODF.

The current species composition and age class distribution across state forest lands affects future management, particularly in the development of *silvicultural* pathways and conservation strategies aimed at promoting *biodiversity*, improving *adaptive capacity* ~~and promoting ecosystem processes that deliver high-quality *habitat*. Compared to simple *stands*, forests with complex stands will support more *biodiversity* and will be more~~, and promoting resilient ~~to windfall and insect infestations. Currently, approximately 45~~forest and *aquatic* ecosystems. Resilient ecosystems deliver important co-benefits over time, including functional aquatic and terrestrial habitats for *native* fish and wildlife, *carbon sequestration* and *carbon storage*, production of forest products, health soils, clean air, and access for all Oregonians. Approximately 40% of state forest lands in the *planning area* have a *dominant cohort* of trees between ~~50~~60 and ~~79~~89 years old. These lands include ~~53~~49% of the merchantable ~~standing~~timber volume in the planning area. ~~Stand ages reflect periods of salvage logging prior to State ownership and subsequent reforestation efforts by the Oregon Department of Forestry (ODF) that occurred after~~The relative abundance of stands in this age bracket reflects a period of reforestation following salvage logging and a series of repeated wildfires ~~in~~ (1933, 1939, 1945~~ and~~, 1951~~, collectively known~~) referred to as the Tillamook Burn~~. However,~~, prior to State ownership. Dominant cohort age is not the only factor that influences ~~forest functioning condition.~~stand conditions, however; site productivity, past management practices, and current and historical *disturbance* ~~and disease history~~ regimes interact to produce the forests that ODF manages today.

FIGURE 3-1
Distribution of Stand Ages as a Percentage of Area of Western Oregon State Forests.
~~Compared to even-aged~~Stands in the 60–89 year age bracket represent a plurality of stands, ~~forests with uneven-aged stands often support a greater~~reflecting the management history of



Source: ODF ~~2022a~~2022.

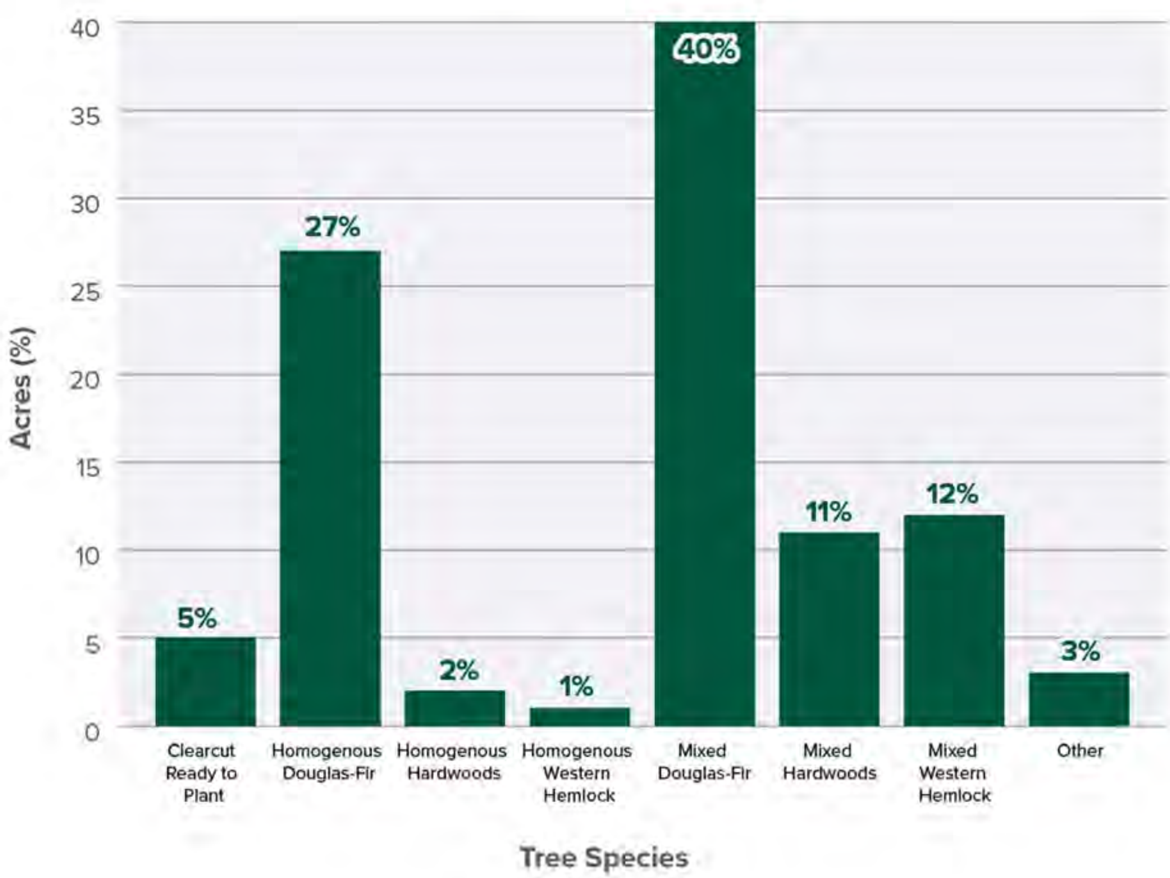
Note: Stands that experienced stand-replacing fire within the Beachie Creek Fire (North Cascade District) had their stand initiation date reset to 2020. Thus, the distribution of stand ages ~~will~~ likely differ markedly from previously published reports that used the *Stand Level Inventory*.

3.1.1 Conifer Management

Management history and geography strongly influence the stand composition of tree species and stand age across space and through time (Figures 3-1 and 3-2). Because of their relatively fast growth rate and value as merchantable timber, Douglas-fir~~-~~ (*Pseudotsuga menziesii*)–dominated forests, in which Douglas-fir accounts for the majority of the stand, are the most common forest type on state forest lands ~~(~~, making up approximately 73% of the forested landscape (homogeneous Douglas-fir plus mixed Douglas-fir stands in Figure 3-2). Western hemlock (*Tsuga heterophylla*)-dominated forests and red alder~~-~~ (*Alnus rubra*)-dominated forests are the next most common forest types. Nearest to the ocean, within the Astoria and Tillamook districts, Sitka spruce (*Picea sitchensis*) is a dominant or *co-dominant* species in stands with a maritime climate with milder temperatures and abundant moisture. As shown in Table 3-

1, true firs (*Abies* species), western redcedar (*Thuja plicata*), and various hardwood species (Section 3.1.2, *Hardwood Management*) add diversity within stands dominated by other species in the North Coast and Western Cascades. In the forests in southwestern Oregon, stands are the most diverse, with additional conifers and hardwoods adapted to drier sites and more frequent fire. In general, each of these forest types presents distinct management opportunities, offers different economic return, provides habitat for different species, and offers different levels of resilience to extreme weather conditions. Species selected to be cut and planted are based on the *emphasis area*, landscape context, stand conditions, and best available information. For example, in General Stewardship lands, planted trees consist primarily of commercially viable conifer species, because they are the most efficient stock to provide timber products, *revenue*, and local jobs. However, non-commercial species are also planted or allowed to regenerate naturally, as these areas still provide a level of diversity.

FIGURE 3-2
~~Dominant~~ Tree Species Composition in Western Oregon State Forests. ~~Tree species richness and~~Stand composition ~~affect~~affects potential vulnerabilities or resilience to disturbances and stressors such as insect outbreaks, pathogens, fire, windthrow, drought, and climate change.



Source: ODF ~~2022d~~2022.

~~Note: Stands that experienced stand-replacing fire within the Beachie Creek Fire (North Cascade District) had their stand initiation date reset to 2020. Thus, the distribution of stand ages will likely differ markedly from previously published reports that used Stand Level Inventory.~~

~~On average, stands of trees in state forest lands have a quadratic mean diameter (a measure of average~~

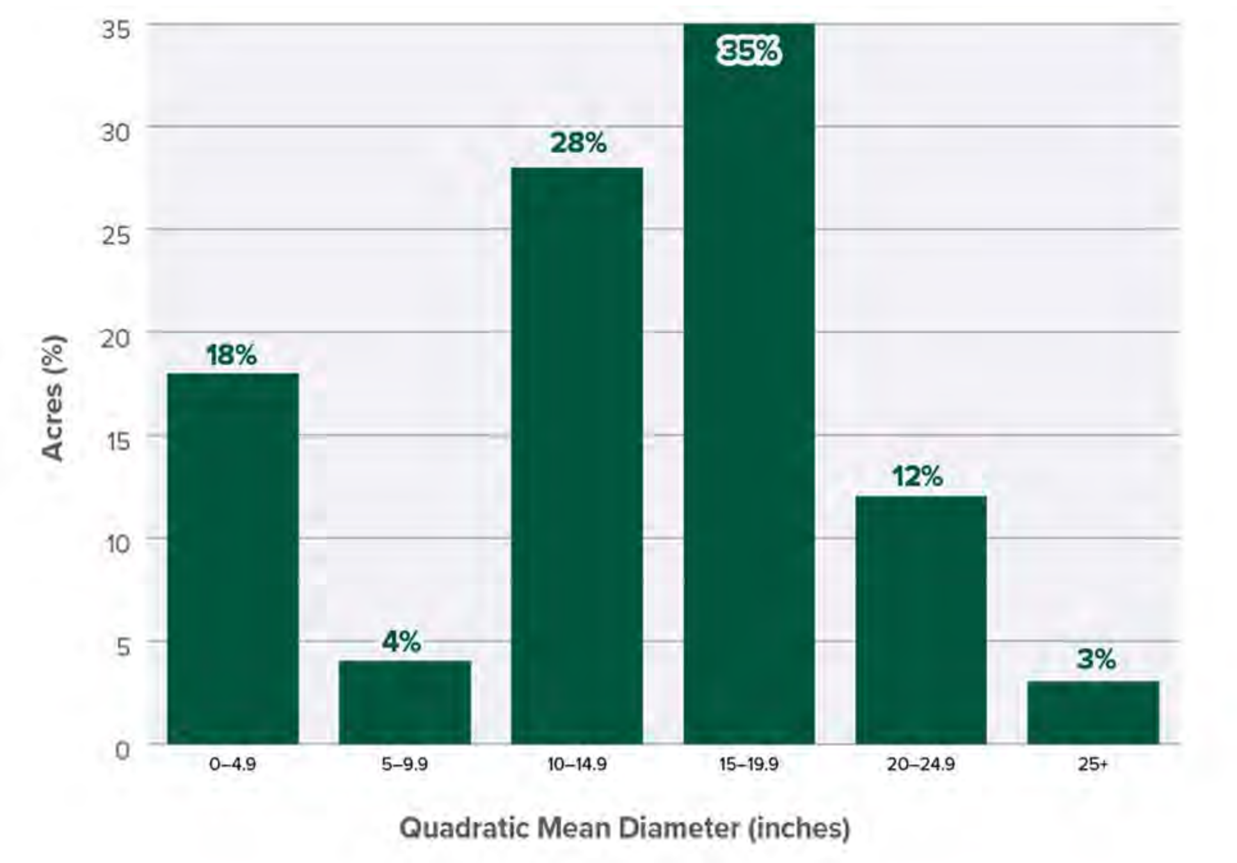
~~tree diameter conventionally used in forestry, rather than arithmetic mean diameter) between 11 and 20 inches (Figure 3-3). A relatively small fraction of trees in the planning area have a quadratic mean diameter of more than 20 inches, reflecting the history of fire, *regeneration harvesting*, and reforestation on state forest lands. Silvicultural prescriptions may help accelerate diameter growth in trees and may help achieve silvicultural and habitat management goals for average tree diameter.~~

Note: For this figure, homogenous is defined as >80% of the stand *basal area* in a single species group; mixed stands have >50% of the stand basal area in the named species group. Other includes stands <50% of the stand basal area in Douglas-fir, western hemlock, or hardwood species.

~~FIGURE 3-3~~

~~**Distribution of Quadratic Mean Diameter of Trees in Western Oregon State Forests.**~~

~~Quadratic mean diameter may be used as an indicator of the quality of habitat for some wildlife species and tree bole merchantability.~~



~~Source: ODF 2022a.~~

~~Note: Stands that experienced stand-replacing fire within the Beachie Creek Fire (North Cascade District) had their stand initiation date reset to 2020. Thus, the distribution of stand ages will likely differ markedly from previously published reports that used Stand Level Inventory.~~

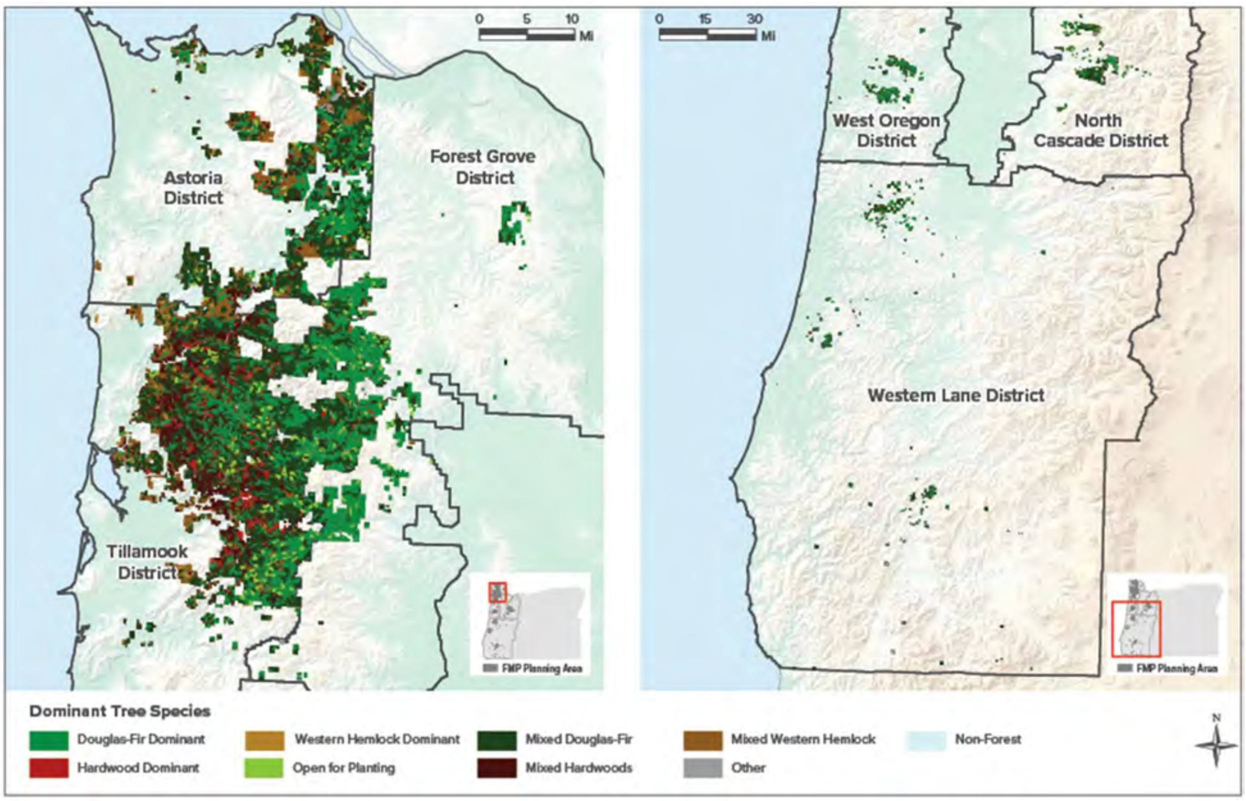
~~Management history and geography strongly influence the dominance of tree species and stand age across space and through time (Figure 3-4). Douglas-fir-dominated forests comprise the majority of forests. While other multispecies forest patches exist on state forest lands, they cover a minimal proportion of the planning area. In general, each of these forest types will present distinct silvicultural opportunities, offer different economic return, and provide habitat for different species. These differences are particularly relevant to habitat development and timber production.~~

~~3.1.1~~3.1.2 Hardwood Management

~~*Native* hardwood trees provide a *diversity* of~~*Native* hardwood trees, such as red alder, bigleaf maple (*Acer macrophyllum*), Pacific dogwood (*Cornus nuttallii*), bitter cherry (*Prunus emarginata*), golden chinquapin (*Chrysolepis chrysophylla*), willow (*Salix sp.*), and others provide a *diversity* of cultural and provisioning services, like timber, food, fiber, shelter, and ecological *functions* and resources for wildlife that complement the conifer-dominated forests typical of state forest lands (Ellis and Betts 2011). Maintaining hardwood diversity within stands ~~may involve appropriate silvicultural interventions,~~

~~including selecting~~ involves retaining some hardwood species as leave trees during harvests ~~or~~ and including hardwood species during replanting ~~with diverse~~or allowing natural regeneration hardwood species. Management actions for hardwoods ~~may~~ depend on the ~~focus~~designation of the stand, such as whether it is intended for revenue generation from timber harvest ~~of conifers~~, or a *habitat conservation area* (HCA) intended to grow more complex habitat. In some cases, hardwood-dominated stands may not provide desired values, such as large trees for wildlife habitat or carbon storage, and may be ~~converted~~managed to introduce additional conifer species, as in the example of anticipated red alder management below. At the time of writing, homogeneous hardwood stands ~~dominated by hardwoods accounted~~account for just under 15% of total acres in the planning area. Table 3-1 shows the distribution of forests dominated by hardwood and other tree species across the state forest districts.

~~FIGURE~~TABLE 3-~~4~~1
Distribution (acres) of ~~Dominant Tree Species~~Forest Types on Western Oregon State Forests. Douglas-fir-–dominated forests comprise the majority of all districts other than Tillamook, but forests dominated by species other than Douglas-fir or by multiple species exist in all districts.



District	Homogenous Douglas-Fir	Homogenous Hardwoods	Homogenous Western Hemlock	Mixed Douglas-Fir	Mixed Hardwoods	Mixed Western Hemlock	Other
Astoria	31,310	1,050	1,080	64,240	8,710	21,750	8,720
Forest Grove	59,620	540	30	43,930	1,830	1,660	7,390
North Cascade	14,220	10	120	24,870	730	2,040	5,490

Tillamook	50,260	16,680	1,430	93,670	51,540	22,650	14,360
West Oregon	23,430	500	0	9,130	1,550	630	1,330
Western Lane	17,930	360	20	26,050	4,310	660	3,710

Source: ODF ~~2022a~~2022.

Note: For this table, homogenous is defined as >80% of the stand in a single species group; mixed stands have >50% of the stand in the named species group. Other includes stands <50% of the stand in Douglas-fir, western hemlock, or hardwood species.

Red alder is a native hardwood that is ecologically and commercially important. In Pacific Northwest forests, red alder is a species that readily colonizes disturbed areas, particularly when reseeding or planting of conifers does not occur. Alders contribute to soil creation and *nutrient cycling*~~, and improve soil nutrients~~ by fixing nitrogen~~,~~ while also supporting *regeneration* of shade-tolerant conifers (Hibbs et al. 1994). This ecological role is particularly important where soil has been damaged by disturbance (e.g., high~~ severity wildfire), such as in portions of the Tillamook Burn area that were subject to repeated fire events. Goals and strategies for soil resources are discussed in Section 3.2, *Integrated Resource Management, Soils and Geology*.~~-severity wildfire), such as portions of the Tillamook Burn that were subject to repeated fire events.. Goals and strategies for soil resources are discussed in Section 3.2, *Integrated Resource Management*.

A history of repeated fires and cut-and-run logging practices~~,~~ prior to the creation of state forest lands~~,~~ resulted in relatively large areas dominated by alder on the North Coast and ~~on~~in the Tillamook and Clatsop State Forests in particular. There are more than 70,000 acres of alder-dominated stands ~~in~~that lack any significant conifer component on the Tillamook District alone. The age of the dominant cohort in red alder-dominated forests primarily ranges between 40 and 80 years old. Red alder rarely live more than 100 years (Hibbs et al. 1994~~); thus,~~). Red alder mortality in the Tillamook District ~~could~~will increase in the next 20 years as these trees approach the end of their life expectancy. Dead and dying alders provide important nesting and denning habitat for diverse wildlife species (Carey et al. 1997). As red alder-dominated stands unravel, the regenerating forest can provide diverse and complex ~~early *seral*~~young forest habitats. Goals and strategies for wildlife habitat are discussed in Section 3.2, *Integrated Resource Management, Wildlife*.

The relatively large proportion of alder stands in some state ~~forests~~forest landscapes provides opportunities for both ~~*passive* and~~ *active management* *and passive management* for specific resource values. The pace, scale, and intent of active management ~~will be~~is different in different emphasis areas. In ~~production~~areas with an economic emphasis ~~areas~~, conversion of some *hardwood stands* to *conifer forests* is an important priority, but ensuring a continued supply of hardwood logs to local mills remains a priority as well. The intent for activities that reduce the proportion of hardwoods is not to eradicate these species or ignore their key role in promoting biodiversity, but to provide a greater array of co-benefits. In conservation emphasis areas (including HCAs), conifer restoration treatments ~~will be more limited, and~~are intended to promote development of habitat for covered species listed in the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP~~) covered species~~), but will have relatively greater retention of hardwoods compared to timber harvest in General Stewardship areas. ~~Hardwood stands in the *riparian area* would be protected under the HCP, which does not allow conifer restoration treatments in *riparian conservation areas* (RCAs).~~

There are at least 30,000 acres of hardwood-dominated stands on areas that are *operationally limited* ~~ground~~for timber harvest, or are otherwise protected, across the planning area. Stand development in these areas ~~will continue~~continues to occur without active management. ~~Areas that are not *actively managed* (e.g., operationally limited areas) provide a basis for comparison~~For example, hardwood stands in *riparian conservation areas* (RCAs) are protected under the WOSF HCP, where cutting of ~~strategies intended to promote conifer and habitat development. The intent~~trees is not ~~to remove hardwoods from the landscape or ignore their key roles in biodiversity and *ecosystem function*, but rather to learn from~~allowed except for limited circumstances such as stream crossings, yarding corridors, hazard tree falling, and aquatic restoration activities. These passively managed stands serve as an important baseline for comparing a broad suite of management approaches to promote conifer and habitat development in an *adaptive management* framework.

~~3.1.2~~3.1.3 Forest Health

There are several *forest health* challenges for state forest lands ~~over~~throughout the planning area. Some forest health concerns are ~~due to~~the result of past practices and history of the lands, ~~while others are due to an increase of forest visitors~~including earlier attempts to restore deforested lands. For example, much of the Tillamook Burn was planted or seeded with Douglas-fir from non-local seed sources, ~~with unknown long-term consequences and are considered part of the factors for *Swiss needle cast* (SNC) impacts on stands. Increasing popularity of recreational activities in state forest lands of northwest Oregon increases the likelihood of new invasive species being introduced, which in turn, could affect long-term forest health. Increases in the frequency, duration, and magnitude of drought and heat waves may stress the forest ecosystem. Under *climate change*, hotter and drier summers will provide more favorable conditions for insect outbreaks and will make trees more vulnerable to infestation. Drought-stressed trees are often subsequently attacked by secondary agents, such as *pathogens*.~~at a time when less was known about the importance of locally adapted seed sources. These non-local trees are known to exhibit reduced growth as they mature and are also one of the contributing factors to increased impacts of *Swiss needle cast* (SNC).

The increasing popularity of recreational activities on northwest Oregon state forest lands increases the likelihood of new invasive species being introduced. Recreationists often unknowingly transport invasive species on their vehicles or by bringing firewood and recreational equipment carrying invasive species. This, in turn, affects ecosystem function and long-term forest health.

The frequency, duration, and magnitude of extended drought periods and heat waves also stress the forest ecosystem. For example, in the aftermath of the June 2021 heat dome, which brought record-breaking temperatures to the Pacific Northwest, nearly 5% of trees in western Oregon and Washington forest canopies had visible damage to their foliage (Sibley et al. 2025). Because of *climate change*, hotter and drier summers create more favorable conditions for insect outbreaks, making trees more vulnerable to infestation (Fettig et al. 2022). Drought-stressed trees are often subsequently attacked by secondary agents, such as *pathogens* (Simler-Williamson et al. 2019).

Forest health strategies are addressed on a site-specific basis ~~when reforestation prescriptions are developed for planting and other young *stand management*~~. Considerations for treatments~~. Site-specific prescriptions~~

~~consider target~~ include species, aspect, elevation, soil types, ~~SNC risk where applicable, *Phellinus weirii* (laminated root rot)~~disease presence, ~~required~~tree stocking guidelines, natural ~~advanced~~tree regeneration, and ~~the~~ *desired* ~~*future condition of the*~~ *stand goals*. Such ~~prescriptions~~strategies also anticipate and plan for drier~~,~~ and hotter future conditions resulting from climate change. ~~This will provide~~This site-specific approach to forest health provides for a diverse, healthy, productive, and *sustainable* forest ecosystem over time that ~~will be~~is more resilient to change.

~~ODF will follow~~ The *integrated pest management* process ~~using~~guides herbicide application and other management techniques that control pest damage or unwanted vegetation. It uses site-specific management *objectives* ~~while decreasing non-target~~and *best management practices* (BMPs) to decrease adverse impacts of herbicides and other control measures on other forest resources and ecosystem processes. The integrated pest management process ~~will be~~is similar across ~~the landscape designations.~~emphasis areas. Actual use of pest management ~~will depend~~depends on the issue, regional context, *Forest Land Management Classification System* (FLMCS) designation, existing conditions, and desired *outcomes*. For example, ~~insect~~insects and disease may be treated differently in HCAs than outside of HCAs, where they have wildlife benefits. ~~Through the AMP and *Structured Decision-making* (Chapter 4, *Guidelines*) process, ODF will participate~~ODF participates in cooperative applied research and *monitoring* projects with partner agencies, universities, and organizations that ~~enable~~encourage cross-ownership~~, treatments and allow for~~ adaptive integrated pest management.

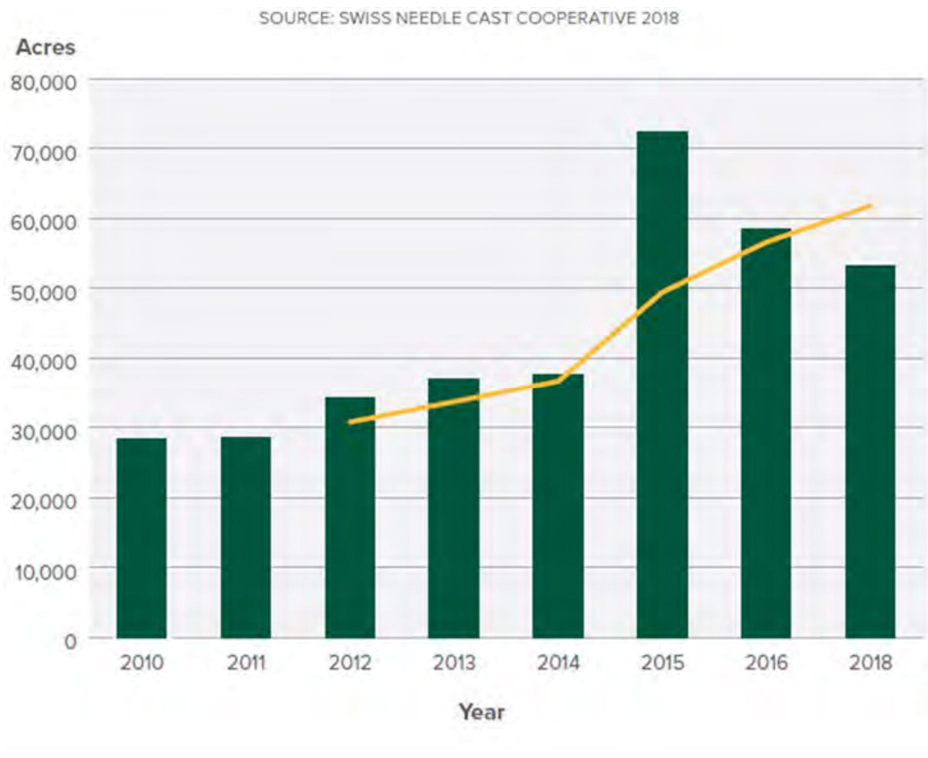
Diseases

Swiss Needle Cast

SNC is a native disease of Douglas-fir caused by the fungus *Phaeocryptopus gaeumannii* that has intensified on coastal lands managed by ODF since 2010 ~~(Figure 3-5).~~. It affects trees of all ages and causes premature loss of needles, especially in the upper crown, which reduces tree growth and vigor. ~~The growth reduction, especially if sustained, will not only reduce~~Trees from non-local seed sources or growing in poor soil conditions are affected more severely, which can be seen by the management and fire history in the Tillamook District. Growth reductions decrease future timber yields ~~but also will~~and affect ODF's ability to manage stands ~~into~~toward desired conditions. While native throughout the range of Douglas-fir, SNC is most prevalent on the west slopes of the northern Oregon Coast Range from the coastline to 28 miles inland. ~~The 2018 SNC aerial survey detected over 53,000 acres of moderate to severe SNC infection. Roughly 90% of infected acres were moderately infected. Most of~~In recent decades, the ~~acres are concentrated on~~zone of highest prevalence has not shifted, but the ~~Astoria and Tillamook Districts, followed by the West Oregon District (Table 3-1). The remaining acres were split evenly between Forest Grove, Western Lane, and North Cascade Districts.~~severity of SNC has increased (Shaw et al. 2021). Management actions have occurred over ~~20 years to harvest the most severely affected Douglas-fir stands and replant with other species such as western hemlock or SNC-tolerant Douglas-fir more suited for sites.~~the last 20

~~**FIGURE 3-5**~~

~~**Swiss Needle Cast on State Forest Lands.** Annual observations and 3-year moving average of Swiss needle cast-infected acres across state forest management since 2010.~~



~~Source: Swiss Needle Cast Cooperative 2018~~

~~**TABLE 3-1**~~

~~**Swiss Needle Cast by District**. Results of 2018 aerial survey of Swiss needle cast-affected acres on state forest lands.~~

~~**District**~~	~~**Acres Affected in 2018**~~
~~Astoria~~	~~12,319~~
~~Tillamook~~	~~35,909~~
~~West Oregon~~	~~4,196~~
~~Remaining Districts~~	~~1,478~~

years to harvest the most severely affected Douglas-fir stands and replant with alternate species such as western hemlock or Douglas-fir that has been bred to be resistant to SNC.

Laminated Root Rot

Laminated root rot, a native ~~fungal~~ disease ~~that~~caused by the fungus *Phellinus weirii,* affects many conifer species, and is the most widespread and destructive root disease of Douglas-fir in the Oregon Coast Range and Western Cascade Range. ~~On average, it affects about 5% of the Douglas-fir forest but is distributed unevenly.~~ Results from ~~several~~forest health surveys show that in northwest Oregon state forest lands, at least 10% of the Douglas-fir-dominated stands ~~is affected~~are affected by this disease. The acres affected in individual stands range from 0% to over 75% of the area. The most susceptible host species are

~~by this disease. The acres affected in individual stands ranges from 0% to over 75% of the area. The most susceptible host species are~~ Douglas-fir, grand fir (*Abies grandis*), and mountain hemlock (*Tsuga mertensiana*). Western hemlock and noble fir (*Abies procera*) have intermediate susceptibility, pines and cedars are resistant, and hardwoods are immune. Treatment of infected areas is accomplished by replanting with more resistant species after harvest.

Black Stain Root Disease

Black stain root disease, caused by the fungus *Leptographium wageneri*, has been detected in many areas but is thought to be more localized in southwest Oregon. In recent years, reports of black stain root disease in young, intensively managed Douglas-fir stands ~~has~~have increased in the northwest part of the state. Treatment of infected areas is accomplished by replanting with more resistant species after harvest.

Forest Insects

Douglas-fir Bark Beetle

Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) usually infest trees following *windthrow*, disease, or drought. When major disturbances occur, ~~the~~a large supply of high-quality downed Douglas-fir allows beetle *populations* to erupt. Outbreaks typically last 2 to 4 years, though can be prolonged when conditions are favorable. Management to reduce the likelihood of outbreaks involves timely salvage of dead or downed trees.

Emerald Ash Borer

Emerald ash borer (*Agrilus planipennis*) is an invasive species that has killed ash trees across the United States since its introduction in Michigan in 2002. It was detected in Forest Grove, Oregon in 2022, and has spread to multiple counties since then. Oregon ash (*Fraxinus latifolia*) is the native tree at risk of infestation and rapid mortality, affecting *riparian* forests west of the Cascades and below 2,000 feet elevation. There are currently no feasible, preventative treatments for this pest that can be applied on a forest-wide scale. Management includes continued *monitoring*, replanting with alternate species where mortality occurs, and breeding programs to create resistant ash hybrids.

Sitka Spruce Weevil

Sitka spruce weevil (*Pissodes strobi*) commonly kills the current and 1-year-old terminal shoots of Sitka spruce. The weevil typically affects trees between 3 and 20 years old. At times, foresters have avoided planting Sitka spruce in western Oregon because repeated weevil outbreaks slow tree growth and produce severe stem deformations (ODF 2007). When planting Sitka spruce, ODF uses seed sources that have shown natural resistance to the weevil. ODF is participating in research to determine the most resistant seed sources, improve understanding of the damage caused by the weevils, and obtain necessary information to breed more resistant seed sources for future planting.

Spruce Aphid

Spruce aphid (*Elatobium abietinum*) is an invasive species that causes premature loss of older needles in Sitka spruce and eventually kills branches or the entire tree. Much of the spruce decline along the Oregon Coast is attributable to the spruce aphid. ODF follows genetic testing studies and breeding programs to determine the most resistant seed sources for planting.

Noxious Weeds

Noxious weeds are terrestrial, aquatic, or marine plants designated by the Oregon State Weed Board under Oregon Revised Statutes (ORS) 569.615 as representing the greatest public menace and are a top priority for action by weed control programs. The Oregon Weed Control Policy (ORS 869.180) declares weeds "shall be detected, controlled and, where feasible, eradicated on all lands in this state." As a result, ODF is responsible for developing and implementing an eradication plan on state forest lands. Currently, roughly 120 species are listed as ~~a~~ noxious ~~weed~~weeds across Oregon. Many of these species occur on state forest lands. The most common, Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus armeniacus*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and Japanese knotweed (*Reynoutria japonica*) are well established throughout all state forest lands. Other non-native invasive species on the state's noxious weed list expanding on state forest lands include false brome

(*Brachypodium sylvaticum*), English ivy (*Hedera helix*), garlic mustard (*Alliaria petiolata*), and non-native geraniums (*Geranium* spp.).

~~Wildfire~~

~~The history of western Oregon state~~

Rum Creek Fire burned near Ennis Riffle County Park after igniting by lightning on August 17, 2022. ~~Wildfires have~~Fire has always been part of Oregon forests and, when managed proactively, can contribute to forest health and development.

Credit: ODF.

Wildfire

Oregon's forests ~~is connected~~are shaped by, and adapted to fire. Fire can have many positive outcomes for forests under the right conditions. However, uncontrolled or high-severity wildfire~~.~~ presents a threat to many forest co-benefits, including habitat, carbon storage, healthy soils, clean water and clean air. As the original stewards of these forests, indigenous peoples used fire on the landscape to maintain and enhance forest conditions. In modern times, human-caused fires have resulted from various activities, usually accidental. For over 100 years, the response to both human and natural fires has been to suppress fire in the forest to protect life and property, including timber values. This

has resulted in conditions where fuels for fire have accumulated, creating increased risk of uncontrolled and even catastrophic wildfire.

There are many examples of historic fire and related salvage activities across the planning area ~~as well as catastrophic fires like Tillamook Burn (1933, 1939, 1945, 1951). The 2020 fires across Oregon had a significant impact on the Santiam State Forest. Climate projections suggest that these trends will likely accelerate in the future (Dalton and Fleishman 2021).~~. Forest wildfires in Oregon are expected to ~~become more frequent,~~ burn larger areas~~,~~ and possibly become more severe as climate change affects the state into the future (Dalton and Fleishman 2021; Reilly et al. 2022).

~~Areas outside of HCAs and RCAs provide a broad array of options for exploring fire mitigation and response. Options in HCAs and RCAs are limited to those consistent with the HCP, but HCAs and RCAs~~

~~also provide opportunities to include alternative approaches and unmanaged control areas in monitoring programs and adaptive management.~~

General Stewardship lands are actively managed and provide various options for exploring fire mitigation and response. ODF's management of these areas includes thinning at key points during forest stand development that reduces the density of trees to maintain stand growth and reduce fire risk. All timber-management activities on General Stewardship lands account for fire risk both during (e.g., operational restrictions) and after (e.g., slash mitigation) operations. The transportation system that supports state forest management also provides access for suppression of wildfires where they occur.

Managing fire risk inside HCAs and RCAs is consistent with the WOSF HCP. Habitat enhancement prescriptions provide mitigation, and adaptive management is employed to provide opportunities to address additional mitigation measures in response to worsening conditions that put habitat values at risk. Future potential mitigation needs in HCAs and RCAs will be developed in collaboration with NOAA Fisheries and the U.S. Fish and Wildlife Service.

~~3.1.3~~3.1.4 Forest Resilience

Through activities on the forest ~~(management and conservation), the over-arching goal~~, the overarching aim of the FMP goals is to ensure healthy, sustainable, and resilient forest ecosystems that ~~over time~~ help achieve environmental, social, and economic goals that benefit all Oregonians. Functioning ecosystems on state forest lands provide a variety of co-benefits including clean water, recreation, wildlife habitat, timber, and other *ecosystem services*.

For this FMP, the health of ~~these forests~~ a forest is defined ~~for this FMP~~ as ~~their~~its ability to increase or maintain productivity and function while maintaining *resistance* and *resilience* to ~~biotic~~biological and ~~abiotic~~physical stressors. Fire, windstorms, ice storms, *landslides*, ~~people~~heat, drought, insects, and diseases ~~periodically~~ present both discrete events and chronic conditions that affect forest health~~, injuring or killing trees and other living things. These~~. Some disturbances are natural and necessary processes of the forest ecosystem~~; however, sometimes~~ that increase the forest's complexity and reduce the intensity of future disturbances. However, active management ~~is~~may be necessary to reset stand trajectories toward goals based on the *management emphasis* of the affected area.

The forest ~~will be~~is actively managed to achieve objectives within stands and across the landscape to create a variety of forest conditions designed to improve resilience and capacity for adapting to climate change consistent with the *Vision for Oregon's Forests* (VOF) and the ODF *Climate Change and Carbon Plan* ~~for state forests.~~(CCCP). Table 3-2 provides examples of management options that foster resilience and adaptation.

Forest Resource, Goals, and Strategies

TABLE 3-2
Examples of Management Options that Foster Resilience and Adaptation.

Management Options to Increase Climate Resilience	Examples
Sustain ecological functions	Maintain or restore hydrology and *riparian areas*
Reduce the impact of existing stressors	Reduce tree density to minimize water stress

Protect from severe disturbances	Alter forest structure to reduce fire or windthrow risk
Maintain *refugia*	Protect unique sites or habitat of *species of conservation concern*
Enhance tree species and structural diversity	Promote diverse age classes, diverse tree species, and biological legacies
Increase redundancy across the landscape	Manage forest and habitat types over a range of sites and environmental conditions
Promote landscape connectivity	Maintain and enhance habitat conditions that support wildlife dispersal and population flow,
Enhance genetic diversity of trees	Use seed sources adapted to future conditions, diversify nursery stock
Aid tree species transitions	Favor drought tolerant species, guide species composition during *young stand management*, consider assisted migration of species
Plan for disturbances	Replant promptly and retain seed source to allow for natural regeneration

Source: Burton 2025.

The effectiveness of novel *silviculture prescriptions* under a changing climate is evaluated during the planning and adaptive management processes described in Chapter 4, *Guidelines*.

Stand Management

Creating forest resilience through management ~~starts with~~follows three major steps: 1) retention of important *legacy structures* (e.g., leave trees, snags, *downed wood*, minor vegetative species) during *regeneration harvest*; 2) successful ~~stand initiation by planting~~replanting using a variety of tree species; and 3) conducting harvest activities that ~~retain a~~promote forest ~~condition~~conditions with multiple age groups, tree densities, and stand complexity that ~~are resilient to disturbance and climate change and~~ deliver ecosystem services. ~~Restoration practices include diversifying tree species, spacing, spatial patterns, variable *density* thinning, and weed control (Ares et al. 2010).~~

~~*Trade-offs* of various silviculture prescriptions and their effectiveness are evaluated during the planning processes described in Chapter 4, *Guidelines*.~~

~~Stand Management~~

Stand management operations ~~will~~ include a full suite of silvicultural prescriptions.
These include partial cuts ~~with~~like fixed and variable density thinning or *variable* ~~density~~ *retention*~~, patch cuts,~~ *harvest* and regeneration harvests. Leave trees, downed wood, and stream buffer requirements are defined in the ~~HCP as part of the conservation strategies. Stand-level management decisions and tradeoffs will be informed by other resource goals and strategies at stand, basin or landscape level.~~

WOSF HCP as part of the conservation strategies. Stand-level management decisions and trade-offs are informed by other resource goals and strategies at the stand, basin, or landscape level. Stand management differs among emphasis areas. Environmental emphasis area management prioritizes fish and wildlife habitat and carbon sequestration. Management within social emphasis areas focuses on safety, stand health, and scenic quality. Economic emphasis area management emphasizes growing healthy and resilient stands to support timber production and generate revenue for social services.

Reforestation and Young Stand Management

Stand initiation after harvest, salvage, or areas affected by wind or fire ~~will be~~is conducted through a combination of tree planting on the majority of sites and ~~some areas of~~allowing for natural regeneration~~.~~ on some sites. Stand initiation and young stand development are imperative to set a stand on a course to ~~meet its~~achieve management objectives. Each area planted is assessed to determine which species to plant, the number of trees per acre~~ to plant, which species~~ to plant, size of the seedlings, and site preparation needs such as *slash* piling or herbicide treatment. In areas where there ~~was~~is a disease present, seedlings are selected that are more~~ resistant or~~ tolerant to the disease, if available.

ODF's ongoing efforts to enhance seedling genetics are vital to improving future resilience of these forests. This includes selective breeding to strengthen tolerance to drought, temperature shifts, insects, and forest diseases that are expected to increase with climate change. ODF also participates in assisted migration studies that evaluate the performance of alternative seed sources or species across a range of site conditions. Findings from these efforts help inform future reforestation strategies and ensure that seed selection contributes to long-term forest health, productivity, and sustainability.

Young stand management activities are important ~~because they can~~to ensure a stand is on a path to reach the long-term goal for the stand based on its emphasis areas, adaptive capacity needs, and role in meeting ~~(~~*Implementation Plan* [(IP]) and performance measure targets. Young stand management can include precommercial thinning for spacing and species selection, or ~~release~~removal of ~~overtopped trees~~competing vegetation to provide more growing space and accelerate tree ~~and stand~~ development. Incorporating uneven-aged stands across the landscape promotes a diverse *structure*~~,~~ with small, medium, and large trees providing a ~~multilayered~~multi-layered canopy. A forest diverse ~~forest~~ in species type, age, and structure can provide needed or preferred habitat for many plant and wildlife species, improve soil conditions by providing diverse tree hosts for mycorrhizal fungi, increase the resilience of forests to climate change, and ~~provide resistance~~reduce susceptibility to diseases and insect infestations that~~ will~~ affect stand health and timber productivity in the long term.

Disturbance Response

Over the ~~time~~duration of this FMP, ~~there will likely be~~ disturbances from wind, fire, ice, and insects or disease~~.~~ will occur. While some disturbance is a part of functioning systems and can be accommodated or incorporated at some scales and in some emphasis areas, strategies that build forest resilience and adaptive capacity are also a key component of ensuring sustainable timber production. When disturbance events ~~occur, there will be assessment of areas impacted~~happen, the affected area is assessed to better determine response. The ~~assessment will~~assessments consider the scale, location, and long-term goals of the forest for habitat development or management. Details for reforestation actions and activities ~~such as salvage or no activity will be~~are addressed at the ~~IP and~~ mid-term planning level, through IPs, at the project level through

Operations Plan (OP) ~~level~~s, and through *standards* and specifications set in *operational policies*.

~~Actions will take place~~Mitigation responses to ~~reduce~~future wildfire include reducing the risk ~~from wildfires to life, property within state forest lands, and the forested landscape through~~through fuel management, prevention, and education. Fuel management ~~will prioritize~~prioritizes restoration actions and treatment areas ~~and may include activities such as~~ , based on risk to communities and critical infrastructure, and emergency ingress and egress. Activities include density management, slash reduction, ~~controlled burns, and working~~and prescribed fire, as well as coordinating priorities and responsibilities for maintaining defensible space with critical facility owners, such as water, power, communications utilities, and non-ODF road owners. In addition, ODF engages *Tribal Partners* to find opportunities to reintegrate traditional cultural fire practices~~.~~

~~3.1.1 Disturbance Response~~

~~A necessary part of managing for sustainable timber production is responding to changing landscapes and climate change by increasing adaptive capacity and~~ to provide ecological ~~function. Disturbances such as wildfire, ice damage, *windthrow*, insects, and disease affect state forest lands. These disturbances can kill or damage trees. Damaged trees often experience reduced growth and subsequent rot while *snags* begin to decay soon after dying. Chronic stressors such as increased temperatures and drought associated~~benefits. ODF may also partner with ~~climate change can affect general forest productivity and sustainable timber production. Strategies that provide for forest resilience and adaptive capacity are also a key component of ensuring sustainable timber production~~neighboring landowners and communities on prescribed burn projects that include common objectives.

~~Silviculture and *stand management* techniques can reduce the risk of damage to timber from climate change.~~ Among the management techniques used in response to disturbance, salvage harvest can be used to remove timber after a natural disturbance affects forest health. Harvest intensity can range from the selective harvest of individual trees to regeneration harvest, depending on the degree of the disturbance event and forest management goals. Salvaging can be employed to remove merchantable timber from disturbed areas, prevent the spread of disease or insect infestation, reduce safety hazards, and promote forest health for future harvest, while considering potential negative impacts (Lindenmayer et al. 2012).

Responding to disturbance and managing state forest lands in accordance with the resource goals of a particular area, promotes sustainable *ecological silviculture* and the continuation and enhancement of ecosystem services. Prescriptions in disturbed areas still follow minimum legacy retention standards, but depending on the event may present additional opportunities to retain additional snags or increase inputs of larger pieces of downed wood. Ultimately, disturbance responses, whether passive or actively managed, present learning opportunities in an adaptive management context.

3.2 ~~Integrated~~ Goals and Strategies for Resource Management

~~The~~This section describes the conditions of forest resources and the overarching goals and strategies ~~represent the integration of multipurpose, ecologically sustainable, and adaptive approaches necessary for maintaining ecosystem services and~~for each to sustain GPV across state forest lands over time. Each of the forest resource management goals ~~for the forest resources~~ support and contribute to different aspects of GPV. Quantitative targets for goals at ~~varying levels.~~a smaller scale are defined in IPs, specific project locations where strategies are enacted are defined in OPs, and detailed standards governing the IP and OP processes are defined in operational policies, the WOSF HCP, and other laws. In the following sections, GPV category icons (Chapter 1, Figure 1-1) and the resource descriptions are used to indicate connections with social, economic, or environmental resources and concepts. GPV can be tracked using the highlighted icons next to each goal.

Because forest resources coexist in space and time, integration of goals and strategies is necessary to minimize conflicts, facilitate decision-making, and ~~balance social, economic, and environmental~~ generate the co-benefits~~.~~ that flow from resilient forest landscapes. Chapter 2, *Management Approach*, provides a discussion of FLMCS stewardship classes ~~and~~ across the landscape. Chapter 4, *Guidelines*, provides additional detail on implementation and how trade-offs are considered. Adaptive management ~~(Chapter 4, *Guidelines*)~~ enables ongoing assessment and modifications of goals and strategies and their application in response to new information and changing circumstances, such as natural disasters, climate change, and new research findings. Effective integration entails synthesis of knowledge, experience, and best available science from multiple disciplines including *forestry*, wildlife and fisheries *ecology*, *geology* and *hydrology*, *engineering,* and recreation resource management.

3.2.1 Forest Resource 1: Timber Management

~~**Timber log deck during harvest operations in Santiam State Forest. Forest product sales are a vital part of the economy, and forest products are needed to build homes, businesses, schools, and other structures needed by society.**~~

Timber log deck during harvest operations in Santiam State Forest.

Credit: ODF

F… roductive in the world. Timber ~~is vital~~harvested from C… component of Oregon's economy and ~~job creation,~~ e… products across the ~~state~~nation and globally. Average w… stry are higher than the average weekly wages in other industries in western Oregon (Daniels and Wendel 2020). ~~Timber harvest~~The availability of harvestable timber directly affects local ~~jobs~~forestry and ~~mills~~mill jobs and indirectly affects the number of additional jobs in local communities.

~~In addition to being a vital part of the economy,~~ Forest products ~~and sales~~ are used to build homes, businesses, schools, and other structures needed by society. ~~*Revenues*~~ Revenue from state forest lands ~~come primarily~~comes largely from timber sales, ~~while a significantly~~though smaller ~~contribution comes~~ amounts are received from the sale of *special forest products* ~~sales~~, leases and agreements, recreation fees, and special use fees.

~~Today, most~~ Within the planning area, 14 Oregon counties, and the local taxing districts within them, share in revenues from these lands ~~(ORS 530.110, ORS 530.010, ORS 530.040);~~. As mandated by state law, 63.75% of Oregon Board of Forestry (the BOF) revenues are distributed to counties ~~and~~, which further distribute revenues to taxing districts~~, where revenue is generated~~. This revenue is a significant contributor to local budgets used to help pay for local community services such as education, rural fire protection districts, law enforcement, roads infrastructure, and community health. ~~Revenue from state forest lands is a significant contributor to local budgets, which support social benefits.~~

The remaining 36.25% of revenue from state forest lands ~~pay~~pays for the management of Board of Forestry Lands ~~(BOFL)~~.. This management includes ~~items such as reforestation,~~planting trees, managing young ~~stand management,~~stands, conducting *threatened and endangered species* surveys, improving fish and wildlife habitat ~~improvement,~~, providing fire protection, and providing recreation, education, and interpretation programs, staff, and infrastructure. ~~These silvicultural activities provide environmental benefits by increasing adaptive capacity to sustain a forested landscape under climate change and improving habitat quality. Revenue from~~

Revenue from timber harvest on Common School Forest Lands (CSFL) is transferred to the Oregon Department of State Lands ~~(DSL). DSL reimburses ODF for costs incurred on CSFL. Net operating income from revenues and costs is~~and deposited ~~into~~in the *Common School Fund*. The Oregon Department of State Lands reimburses ODF for CSFL management costs and related overhead from the Common School Fund.

ODF has historically managed the forest with the objective of maximizing timber volume over the long term. This results in the regeneration harvest of individual stands near the point where tree growth slows, which can be between 70 and 90 years old, depending on the productivity of the site (e.g., soils, precipitation, and other factors). This plan allows for flexibility in harvest objectives over time, but it is

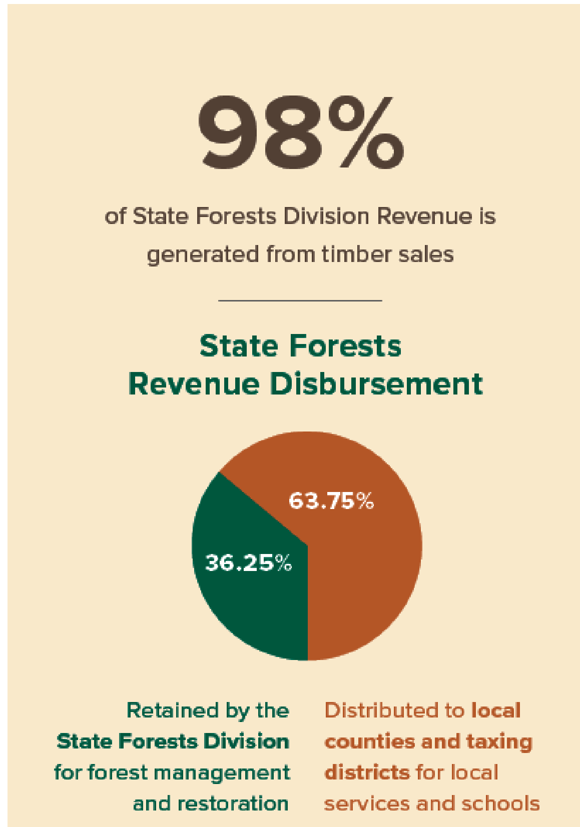
likely that ODF will continue to manage for sustainable, long-term maximization of volume in general stewardship areas.

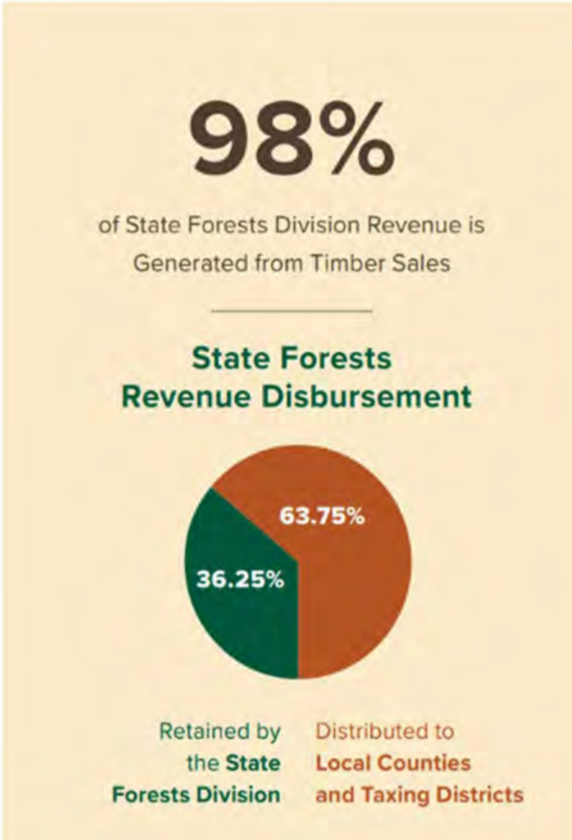
Goal: Timber Production

Provide a sustainable and predictable supply of timber that ~~provides~~generates revenue for the benefit of the state, counties, and local taxing districts, and that results in economic opportunity, jobs, and availability of sustainably harvested forest products.

Strategy: Sustainable Harvest ~~Objective~~

Determine ~~a~~the sustainable harvest ~~objective~~level during IP development ~~and complete this harvest objective with~~ to ensure predictable ~~year-to-year~~ timber supply over the life of the IP.





~~Strategy: Timber Salvage~~

~~Implement a timely response to natural disturbances (fires, windstorms, ice storms, etc.) to salvage merchantable timber, based on the management emphasis of the affected areas and operational *policy*.~~

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es,
production goals is prioritized on a significant portion
hip lands. Although economics is the emphasis of
aged to continue to provide a suite of additional
equestration and carbon storage, and habitat for many
nd mid-*seral* forest types. Active management in HCAs
ies associated with late-seral forests, but will also

Strategy: Silviculture Practices for Stand Management and Development

a. ~~In general stewardship land,~~Implement a variety of silvicultural prescriptions ~~will be~~ to ensure successful stand initiation and development of a variety of tree species, ages, and densities that are resilient to disturbance and climate change and sustainably deliver ecosystem services, based on emphasis area.

b. Use silvicultural prescriptions designed for sustainable timber production and economic performance~~, whereas~~ in ~~HCAs, silvicultural prescriptions will be designed~~General Stewardship areas, while still providing for ~~resilient wildlife habitat. For example, red alder may be harvested~~retention of legacy structures in ~~general stewardship and left as snags and stand~~ varying arrangements, forest connectivity, and species diversity.

c. Diversify tree species for reforestation to consider species that are likely to have better growth and survival under projected future climate conditions.

Intent

The intent of this strategy is to support timber production and wildlife species that are associated with early- and mid-seral forests while increasing the resiliency of all stands across the landscape. Lands in ~~HCAs. Other~~ stewardship classes other than General Stewardship may require silviculture prescriptions that emphasize other objectives, such as safety in Recreation Special Use and Focused Stewardship classes, or traditionally important natural resources in Cultural Resource Special Use and Focused Stewardship classes.

~~Within HCAs and RCAs, opportunities to increase adaptive capacity through silvicultural activities are more limited than they are for General Stewardship lands. However, certain conservation actions to promote~~The intent of this strategy is also to maintain and enhance habitat ~~enhancement will provide specific points to promote resiliency and resistance or to observe *transformation*.~~for the species covered by the WOSF HCP. Management of HCAs ~~will incorporate~~incorporates principles of ecological ~~silviculture, which seeks to emulate stand initiation and development~~ forestry. During harvest of SNC and hardwood stands, and gap creation in variable retention treatments, additional legacy features are retained, an even greater variety of tree species planted, and herbicide use limited to regenerate forests that provide complex early-seral habitat that is positioned to grow into mature stands with high biodiversity. Variable retention treatments are designed specifically to emulate processes that result from small-scale natural disturbances (e.g., windthrow, lightning, insects, disease) ~~to~~that promote within-stand diversity and complexity ~~and~~in mid-seral stands. Passive management in HCAs and RCAs for late~~ seral stands. A proportion of HCAs that are stunted due to SNC cast will be managed early in the permit term, which will retain unaffected conifers and hardwoods, ~~-seral conditions also promotes resilience in mature forests and ~~will be replanted with habitat-suitable species mixtures.~~provides a baseline for comparison of strategies. The majority of treatments to reduce fire, insect, and disease risk ~~will~~ occur in stands outside of the HCAs.

Strategy: Timber Sale Design

Design timber sales that consider timber markets and cost of logging, to ensure efficient operations and increased revenue consistent with other desired outcomes, and FMP goals and strategies.

Intent

The intent of this strategy is to increase the revenue generated from timber sales by designing sales with cost-effective and logical harvest units. Well-designed harvest units decrease logging costs and can also lead to more competitive bidding on timber sales, leading to increased revenue. Structuring timber sales to target specific log product markets and scheduling timber sales to take advantage of historic seasonal trends (e.g., bid prices for timber that can be logged in the winter months are typically increased) can increase revenues. OPs balance low- and high-value timber sales and units to ensure that forest management treatments are conducted where need, not just in high-value areas.

Strategy: Timber Salvage

Implement a timely response to natural disturbances (e.g., fires, windstorms, ice storms) to salvage merchantable timber, in accordance with the management emphasis of the affected areas, other forest management plan goals and strategies, and opportunities for additional legacy retention on the landscape.

a. Limit salvage within HCAs and RCAs to hazard tree felling.

b. Develop and implement responses to more extensive events in HCAs and RCAs in collaboration with NOAA Fisheries and U.S. Fish and Wildlife Service

Intent

Natural disturbances occur periodically across the landscape. These can result from different events such as windstorms, ice storms, and fires. These disturbed areas can range in size and impact and require careful consideration by foresters. The intent of this strategy is to ensure that timber is salvaged quickly after natural disturbances to recover economic value and reduce safety and wildfire risks.

3.2.2 Forest Resource 2: Transportation

Bridge replacement in the Tillamook State Forest. Stream crossing improvements can help protect water quality~~, reduce the risk of flood damage, and improve aquatic habitat by enabling organism passage to upstream habitats~~.

Credit: ODF.

The state forests road system is an integral part of achieving desired economic, social, and environmental outcomes by providing access for the many activities that happen on state forest lands.

There are approximately 4,500 miles of road on state forest lands, and 88% of all state forest land acres are within 0.25 mile of a road. Approximately 85% of the roads are surfaced, mostly by gravel, which reduces risk of roads contributing fine sediments to streams and adversely affecting water quality and aquatic

~~3.1.2 Transportation~~

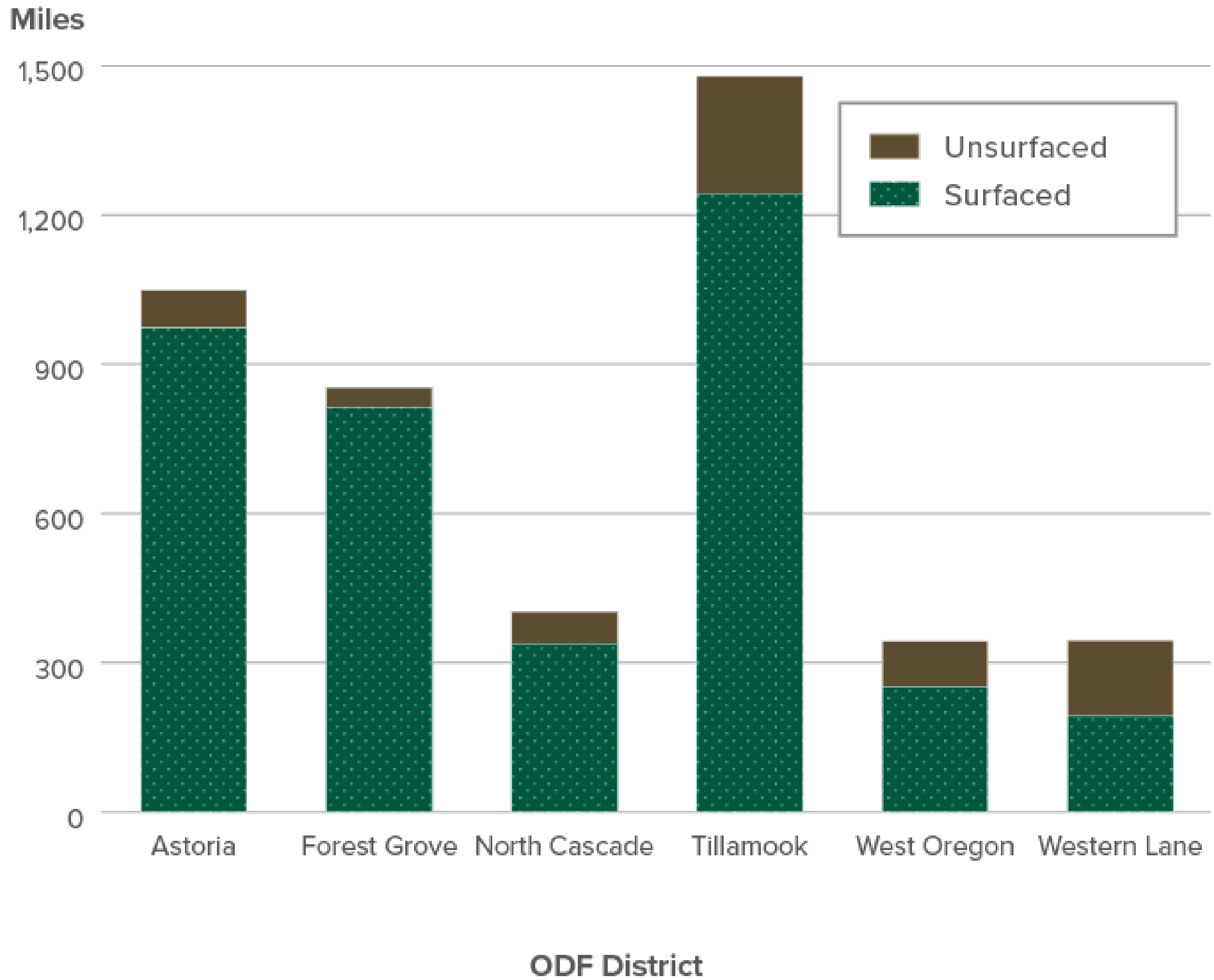
~~The road system is an integral part of achieving GPV. The road system supports economic benefits by facilitating timber and special forest product harvest and firefighting, which protects the timber resource. Roads provide access for a wide range of social benefits such as recreation and cultural activities and firefighting to protect public safety.~~

~~There are approximately 4,300 miles of road on state forest lands with 88% of all acres located within 0.25 mile of a road. Approximately 83% of the roads are surfaced.~~

habitat (Figure 3-3). The road system has the potential to adversely ~~impact~~affect natural resources, particularly water quality and aquatic species migration~~.~~ when it is not properly maintained. The condition of the road system ~~on state forest lands~~ is ~~managed to protect~~dynamic and changes over time depending on weather conditions, soil saturation, vegetation growth, public use, and hauling activities. Monitoring these conditions is important and BMPs must be incorporated to protect natural resources ~~in accordance with the HCP, ODF guidance, best management practices (BMPs), Oregon Forest Practices Act (FPA), and other applicable laws~~.

The transportation system is evaluated on an ongoing basis to determine the current condition, potential resource impacts, and future access needs. Different emphasis areas help guide management decisions for road construction, improvement, maintenance activities, as well as vacating, which can involve removing the road or closing it. For example, the WOSF HCP conservation actions guide road construction in RCAs and HCAs. An example could be building a temporary dirt spur that is only used in the summer and vacated after use, which would eliminate the need for long-term maintenance, reducing potential resource impacts.

FIGURE 3-3
State Forest Roads by District. There are approximately 4,500 miles of road on state forest lands; approximately 85% of these roads are surfaced (primarily graveled, though some main travel routes are paved).



Source: ODF 2026.

Existing roads are improved if determined to have potential impacts on aquatic species based on the transportation assessment. Roads outside of HCAs and RCAs go through the same assessment process; however, the improvement strategy may include more rock replacement, mitigation strategies, and BMPs for water quality if wet weather timber-hauling activities are anticipated.

A major concern for forest roads is hydrologic connection to streams, where water from the road drains directly into a stream, which can negatively affect water quality. ODF collects and maintains data over time to track where these connections exist so that ODF can target road-drainage improvements that reduce the negative impacts of roads on water quality. Adding drainage features, like cross-drains and rolling water dips, to ensure road segments drain water to hillsides instead of streams, combined with maintenance of the road surface, ditches, and drainage features, reduces erosion, sediment loading, and potential impacts on natural resources. Road improvement projects are prioritized to address large hydrologic disconnection projects, culvert replacements that are barriers to fish migration, infrastructure stability for public safety, and facilitation of timber sales.

Goal: Transportation System Management

Manage the transportation system in a fiscally sound manner that ~~provides for resource protection,~~protects resources and promotes transportation efficiency~~,~~ and safety~~, and sound fiscal management while meeting forest management objectives~~.

Strategy: Transportation Planning

Use transportation planning principles, engineering standards, and BMPs to ensure that the transportation system facilitates achievement of GPV, provides for safe and efficient traffic flow, and minimizes impacts on natural resources.

Intent

The intent of this strategy is to build a lasting transportation system with an informed and holistic view, which considers all factors relevant to management decisions, resource protection, and public safety. Using these principles, standards, and BMPs reduces erosion potential, disconnects road segments from streams, maintains adequate surface conditions, and mitigates chronic issues over time through road vacating or other methods. Priorities for different emphasis areas are considered during the planning process, including following the WOSF HCP conservation actions that guide road construction in HCAs and RCAs. Additional details can be found in supporting documents, including the WOSF HCP, ODF guidance, State Forest Roads Manual, BMPs, Oregon Forest Practices Act (FPA), and other applicable laws.

Strategy: Transportation Assessment

~~Periodically~~ Monitor and assess the transportation system to ensure alignment with ~~GPV management objectives~~other FMP goals and strategies, resource protection standards, and safety.

Intent

The intent of this strategy is to collect information over time to verify the transportation system is being managed according to standards and policies. This information helps inform adaptive management decisions to address management goals, resource protections, and public safety related to the transportation system. The effectiveness of standards and BMPs can be evaluated and refined through this process. Through this assessment, projects can be prioritized for improvement based on potential impacts on natural resources, infrastructure stability, and public safety.

~~3.2.2~~3.2.3 3: Cultural and Historic Resources

Traditional cedar bark collection in the Astoria District. Western redcedar ~~(*Thuja plicata*; canoe cedar~~) is one of the most ~~important~~ culturally significant trees on ODF land.

Credit: Keepers of ancestral knowledge. Photograph taken by Fran McReynolds, with permission from the Confederated Tribes of Warm Springs.

Cultural and *historic resources* provide a record of our shared past, present, and future relationship with the land~~,~~ and how this relationship changes over time. ~~Remnants of past cultures and *lifeways* represent thriving cultures of the past and of today. This is~~ These resources are often observed in physical forms, such as historic buildings, arrowheads, rock art, basketry, ~~etc~~and other items. What is not as apparent is the interconnectedness of humans and the natural and cultural resources that support them. These relationships with the land are illustrated through practices, such as preserving sites and objects of

~~illustrated though practices, such as preserving sites and objects of~~ cultural importance, and cultivating plants and trees and other natural resources for traditional uses.

Protecting cultural ~~practices~~and historic resources is a shared responsibility for all Oregonians, as they provide an opportunity to apply knowledge from past civilizations to inform management practices and approaches to living with the land. ~~The Tribal cultural resources goals for the FMP were developed in collaboration with the nine federally recognized Tribes of Oregon in the government-to-government forum.~~The tribal cultural resources goals for the FMP were developed in collaboration with the *nine federally recognized Tribes of Oregon* in government-to-government forums.

Tribal ~~Nations:~~[2]Partners:[1] Natural Resources Protection

ODF recognizes that Tribal ~~*Nations* (also referred to as Tribal~~ Partners~~)~~ have lived in *reciprocity* with the landscape ~~for~~since time immemorial, using sustainable management practices to achieve quality, abundance, and self-sustaining plant and wildlife populations. Each Tribe has a unique perspective and history, with cultural identities that are intrinsically tied to their ancestral lands. ODF ~~acknowledges this relationship with ancestral lands that are currently considered State Forests and~~ seeks to honor these ~~ties~~relationships by working with Tribal ~~Nations~~Partners in ~~partnership and~~ shared stewardship toward a sustainable future. ODF is committed to integrating tribal cultural stewardship practices and *Indigenous Traditional Ecological and Cultural* ~~*Knowledge*~~[3]*Knowledge*[2] (ITECK) into planning, implementation, and adaptive management processes to ensure that ~~State Forests~~tribal ancestral lands are respected and honored by state forest's management activities ~~respect and honor the Tribal cultures whose ancestral lands comprise these lands~~.

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[2]~~Tribal Nations~~Landscape-scale stressors such as droughts, floods, wildfires, plant and animal extinctions, and changes in climate occurred in the past, as did Native Americans' adaptations to such events. Working with the Tribes to integrate their cultural and natural resources knowledge and stewardship practices builds

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[1]Tribal Partners include the nine federally recognized Tribes of Oregon: Burns Paiute Tribe, Confederated Tribes of Coos, Lower Umpqua ~~&~~and Siuslaw Indians, Confederated Tribes of Grand Ronde, Confederated Tribes of Siletz Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Coquille Indian Tribe, Cow Creek Band of the Umpqua Tribe of Indians, and the Klamath Tribes.

[~~3~~2] Indigenous Traditional Ecological and Cultural Knowledge (ITECK) is grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. ITECK is inherently ~~heterogeneous~~heterogenous and unique to each Tribe~~,~~ due to the cultural, geographic, and socioeconomic differences, as well as their history and the surrounding environment.

~~Current landscape-scale stressors and perturbations such as droughts, floods, wildfires, plant and animal extinctions, and changes in climate occurred in the past, as did human adaptations. Working with the Tribes to integrate their cultural and natural resources knowledge and stewardship practices will build adaptive capacity across the landscape. Tribal Nations~~**Forest Resource, Goals, and Strategies**

adaptive capacity across the landscape. Tribal Partners, their communities, peoples, ancestors, and culturally significant places persist, as do their ancestral knowledge and practices. They hold a rich diversity of holistic strategies, technologies, and management techniques that have ~~sustained throughout~~existed through many generations and can help inform current conversations regarding climate change and landscape resiliency.

ODF is committed to working with Tribal Partners to understand, identify, manage, and provide access to native populations of culturally significant plants, trees, animals, places, and waters on ODF-managed lands. This includes working with Tribal Partners to develop *ethnobotanical* strategies that are adaptive to the effects of climate change, using native seed sources to encourage self-sustaining plant communities over time, and using fire-adapted *successional* plants to prevent *erosion*. ODF ~~will~~ also ~~consider~~commits to diversifying tree species in reforestation efforts to encourage proliferation of traditional plants.

The following description of culturally significant natural resources is intended to provide a generalized ~~sense for~~understanding of the past and present cultural and natural resources that occur or have existed on state forest lands. Culturally significant natural resources, their uses, and associated management practices are extensive. A few examples are provided with the ~~intention~~intent of demonstrating the concept of reciprocity, in which all plants, trees, animals, and humans were a part of and contributed to a ~~whole and healthy~~holistic ecosystem.

Among the many traditionally important natural resources, western redcedar (~~*Thuja plicata*) (~~canoe cedar) is one of the most ~~important~~ culturally significant trees on ODF land (Whereat-Phillips 2016). It has healing and symbolic properties that are at the source of many Tribal ~~Nations'~~Partners' ideological and cultural identities. The cultural significance of western redcedar is inextricably tied to its ideological value, as well as its many uses, including medicine-making and ceremonial ~~use. The~~uses. Western redcedar ~~provided~~provides material for basketry, mats, ~~building materials~~buildings, canoes, cups, buckets, backpacks, spears, bedding, pest abatement, and much more.

Pacific yew (*Taxus brevifolia*) and ash (*Fraxinus*) trees provide ~~the~~ raw ~~material~~materials for bows. Arrows are sometimes made from hazel (*Corylus cornuta*), oceanspray (*Holodiscus discolor*), or other available plant species, and vine maple (*Acer circinatum*) ~~are~~is used for making net and spear handles.

Sitka spruce is an example of a culturally important ~~in~~ tree species that requires careful tending of individual trees to strengthen the root system and promote healthy growth. It has many important uses, including basketry and ~~the~~ making ~~of~~ multiple types of fishing and foraging devices to gather eel, smelt, ~~and~~ salmon, ~~etc.~~and other aquatic species. In addition, ~~this tree species'~~Sitka spruce's versatility serves well for making larger bowls and cups and other vessels. ~~Management of spruce required careful tending of roots to strengthen the root system and promote healthy growth. Another example of~~

Tribes' management of natural resources ~~is~~ includes the extensive use of fire ~~management, which promotes~~to create clearings in the forest to promote growth of successional plants like serviceberry (*Amelanchier alnifolia*). Various parts of serviceberry ~~were~~are used for medicinal purposes and consumption (raw, dried, or made into a preserve), and the branches ~~served~~serve as tool handles, ropes, and sometimes spears or arrow shafts. Bear grass (*Xerophyllum tenax*), bulrush (*Typha*), hazel, and fireweed (*Chamaenerion angustifolium*) are examples samples of other plant species that require burning for production. These species colonize clearings and decline as the forest canopy closes and ~~shading prevents~~shade inhibits their growth~~. They are, therefore, prominent examples of successfully fire-managed species as they colonize created clearings~~.

~~Bear grass (*Xerophyllum tenax*), bulrush (*Typha*), hazel (*Corylus cornuta*), and fireweed (*Chamaenerion angustifolium*) are a sampling of other plant species requiring cultural burning for production and use of their many attributes.~~

Understory burning ~~also produced~~that maintains forest canopy cover produces habitat for large and small game including elk, deer, and other sustenance-providing animals~~.~~; however, animals ~~were~~are more than food~~;~~. The animal ~~shared~~shares its life with people to make clothing, bones for fishing implements, sinew for binding, brains for hide tanning, bones for gaming pieces, and shells for trade, jewelry, rituals, and symbolic displays. Still, many animals ~~were~~are not used for food or other utilitarian purposes but ~~held—and continue to~~ hold —deep symbolic meaning in the form of cultural ~~origins, religious prescription,~~origin stories, and inform and ~~qualities. For example, northern flicker (*Colaptes auratus*) flight feathers represent healing and healers who make people whole again; ravens, owls, eagles, are all of ideological and symbolic importance~~contribute to medicinal practices.

Goal: Tribal Access and Use of Natural Resources

In coordination with the nine federally recognized ~~Tribal governments~~Tribes of Oregon, ~~ODF will~~ provide access, availability, and enhancement of cultural resources and natural resources ~~for their membership~~ on state forest lands.

Strategy: Tribal Engagement

Engage Tribal Partners in planning processes for state forest lands and provide opportunities for implementation of cultural and natural resources stewardship practices appropriate to location and habitat.

Intent

The intent of this strategy is to ensure that significant cultural and natural resources are recognized and integrated into planning and management activities. ODF and tribal governments meet regularly to ensure that communication is occurring early and often with the appropriate staff, and at the appropriate levels. The intent is also for tribal and ODF staff to understand respective organizational structures and planning processes to identify meaningful points of engagement, cultural and natural resources stewardship practices, and culturally significant plant and animal species. ODF works with interested Tribes to integrate cultural and natural resources stewardship and restoration practices and priorities for culturally significant plant and animal species in the IP, OP, and adaptive management processes.

Strategy: Coordinate Tribal Ethnobotanical Strategy

Coordinate with Tribal Partners to develop and implement an ethnobotanical strategy that is adaptive to the effects of climate change and ensures self-sustaining populations of culturally significant species are abundant and available on state forest lands.

Intent

The intent of this strategy is to have a process for including or introducing culturally significant plant species and cultural techniques into forest management practices, including native seed source recommendations that consider appropriate habitat in planting regimes, climate resiliency, and legacy seed source information that contributes to a storied landscape understanding.

Strategy: Tribal Seed Sources

Collaborate with Tribal Partners on native seed source recommendations that consider appropriate habitat in planting regimes, climate resiliency, and legacy seed source information that contributes to a *storied landscape* understanding.~~.~~[4] .[3]

Intent

The intent of this strategy is to identify and cultivate partnership opportunities with established native nurseries, including but not limited to the Coastal Native seed partnership, the Oregon Department of Agriculture's (ODA) seedbank, and tribal seed nurseries. The intent is also to continue to work with Tribal Partners in IP, OP, and adaptive management planning processes to develop and implement climate adaptation strategies to support culturally significant plant and animal species.

Strategy: Tribal Access

Work with Tribal Partners to develop and administer processes that facilitate ~~*unimpeded*~~[5]*unimpeded* *access*~~,~~,[4] with protected allowances for Tribal Partners' ~~membership~~ to access, use, and manage cultural and natural resources (e.g., western redcedar bark peeling, bear grass collection) on state forest lands.

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[4]*Intent*

The intent of this strategy is to implement processes necessary to allow protected tribal access to state forest lands. ODF and Tribes build their understanding of locations and logistical needs for accessing culturally significant locations and forest resources. ODF and Tribes clarify responsibility for ensuring access, including but not limited to identifying entities responsible for access administration, methods of identification of tribal members, and provisions and conditions for gathering, cultivating, and harvesting. Tribal input on access is considered during IPs. ODF may consider Oregon Parks and Recreation Department tribal collection processes as a model program.

Tribal Partners: Cultural Resources Protection

European settlement in western states destabilized existing human-ecological systems and severed ties between the past and present that are culturally significant to Tribal Partners. Historic practices, behaviors, and laws physically, emotionally, and spiritually forced tribal peoples from their lands and ways of life, yet the history, language, and people endure. Human remains (ancestors), funerary objects (tangible pieces of death rites and ceremonies), objects of cultural patrimony (spiritual and material associations), and culturally significant objects (religious or spiritual objects used in ceremonies) are prevalent across Oregon, including on state forest lands. These non-renewable resources may include culturally modified trees, rock cairns, waterfalls, caves, and other features. Visible evidence of ancestral communities include items of everyday life, such as animal bones, mollusks, beads, needles, and obsidian

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[3] Within tribal contexts, storied landscape refers to a multitude of intrinsically linked and deeply held understandings, relationships, and actions between indigenous cultures and the landscapes with which they interact throughout time, including but not limited to ~~creation~~origin stories, landscape features, and wildlife attributes that signal hunting,

gathering, planting, and other seasonal use patterns.

~~5~~4 Provide reasonable opportunity for access, considering public safety, infrastructure, and topographic constraints.

~~3.1.3 Tribal Nations: Cultural Resources Protection~~

~~European settlement in western states destabilized human-ecological systems and severed ties between the past and present that are culturally significant to Tribal Nations. Historic and even modern practices, behaviors, and laws physically, emotionally, and spiritually forced Tribal peoples from their lands and ways of life. Yet the history, language, and people endure. Human remains (ancestors), funerary objects (tangible pieces of death rites and ceremonies), objects of cultural patrimony (spiritual and material associations), and culturally significant objects (religious or spiritual objects used in religion and religious ceremonies) are prevalent across Oregon, including on state forest lands. These non-renewable resources may include culturally modified trees, rock cairns, waterfalls, caves, etc. Visible evidence of ancestral communities would include items of everyday life, such as animal bones, mollusks, beads, needles, and obsidian~~ tools. Protection of culturally significant sites and objects is critical ~~in~~for honoring and maintaining connections ~~from~~between ancestors ~~to~~, current tribal members, and future generations of tribal descendants.

ODF is committed to the shared and facilitated protection and repatriation of any ~~items[6]~~items[5] (spiritual or material) that are considered culturally significant by Tribal Partners. Protection ~~includes~~extends to known sites and locations, identification of undocumented sites, and avoidance of sacred spaces and places of concern. ~~It~~Protection of cultural resources also extends to management and recovery activities related to fire, restoration, flooding, wind, landslides, and other disturbance events.

The FMP provides for access, availability, protection, and enhancement of cultural ~~and natural~~ resources on state forest lands. ~~It~~The plan recognizes these lands are a part of a long historical relationship, and access to *Traditional Cultural* ~~Places[7]~~*Places*[6] for spiritual, ceremonial, and traditional practices enables Tribes to maintain cultural identity, which is deeply rooted in the land. These locations are typically kept from common knowledge because of their sanctity and are almost exclusively known to Tribes and ~~membership; sometimes~~tribal members. Sometimes, only certain groups within a Tribe are keepers of such knowledge. Traditional Cultural Places and culturally significant forest and natural resources are *confidential*, and as such, ODF is committed to shared stewardship with Tribes, with stewardship being the protection of locational knowledge, meaning, and materials (ORS 192.005–192.170). ODF is also committed to increasing internal and external cultural awareness, understanding, and accountability ~~for cultural resources protection~~ through regular training focused on prioritizing, recognizing, and protecting cultural resources. These commitments ~~will~~are only ~~be~~ successful through shared stewardship and partnership, built from mutual respect, trust, and understanding.

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[6] ***Goal: Tribal Cultural Resources Protection***

Take an inclusive and proactive approach to working with Tribes to identify, record, preserve, protect, and keep confidential[7] culturally significant resources, including but not limited to *archaeological* and *historic sites* and *objects*, considerations for human remains, historic artifacts, and real property.[8]

Strategy: Tribal Relationships

Develop and maintain relationships with Tribal Partners to facilitate consistent information sharing and collaboration on state forest management activities that may affect cultural resources, including timber harvest and related activities, wildfire suppression and recovery, and habitat restoration.

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[5] 43 CFR § 10 (Native American Graves Protection and Repatriation Act); 16 U.S.C. § 1B (Archaeological Resources Protection Act); 16 U.S.C. § 470 (National Historic Preservation Act), ORS 97.740–97.760, ORS 358.905–961, and ORS 390.235–390.240. Oregon EO 17–12, 368.905–358.961; 97.740–97.760; 390.235.

[~~7~~6] The National Historic Preservation Act and the 36 CFR 800 regulations implementing it refer to "properties of traditional religious and cultural significance." ~~They~~These are geographic places prominent in a particular group's cultural practices, beliefs, or values, when those practices, beliefs or values: (i) are widely shared within the group, (ii) have been passed down through the generations, and (iii) have served a recognized role in maintaining the group's cultural identity for at least 50 years.

[7] Includes culturally sensitive locations in *State Historic Preservation Office* and tribal databases and places known by affiliated Tribes.

[8] EO 96-30; EO 17-12; ORS 358.640 and 358.653, ORS 97.740 to 97.760; 358.905 to 358.955; and 390.235.

~~Goal: Tribal Cultural Resources Protection~~

~~Take an inclusive and proactive approach to working with Tribes to identify, record, preserve, protect, and keep confidential[8] culturally significant resources, including but not limited to *archaeological* and *historic sites* and *objects*, considerations for human remains, historic artifacts, and real property.[9]~~

~~*Strategy: Tribal Relationships*~~

~~Develop and maintain relationships with Tribal Partners to facilitate consistent information sharing and collaboration on state forest management activities that may affect cultural resources, including timber harvest and related activities, wildfire suppression and recovery, and habitat restoration.~~

Intent

The intent of this strategy is to promote communication with Tribes about potential impacts and opportunities of forest management activities by developing tribal engagement policies and procedures and ensuring ongoing consultation and coordination. This includes working with Tribal Partners toward a systematic notification and record keeping process for state forests management activities and emergency operations (e.g., fire, flood, wind) that provides established points of contact and a collaborative structure for protection and rehabilitation of natural and cultural resources.

Strategy: Cultural Resources Inventory

Develop a comprehensive and ongoing cultural resources survey and inventory strategy to increase the understanding of culturally significant archaeological, historic, and cultural sites and objects on state forest lands, and implement the strategy in coordination with Tribal Partners over time.

Intent

The intent of this strategy is to work with Tribal Partners to develop and implement cultural resources protection processes and strategies associated with all forest management activities to help identify and protect culturally significant resources and to ensure their protection is part of IP, OP, and adaptive management processes.

Strategy: Determining Level of Cultural Significance

Coordinate with Tribal Partners to identify Tribes that have direct ties to state forest lands (~~by~~in terms of location, materials, knowledge, and practice~~, etc.);~~); determine the level of significance of archaeological, historic, and cultural sites and objects; and solicit recommendations for protection and preservation thereof.

Intent

The intent of this strategy is to promote communication with Tribes to determine significance and relative protection measures to be taken.

Strategy: Cultural Resource Awareness

Increase internal and external cultural awareness, understanding, and accountability for cultural resources protection through regular training focused on prioritizing, recognizing, and protecting cultural resources.

Intent

The intent of this strategy is to provide ongoing education to ODF staff, volunteers, contractors, and visitors to state forests so they understand their role in cultural resources protection. The intent is also for ODF to provide internal and external cultural awareness training opportunities for staff, volunteers, and contractors, and coordinate with Tribal Partners on curriculum development, including Senate Bill

(SB) 13:[9] Tribal history/Shared History curriculum (as outlined by Tribal Partners). Awareness training opportunities for visitors is provided through education and interpretation programs and the Tillamook Forest Center.

Strategy: Intergovernmental Agreements

Use intergovernmental ~~agreements[10]~~agreements[10] with ~~federally recognized Tribes of Oregon~~Tribal Partners to facilitate cooperation, information exchange, and cost sharing.

Intent

The intent of this strategy is to codify communication processes, cultural and natural resources protection strategies, and land management partnerships.

Historic Cultural Resources

~~Historic sites and artifacts are not just records of white settlement; they record the protohistoric era where European and Tribal interactions and assimilations occurred, Chinese immigrants worked toward freedom from servitude on western railroads, and Russian colonies pre-dating, non-Spanish westward expansion.~~ Historic sites and artifacts across Oregon's ~~historical~~ landscape tell a rich ~~history of diversity~~story of people, communities, travel, conflict, trauma, and persistence, which collectively represent ~~in~~ the diversity of descendants of Oregonians today.

~~[8] Includes culturally sensitive locations in *State Historic Preservation Office* and Tribal databases, and places known by affiliated Tribes.~~

~~[9] EO 96-30; EO 17-12; ORS 358.640 and 358.653, ORS 97.740 to 97.760; 358.905 to 358.955; and 390.235.~~

~~[10] ORS 190.110, National Historic Preservation Act Section 106, ORS 358.653.~~

European explorations ~~that began~~intensified in the ~~1830s~~early 1800s and expanded significantly with the 1850 Oregon Donation Land Law bringing over 30,000 white settlers.~~ 11~~ This cultural shift, predicated on colonization and western cultivation of the landscape, brought extractive agriculture, ranching, logging, and homesteading (a foreign concept of land ownership and control for Native Americans). The European explorers and settlers also brought diseases that decimated Native American peoples and ~~life ways~~*lifeways*. The Native Americans that survived this era of disease and genocide were forced to join an unfamiliar labor culture to provide for their families.

Other groups also found their way to what is now Oregon, despite laws that intended to keep them out. Even before Oregon became a U.S. territory, the Provisional Government of Oregon enacted laws that banned both free and enslaved ~~Blacks~~Black people from Oregon and threatened violence to those who stayed. Oregon's state constitution was the first to ban Black residents and barred Chinese residents from voting, ~~who had~~despite having worked and lived in Oregon since the early 1800s. Despite these laws and bans, these marginalized communities endured. For example, Maxville, a logging camp east of the town of Wallowa, was home to a ~~multicultural~~multi-cultural logging camp, with 400 residents, 40 to 60 of which were ~~African American~~Black people. It was the largest town in Wallowa County between 1923 and 1933 and is memorialized by the Maxville Heritage Interpretive Center.

~~Non-European~~Other immigrants continued to find their way to Oregon, including the Basque (primarily sheepherders), Mexicans who mined gold and tended livestock, and Chinese who established mining camps in southwest and northeast Oregon~~,~~ and continued to work on building the transcontinental railroad. The Chinese Exclusion Act of 1882 forced many Chinese immigrants, and their American-born children, to

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[9] Senate Bill (SB) 13 Tribal History/Shared History directs the Oregon Department of Education to create the K-12 Native American Curriculum for inclusion in Oregon public schools and provide professional development to educators.
[10] ORS 190.110, National Historic Preservation Act Section 106, ORS 358.653.

leave the state. ~~The resultant~~This resulted in labor shortages that were filled by immigrants from Japan~~.~~ and other parts of Asia. The ~~marks~~influence of these many communities can still be found upon the state's landscape and ~~made~~are visible in the historic cultural resources memorializing their experiences.

Historic cultural resources are some of Oregon's most valuable and important *assets*. Buildings, structures, sites, furnishings, art, objects, and items of personal property that are important to local, state, or national history can tell the story of a region's cultural history~~ and might be~~. These cultural resources are protected under the National Historic Preservation Act and Oregon state law ~~if~~when they meet certain criteria~~, including being at least 50 years old.~~~~[12]~~.[11] ODF is committed to historic cultural resources stewardship~~, using various methodologies designed to identify and protect~~ through the identification and protection of culturally sensitive ~~areas and locations~~resources across state forest lands. Historic cultural resources protection provides an opportunity for visitors to state forest lands to connect with the state's history and people.

Goal: Historic Cultural Resources Protection

Identify and protect historic cultural resources.

~~[11] The1850 Donation Land Act specifically excluding Blacks, Native Americans that were not "half-breeds" and Hawaiians.~~

~~[12] National Historic Preservation Act Section 106, ORS 358.653.~~

Strategy: Archaeological Review

Perform archaeological review of all operation locations and protect historic resources following applicable rules and statutes.

Intent

The intent of this strategy is to incorporate historic cultural resources review by qualified cultural resources specialists, in compliance with state and federal regulations, into operation planning processes to ensure protection of historic cultural resources across state forest lands.

~~3.2.3~~3.2.4 Forest Resource 4: Recreation, Education, and Interpretation

Mountain biking on one of ODF's many trail systems. Demand for outdoor opportunities in Oregon is increasing.
Credit: ODF.

ODF's recreation, education, and interpretation program manages both developed and *dispersed* ~~recreational opportunities in~~*recreation* and interpretive programming across all state forest lands, with the ~~largest~~greatest concentration of ~~recreational~~ opportunities and visitor use ~~occurring~~ in northwest Oregon on the Clatsop, Santiam, and Tillamook State Forests. ~~Recreation, education, and interpretation programs are aimed at welcoming~~The program aims to welcome all visitors, provide opportunities to ~~enjoy and~~ learn about ~~Oregon's state~~ forest ~~lands and their~~ stewardship, and ~~providing~~ensure lasting, diverse, and accessible outdoor experiences.

~~accessible outdoor recreation, education, and interpretation opportunities. Research conducted in conjunction with the *Oregon State Comprehensive Outdoor Recreation Plan 2019–2023* (Oregon Parks and Recreation Department 2019–2023) reveals that the demand for outdoor opportunities in Oregon is increasing, the popularity of specific activities is changing over time, and some groups or persons have not accessed~~On state forest lands ~~for a variety of reasons. This reflects ever-evolving changes in user *demographics*, advances in technology, shifting economic trends, and outdoor recreation trends and opportunities for more inclusion overall.~~

~~State forest lands provide recreational opportunities for both residents and~~ , visitors ~~to the state,~~ enjoy a wide range of activities such as camping, hunting, ~~boating, angling, target shooting,~~ fishing, hiking, ~~birding,~~ mountain biking, boating, horseback riding, ~~and motorized and non-motorized trail use. Public use is regulated through OAR 629.25.~~target

~~The availability of recreational~~

[11] National Historic Preservation Act Section 106, ORS 358.653.

shooting, and motorized trail use. These opportunities are regulated under Oregon Administrative Rules (OAR) 629-25 to ensure safety and resource protection.

Recreation on state forests involves more than leisure activities—recreation is an ecosystem service that ~~contributes to the~~ improves quality of life, ~~and additionally provides~~supports cultural traditions, and connects Oregonians to their state forests. It also generates significant economic benefits ~~to~~for nearby communities ~~adjacent~~and the state as a whole.
According to Oregon's 2025–2029 Statewide Comprehensive Outdoor Recreation Plan (SCORP), outdoor recreation in Oregon contributes nearly $57 billion annually to ~~state forest lands. For many Oregonians, recreation on state forest lands is part of their cultural heritage.~~the state's economy and saves billions in health-related costs (Oregon State Parks 2025).

SCORP data show that demand for outdoor recreation continues to grow across the state. Hiking, camping, and wildlife viewing remain among the most popular activities, while mountain biking and non-motorized trail use are seeing steady growth. At the same time, barriers persist for some groups, including low-income households, people with disabilities, and racially or ethnically diverse communities. This highlights the need for more inclusive access and programming.

As demand grows and user demographics evolve, the recreation program continues to adapt facilities, trails, and educational offerings to meet changing needs and create more inclusive experiences. The following sections describe some of these recreational opportunities ~~are discussed~~ in ~~more~~ detail ~~in the following sections~~and outline strategies for future improvements.

Motorized Trail Use

State ~~forest lands offer~~ forests provide some of the most diverse and challenging off-highway vehicle (OHV) ~~trail~~ opportunities in ~~the Pacific Northwest~~Oregon, filling an important recreational niche in the ~~state and region.~~Pacific Northwest. OHV staging areas ~~(~~, including campgrounds and day-use ~~areas) provide~~ sites, offer parking and camping ~~opportunities~~ that support ~~OHV trail system~~ access to trail systems.

~~OHV areas in~~ The Clatsop and Tillamook State Forests ~~include trails~~ feature extensive OHV networks for ~~motorcycle, quad~~motorcycles, quads, side-by-~~side~~sides, and four-wheel ~~use that range~~-drive vehicles, with trails ranging from ~~easy to extremely challenging. OHV areas on~~beginner-friendly to highly technical. The Santiam State

Forest and the West Oregon District offer smaller systems with easy-to-moderate ~~opportunities~~routes for ~~motorcycle~~motorcycles and ~~quad use. The~~quads. OHV ~~trail system accommodates~~trails are generally open year-round ~~use~~, with ~~the highest~~peak use ~~levels occurring~~ in ~~the~~ spring and fall.

Non-motorized Trail Use

State forests offer an extensive network of non-motorized trails ~~and supporting infrastructure, such as trailheads and campgrounds, accommodate~~for hiking, horseback riding, trail running, and mountain biking. ~~The non-motorized trail system is primarily used by day-use visitors. The trail system includes a variety of~~ These trails range from scenic forest paths to purpose-built mountain bike ~~trails~~routes, including cross-country ~~and all-mountain trails~~, downhill ~~trails~~, and ~~free-ride opportunities~~freeride options. The Black Rock Mountain Bike Area in the West Oregon District is a prime example, managed in ~~collaboration~~partnership with the Black Rock Mountain Bike Association to provide advanced riding experiences.

Looking ahead, maintaining and expanding these trails will require strong collaboration with local trail organizations and other nearby systems—such as those managed by counties, cities, and nonprofits—to create seamless connections between state forests and regional networks. These linkages enhance recreational opportunities, reduce congestion, and support tourism by offering longer, integrated trail experiences.

Camping

~~ODF~~ Camping on Oregon's state forests offers a range of experiences, from rustic dispersed sites to developed campgrounds with amenities. ODF manages three primary types of camping ~~opportunities~~: developed campgrounds, designated ~~campsites~~sites outside ~~of developed~~ campgrounds, and dispersed camping across ~~state~~ forest lands. Developed campgrounds vary in size and ~~amenities offered.~~

~~Campground opportunities are diverse and include regular~~features, including drive-in ~~site campgrounds that accommodate~~ sites for recreational ~~vehicle (RV)~~vehicles and ~~tent use~~tents, walk-in tent ~~site campgrounds that accommodate tent use only~~sites, horse camps~~, that are~~ designed for equestrian users, and OHV campgrounds ~~designed and managed to accommodate OHV enthusiasts~~tailored for motorized recreationists.

ODF campgrounds serve as hubs for recreation, providing access to trails, rivers, and scenic viewpoints. Many sites are intentionally kept simple to maintain a natural forest experience, while still offering essentials like fire rings, picnic tables, and vault toilets. Future priorities include improving accessibility for all visitors, upgrading infrastructure for safety and sustainability, and exploring partnerships to expand camping options near high-demand areas.

Day-Use Activities

~~State forests are popular destinations for~~ ODF manages a variety of day-use ~~activities, such as swimming and water play, target shooting, fishing, hiking, mountain biking, horseback riding, OHV trail use, and picnicking. Day-use facilities~~ sites that provide ~~parking and restrooms, and some locations have picnic tables and cooking grills.~~

~~Facilities are generally rustic in nature but often provide river access and support other day-use activities. Developed facilities include~~ essential amenities for visitors, including trailheads, picnic areas, boat launches, target-shooting lanes, interpretive sites, and ~~a *demonstration forest*~~demonstration forests. While facilities are generally rustic, many offer river access, restrooms, and picnic shelters. These sites serve as gateways to recreation, supporting activities like hiking, mountain biking, fishing, and OHV riding.
Target shooting is also supported at designated shooting lanes, which are maintained to improve safety and reduce environmental impacts.

Future priorities include improving accessibility, upgrading infrastructure for safety and sustainability, and enhancing interpretive elements to enrich visitor experiences.

Aquatic Activities and Hunting

~~State forest rivers are a destination for~~ State forest lands provide abundant opportunities for water-based recreation and hunting, both deeply rooted in Oregon's outdoor traditions. Rivers and lakes within the forests support fishing, boating, and ~~water play. In support of fishing and boating activities,~~swimming. ODF manages several primitive boat launches, some ~~of which are managed~~ in partnership with the Oregon Department of Fish and Wildlife (ODFW~~).~~), and small lakes in the Santiam and Clatsop State Forests ~~also provide opportunities for swimming,~~offer angling~~,~~ and non-motorized boating. RCA protections support healthy fish populations and ensure the recruitment of in-stream downed wood and other habitat elements over time.

Hunting

~~Oregon has~~ remains a ~~long history of hunting~~cornerstone activity on state forests~~.~~, with ODF ~~works~~working closely with ODFW and hunting organizations to ~~better~~ manage ~~hunting~~ access~~, through~~ and maintain habitat to support healthy populations of game animals. *Travel management are*as and ~~selected~~selective road closures ~~to provide~~create walk-in hunting opportunities while balancing habitat protection and safety. These activities not only connect people to Oregon's natural heritage but also contribute to local economies and community wellbeing.

~~Target Shooting~~

~~Target shooting is most active in districts closest to the Willamette Valley and the Portland metropolitan area. Most target shooting takes place at established shooting lanes or dispersed locations such as rock quarries, rock stockpiles, and at the end of spur roads.~~

Looking forward, ODF aims to enhance water access points, improve signage and safety features, and strengthen partnerships to support sustainable hunting practices and aquatic recreation.

Interpretation and Education Services

~~ODF has been supporting interpretative and educational programs~~ Education and interpretation are central to the VOF by fostering stewardship and understanding of Oregon's forests. Since the mid-1990s, ~~providing information about current and past land management, natural disturbance, and forest stewardship occurring~~programs have provided insight into forest ecology, wildfire history, and sustainable management practices *on* ~~Oregon lands to both locals and a diverse array of visitors. One facility that is a popular stopping-off point between the valley and the coast is~~*working forests* that promote resilient ecosystems. The Tillamook Forest Center, ~~which was constructed in the Tillamook State Forest~~built in 2006~~. This center~~, is the flagship facility—a premier destination for ~~Oregonians~~locals and ~~out-of-state~~ visitors ~~and is one of the region's largest forest-based learning centers providing information about the natural and cultural history of Oregon's forests, wildfire science, and sustainable forest management. A variety of educational and interpretation opportunities are provided there, including interpretive~~ alike. It features interactive exhibits~~ in the museum, a movie theater showing~~, an award-winning film ~~about~~on the Tillamook Burn, accessible trails, seasonal presentations, traveling exhibits, ~~educational programs for school groups, and facility rentals at the Smith Homestead Shelter. A primary focus of the~~and school programs. School programs for K–12 classrooms are especially important for ensuring that school children experience the forest and are aware of future career opportunities in stewardship of their natural resources.

Future plans emphasize modernizing interpretive ~~and educational~~ services~~ and programs is intended to assist the public in developing an understanding of basic ecological processes, which in turn may foster a sense of environmental awareness and long-term stewardship of shared natural resources~~, expanding digital engagement, and strengthening partnerships with schools and community organizations. These efforts aim to reach broader audiences, integrate climate and wildfire education, and ensure that interpretation remains relevant and engaging for the next generation.

Goal: Recreation, Education, and Interpretation Opportunities

Provide forest recreation, education, and interpretation opportunities to create meaningful and enjoyable experiences that foster appreciation and understanding of state forest lands and contribute to community health, sustainable working forests, and economic wellbeing.

Strategy: Welcoming~~, Inclusive,~~ and ~~High-Quality~~Accessible Recreation, Education~~,~~ and Interpretation Opportunities

improve recreation, education, and interpretation opportunities
isting trails, facilities and future development.

~~e a diversity~~existing recreational infrastructure when planning
ximity.

rds, and planning principles suited for facility and trail

joyable experiences~~, services and programs, improve delivery of~~
~~nities include interpretation and education services for forest visitors~~
~~mmunities to learn about~~within educational fields that build
~~ect~~support connection with Oregon's history, people, and

Strategy: Visitor Use Research and Monitoring

~~Conduct~~Monitor visitor use ~~research and monitoring~~of program assets to inform decisions related to the recreation, education, and interpretation program ~~management, leverage capacity of future investments into recreational~~., Support efforts to diversify program funding mechanisms, contribute to program sustainability, and help the program describe and deliver its contribution to GPV and resilient ecosystems.

a. Regularly collect and analyze data on how visitors use state forest recreation, education, and interpretation facilities and programs to guide decisions and improve services.

Intent

The intent of the strategy is to prioritize infrastructure ~~and services and enhance support for the program~~upgrades, design new programs, and demonstrate the value of investments to stakeholders.

Strategy: ~~Recreation, Education, and Interpretation~~ Community Engagement

~~Enhance~~ Build partnerships and community ~~*engagement* to foster partnership development,~~connections to increase investment, ~~and sense of ownership, as well as the capacity to advance recreation, education, and interpretation program goals.~~

~~Through these connections the~~ collaboration, and support for recreation, education, and interpretation ~~program can engage~~programs.

Intent

The intent of this strategy is to create a sense of shared ownership around the mission, vision, and brand of the recreation, education, and interpretation program through collaboration and engagement with diverse audiences ~~and potential~~, partners, ~~which in turn fosters~~and stakeholders that creates community ~~collaboration and~~ connections, develops broad support for ~~the work of the program and promotes~~and investment in the program ~~and associated activities. Creating strong community connections~~, and increases ~~the diversity, capacity, and adaptability of recreation, education, and interpretation services~~our collective capacity.

Forest Resource~~, Goals, and Strategies~~

~~3.2.4~~3.2.5 5: Visual Resources

…ls are near some of Oregon's major cities. Several *scenic* highways and …d attract people to recreational infrastructure including many campgrounds and extensive trail networks. Sightseeing is popular in state forests, and visual resources play a major part in the quality of experience in social activities, such as camping, trail use, fishing, wildlife watching, rafting, and driving. Visual resources enhance the quality of social benefits and attract tourists whose spending supports the local tourism economy and contributes to revenues.

~~The~~

In many places, smaller parcels of state forest lands are not readily distinguishable from other

surrounding forestlands by visitors. By contrast, the Clatsop and Tillamook State Forests~~, the largest~~ are large, consolidated blocks of state forest lands~~, are the state lands most likely~~that are signed and well-known to many visitors and dominate *viewsheds* ~~and be recognized as state forests by the public~~

~~as they visit the area. In many places, state forest lands blend with the surrounding forest~~along some busy travel corridors, especially between Portland and ~~are not recognized as state land by visitors.~~

the Oregon Coast. Goals for retaining visual buffers from timber harvest are balanced with goals for maintaining safe conditions for motorists and recreationists.

~~State forest lands provide a unique experience as these lands are~~

~~actively managed and provide for a wide range of forested settings. Visitors can expect to see settings that contain views of regeneration harvest with leave trees and snags, harvest buffers to protect resources, streams and rivers, and forest stands in stages from newly planted seedlings to mature trees. The varied views from state forest lands reflect the social, economic, and environmental values for which these forest lands are managed.~~

State forest lands are also home to state-designated *scenic waterways*, which are designated to create a balance between protecting ~~the~~ natural resources, scenic value, and recreational use of these rivers.

Santiam State Forest. On state forest lands visitors can expect to see a wide range of forested settings, streams, rivers, lakes, and other scenery.
Credit: Zak Stone.

Scenic Highways, Byways, and Visually Sensitive Corridors

State forest lands are a major part of the view along some stretches of Highway 6 and Highway 26 in the Oregon Coast Range. Along major highways, the immediate visual foreground is protected either by Oregon Department of Transportation-owned scenic buffers or by statute. Many highways in western Oregon are designated as scenic for the purpose of visual corridor management (ORS 527.755) and are within or adjacent to state forest lands.

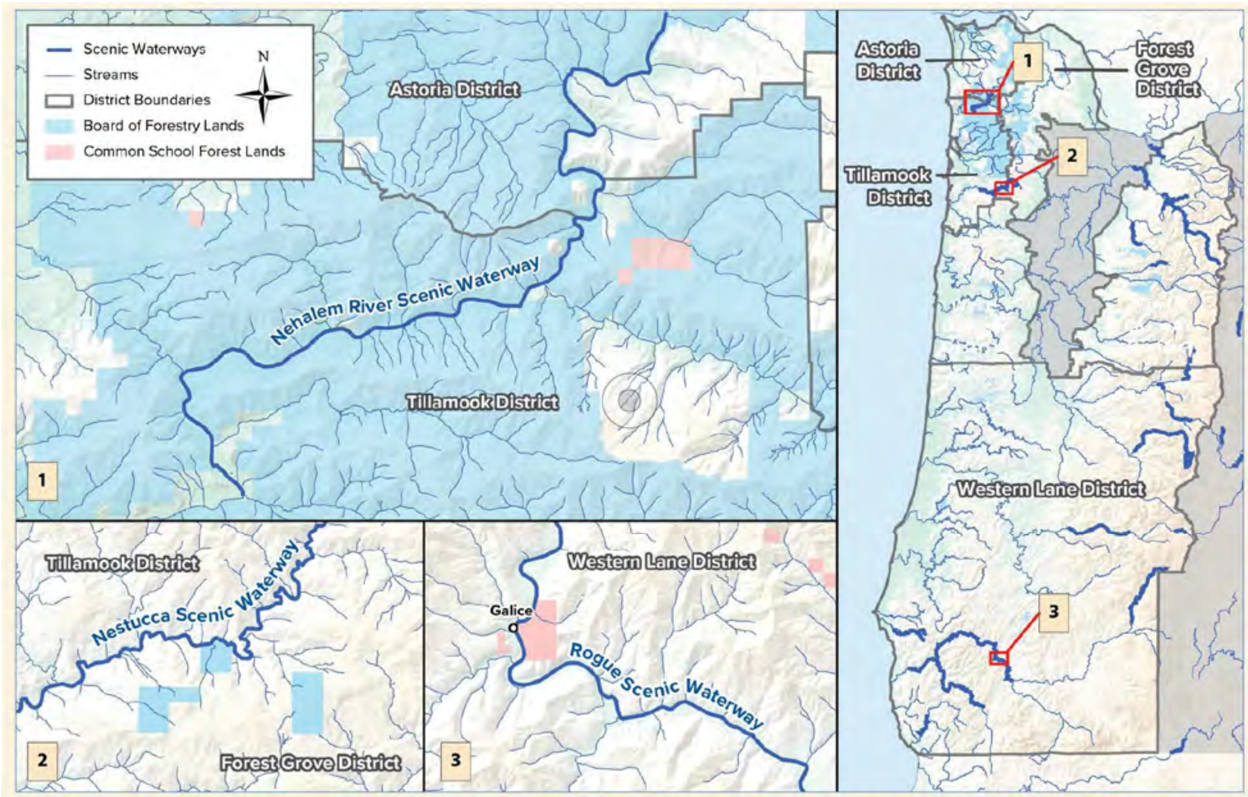
Special rules apply to timber harvest in *visually sensitive corridors*. Goals for retaining scenic buffers are balanced with goals for maintaining motorist safety. Additionally, Highway 6, located in the Tillamook State Forest, is designated as a portion of the Trees to Sea Scenic Byway and must be maintained as a scenic corridor per the *Trees to Seas Highway 6/131 Scenic Byway Corridor Management Plan* (ODF 2018).

Scenic Waterways

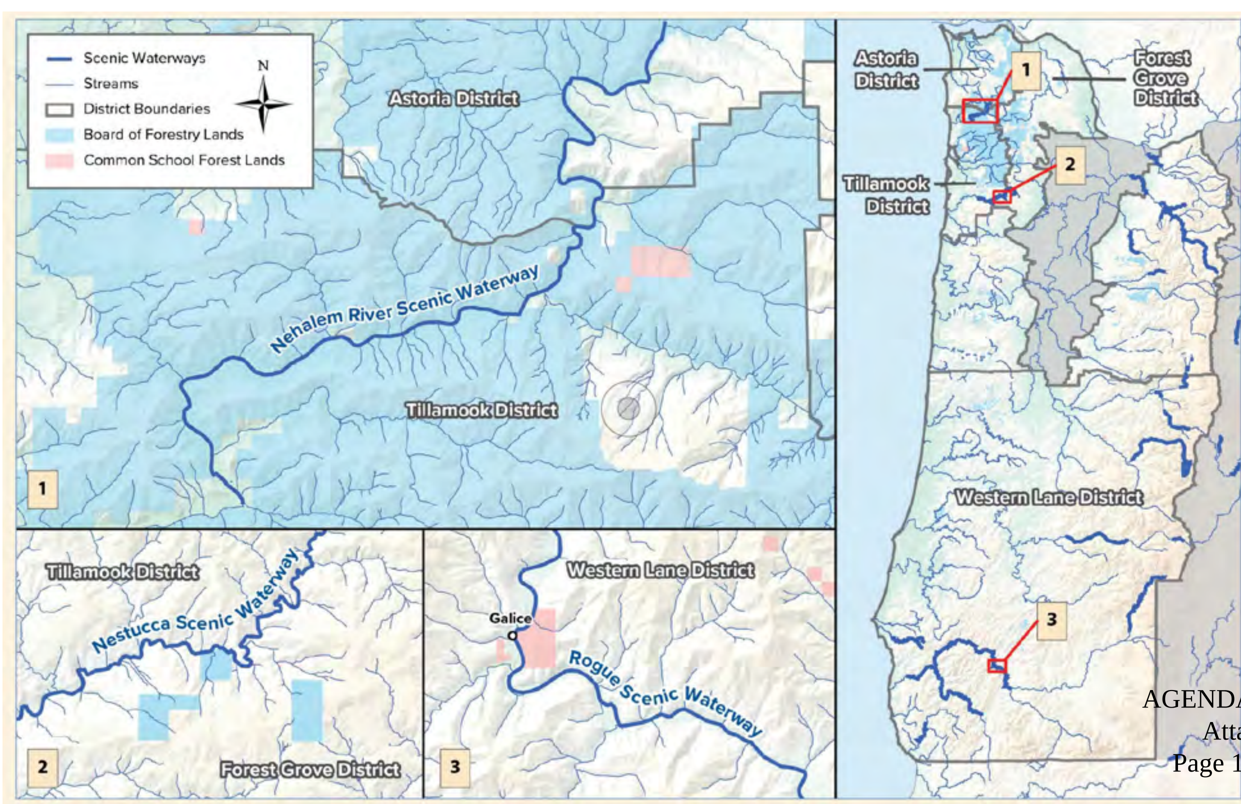
There are three state scenic waterways ~~located~~ on or adjacent to state forest lands. Management of lands in and adjacent to designated scenic waterways is subject to the provisions of ORS 390.805 to 390.925, and administrative rules adopted by the Oregon Parks and Recreation Department. The first designated waterway is the Nestucca River Scenic Waterway in Forest Grove and Tillamook Districts (designated by ORS 390.826(11); OAR 736-040-0041) (Figure 3-~~6~~4). The second state scenic river is a 17.5-mile section of the Nehalem River located in the Clatsop and Tillamook State Forests (designated by Executive Order 2019-05; OAR 736-040-0120). The third state scenic river is the Rogue River Scenic Waterway (designated by ORS 390.826(9)) located adjacent to CSFL in the Western Lane district near the small town of Galice (16 miles northwest of Grants Pass). This same reach is also part of the Lower Rogue National Wild and Scenic River, which is one of eight rivers established under the passage of the Wild and Scenic Rivers Act in 1968.

FIGURE 3-~~6~~4

Scenic Waterways. Scenic-designated segments of the Nestucca, Nehalem, and Rogue Rivers flow through the planning area.



~~CSFL near the small town of Galice (16 miles northwest of Grants Pass) and near the well-known Grave's Creek Boat Launch are located within the corridor of the collocated Lower Rogue National Wild and Scenic River (established by Public Law 90-542) and Rogue River Scenic Waterway (designated by ORS 390.826(9)). The Lower Rogue National Wild and Scenic River was one of eight rivers established under the passage of the Wild and Scenic Rivers Act in 1968.~~



Goal: Visual Resources

Manage forests in ways that value scenery and a range of forested settings ~~to meet~~based on emphasis area ~~management objectives~~.

Strategy: Scenic ~~Classification System and~~ Considerations

~~Implement the scenic classification system defined in the FLMCS as Special Use and apply state and federal regulations to integrate scenic considerations into management decisions.~~

~~Special~~ Integrate scenic considerations into management decisions where compatible with safety considerations, other resource priorities, harvest plans and operational needs. Scenic emphasis areas are mapped as part of the FLMCS based on classification criteria for visual sensitivity. Classification criteria may include factors such as number of viewers, viewing distance, viewing angle, landform, vegetation, water and uniqueness. Table 3-3 provides examples of visual sensitivities.

TABLE 3-3
Examples of Visual Sensitivities used to Map Scenic Emphasis Areas as Part of the FLMCS

Visual Sensitivity	Examples
High	Areas where state and federal regulations apply such as scenic highways and scenic waterways.
Moderate	Portions of the viewshed visible from established campgrounds, high use vistas, viewpoints along major highways, urban views, and heavily used recreation areas.

Intent

The intent of this strategy is to provide views of a wide range of managed forest settings, including areas where scenic considerations are regulated by law. Active management of state forest lands provides a unique experience where visitors can expect to view a range of forest conditions ranging from newly planted seedlings to stands of large, mature trees; management activities including thinning and regeneration harvests with leave trees, snags, and resource buffers; and natural features like streams, rivers, lakes, and waterfalls. The varied scenes experienced on state forest lands reflect the social, economic, and environmental co-benefits that come from these working forests.

~~3.2.5~~3.2.6 Forest Resource 6: Special Forest Products

Hand-picked Chantrelle mushrooms ~~*(Cantharellus formosus).*~~. Special forest products provide social and economic benefits for communities.

Special forest products are ~~those~~ non-timber products that are collected for personal and commercial uses. They include firewood and other products identified by the BOF (ORS 530.050 and 164.813; OAR 629-028). In western Oregon State forest lands, special forest products include, but are not limited to, ~~beargrass (*Xerophyllum tenax*),~~bear grass, evergreen boughs, cedar shakes, cones, ferns, firewood, moss, mushrooms, vine maple cuttings, poles, Oregon ~~grape (*Mahonia spp.*), salal (*Gaultheria shallon*),~~
grape (*Mahonia spp.*), salal (*Gaultheria shallon*), and Pacific yew ~~and Pacific yew (*Taxus brevifolia*)~~ Credit: ODF.

bark.

The special forest products industry makes an important contribution to Oregon's economy, cultural values~~,~~ (Section 3.2.3, *Cultural and Historic Resources*, for more details), and social wellbeing. The ~~quantity and quality~~types of products vary among districts. Managing special forest products as a viable, sustainable commodity program, compatible with other forest resources, provides economic and social benefits for local communities and allows the special forest products industry to adapt and serve changing needs over time.

Forest Resource, Goals, and Strategies

Goal: Special Forest Products

Provide opportunities for sustainable harvest of special forest products for ~~recreational,~~ personal~~,~~ and commercial use.

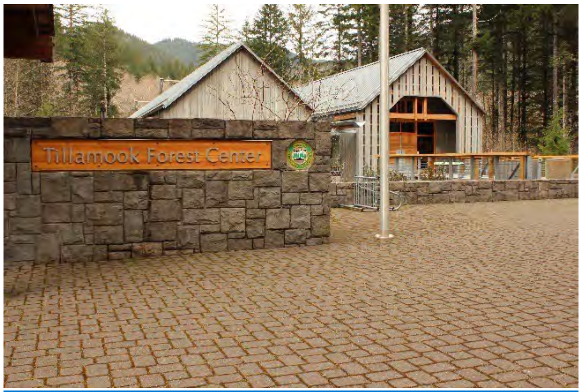
Strategy: Special Forest Products Harvest

Sell permits for sustainable commercial harvest of special forest products ~~and~~. Provide the public with information on locations and acceptable collection limits of products for personal use, consistent with other goals and the protection of forest resources.

Intent

The intent of this strategy is to provide opportunities to harvest special forest products that are compatible with other resource goals, while complying with ORS 530.050 and 164.813. The permitting process is used to guide personal or commercial users to specific areas of the forest where special forest products are available and harvest is unlikely to affect other resources (e.g., sensitive wildlife areas, campgrounds).

~~3.2.6~~3.2.7 Forest Resource 7: Mining, Agriculture, Grazing, Administrative Sites



Tillamook Forest Center is a modern education and interpretive center in the heart of the Tillamook State Forest.
Through hands-on exhibits, attractive riverside and forest trails, and educational offerings, visitors take a journey through the history of Oregon's forests, the power of wildfire and the art and science of sustainable forest management today.
Credit: ODF.

Mining, agriculture, grazing, and *administrative sites* provide direct economic benefits by generating income and revenue, and indirect social benefits by supplying education and interpretation facilities and materials for developing and maintaining the transportation network. The mineral, oil, and gas potential of western Oregon state forest lands is largely unknown. Few systematic surveys have been conducted for most commodities, and no regional geochemical studies have been conducted to define or eliminate areas of possible metal mineralization

~~[Tillamook Forest Center.]~~

~~and no regional geochemical studies have been conducted to define or eliminate areas of possible~~ ~~metal mineralization. Mineral~~Generally, except where a prior reservation exists, minerals and geothermal resources are owned by the State of Oregon and are managed jointly by ~~DSL~~the State Forester and the Department of State Lands (ORS 530.050(2) and ORS 273.551). ~~Revenues derived~~ODF's share of revenues or royalties from ~~the sale of~~ these ~~mineral~~ resources ~~are allocated~~under ORS 530.110 and 530.115 is typically distributed to the Common School Fund ~~(~~by operation of ORS 273.780~~).~~ and 273.785(4), while the counties' share of such revenues under Chapter 530 are distributed to the counties under ODF's revenue distribution statutes. Development of subsurface mineral resources may still require easements or special use permits issued by ODF and other agencies.

~~However,~~

WESTERN OREGON STATE FORESTS MANAGEMENT PLAN

ODF may use soil, clay, stone, sand, and gravel for constructing or repairing roads or other state facilities (ORS 530.050). State forest lands ~~have provided high-quality~~can provide rock for local road surfacing ~~and ballast rock. This rock~~, which is an important resource for road construction, road improvement, and road maintenance ~~of roads~~.

Although state laws permit agriculture and grazing on state forest lands if those uses are compatible with other forest resources, the topography of state forest lands is generally not suitable for most agricultural uses. Historically, under the open-range laws, all of the districts in western Oregon allowed grazing on burned or logged areas. As forests were re-established, grazing diminished. Open-range grazing ended in the early 1980s, and grazing is now almost non-existent on state forest lands.

Goal: Permit Mining, Agriculture, Grazing, Administrative Sites

Permit mining, agricultural use, development and use of administrative sites, and livestock grazing when these uses are compatible with other forest resource goals.

Strategy: Special Use Permit Evaluation

Consider mining, agricultural use, administrative sites, and livestock grazing on a case-by-case basis, such that use is not detrimental to the best interest of the state, is allowed by law, and is compatible with ODF resource management policies and plans.

~~3.1.4 Soils and Geology~~

~~**Soil composition. Dynamic processes, such as forest succession, wind, and fire affect the accumulation of organic matter and available nutrients in the soil.** Credit: ODF~~

Intent

The intent of this strategy is that proposals for uses such as mining, agriculture, grazing, and administrative sites be considered only after consultation with a staff biologist, an aquatic and riparian specialist, a land specialist, planners, and districts to ensure alignment with ORS 530.050. The purpose of the consultation is to evaluate whether these uses are compatible with other forest resource goals and with maintaining forests. Potential subclasses include Administrative Sites, Agriculture, Grazing Wildlife Forage, Easements, Energy and Minerals, or Transmission.

3.2.8 Forest Resource 8: Geology and Soils

~~siting and conditions~~Dynamic processes, such as forest succession, wind, and fire affect the accumulation of organic matter and available nutrients in the soil.

Credit: ODF.

The landscape upon which forest management ~~of any scale~~ occurs is ~~controlled~~affected by ~~a~~ historic geologic ~~process~~processes and their resulting *formations*. Volcanic activity, sediment deposition, *uplift*, soil formation and erosion are the driving forces that have given western Oregon its unique terrain. The soils~~—the most visible of the~~ , which are derived from geologic and biological materials~~—are~~ and form the bedding from which Oregon's forests grow ~~providing~~, provide many ~~ecosystem services key to delivering all three types of GPV. For example, timber and other plant community production is determined largely by the soil characteristics, slope aspect, and access, as well as precipitation. Road and other recreation infrastructure~~ ecosystem services that are key to maintaining resilient forests. Tree and other plant community productivity is determined mainly by soil characteristics and soil health. Road and recreation infrastructure depend on soil and topographic

Forest Resource, Goals, and Strategies

characteristics for stability~~,~~ and seasonal accessibility~~, and visual resource offerings.~~. Inoperable areas ~~and landslide-prone areas, while less opportune for vegetation harvest~~that are not available for active management due to unstable slope characteristics, provide other ecosystem functions such as wildlife habitat and carbon storage. ~~Soils and near-surface formations are moveable parts of the landscape. Landslides, part of the natural erosive process, are a testament to the changing nature of the terrain and can affect, or be affected by, forest management.~~

Geology

~~Volcanic activity below the surface of the ocean and offshore of Oregon, in conjunction with deposition of marine sediments derived from volcanoes in the Cascades Range to the east, produced a submarine assemblage of volcanic rocks layered with marine siltstones, sandstones, and mudstones.~~

~~Compression by *tectonic* activity uplifted and moved this assemblage of material east, where it added to the ancient Oregon coastline. This uplift occurred later in the northwestern-most portion of~~ The planning area ~~(north of the present-day Tillamook Highlands) and, as a result, that area received *deposition* of much younger marine sediments than other areas.~~

~~Concurrently, huge volumes of fluid basalt (flood basalts)~~includes a diverse mix of terrain and soil types owing to a variety of geologic processes over time. Submarine volcanic activity, deposition of marine siltstones, sandstones and mudstones, and uplifting have resulted in mountainous terrain across most of the planning area. In addition, fluid basalts from volcanic activity further east flowed down the ancestral channel of the Columbia River Gorge~~,~~ into the ~~developing low area~~lower areas of the Willamette Valley~~,~~ to the margins of the present ~~margin of the~~ coastline throughout much of the northern ~~portion of the planning area. These flood basalts seem to be absent in the area of the Tillamook Highlands and further south, indicating that those areas were probably topographically higher at the time.~~

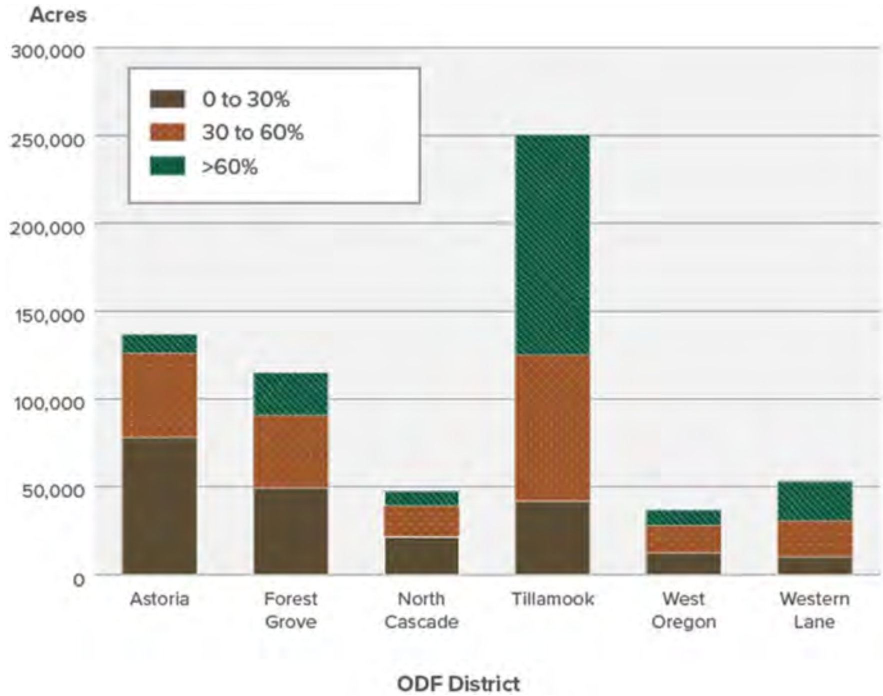
area of the planning area. Erosion ~~has modified this uplifted terrain to today's highly *dissected* topography. Landslides, along with down-cutting and transport of sediment by streams fueled by~~from heavy precipitation~~, produced the~~ and landslides transported large amounts of sedimentary material downstream, resulting in the deeply incised and complex topography that is the present-day Oregon Coast Range. ~~Concurrent tectonic activity produced periodic large~~ Periodic earthquakes ~~, which may have~~ triggered many ~~of the largest, most~~large, deep-seated ~~ancient~~ landslides ~~observable in the planning~~that exist throughout this area today. ~~Large swaths of land in the northern portion of the planning area were extensively altered by these landslides.~~

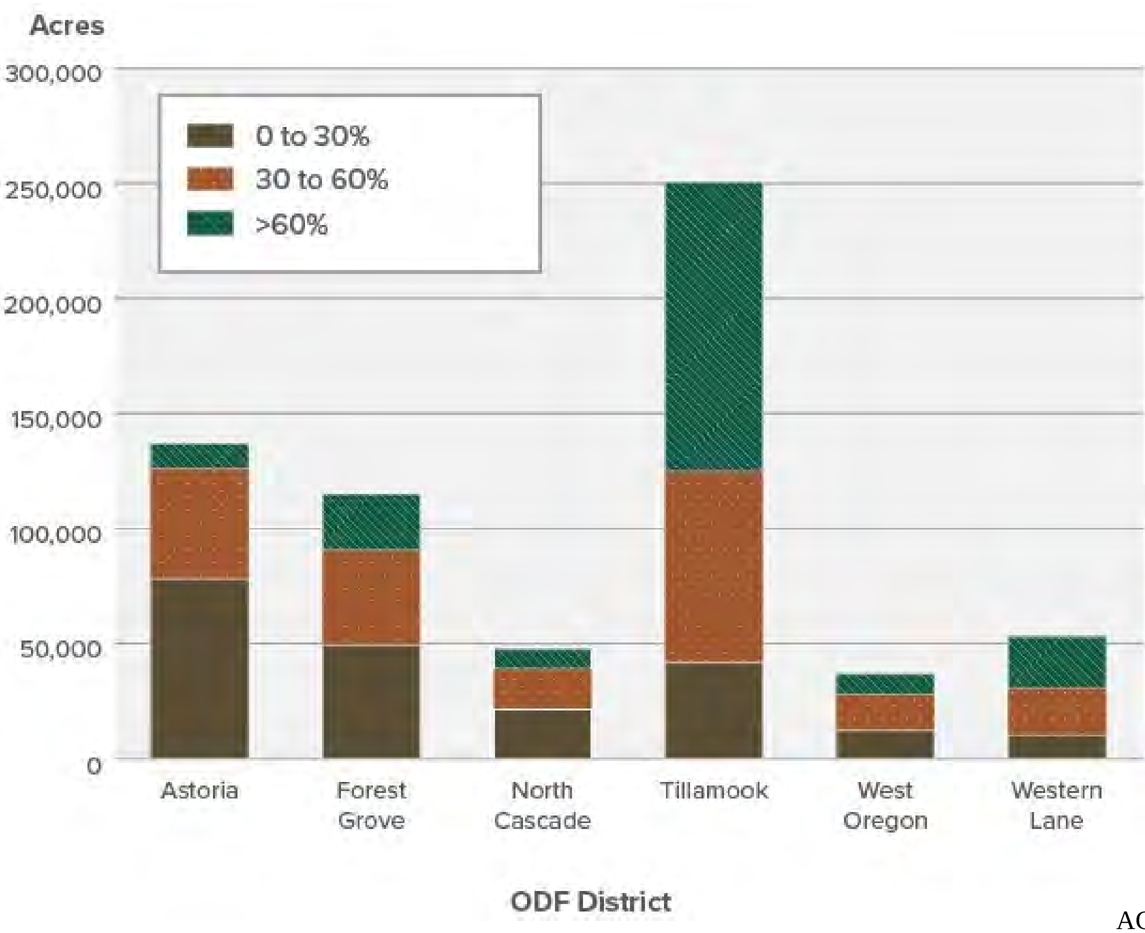
Concurrent with ~~erosion along~~ the shaping of coastal mountains, volcanism formed the high Cascade ~~volcanic~~ mountains ~~were formed~~ along the eastern ~~margin~~edge of the planning area. ~~After volcanism, major changes to~~Following their formation, the topography ~~were not only affected~~was further shaped by erosion processes similar to the coastal mountains, but also by ~~glaciation~~the formation and subsequent receding of glaciers.

The net effect of geology, erosion, and climate is apparent in the distribution of slope steepness across the planning area. Nearly 33% of state forest lands have a slope greater than 60% (Figure 3-~~7).~~5). Steeper slopes are generally more prone to landslides as a result of harvest and road construction, more difficult to safely operate on, and can be less productive for tree growth in general. Where steep slopes are prevalent, logging and building access roads is more costly, and some areas are inoperable and excluded from timber harvest planning.

FIGURE 3-~~7~~5

Slope Steepness across the Planning Area. The highest percentage of steeper slopes in the planning area are ~~on~~in the Tillamook and Western Lane Districts.





Source: Oregon Lidar Consortium 2007–2020.

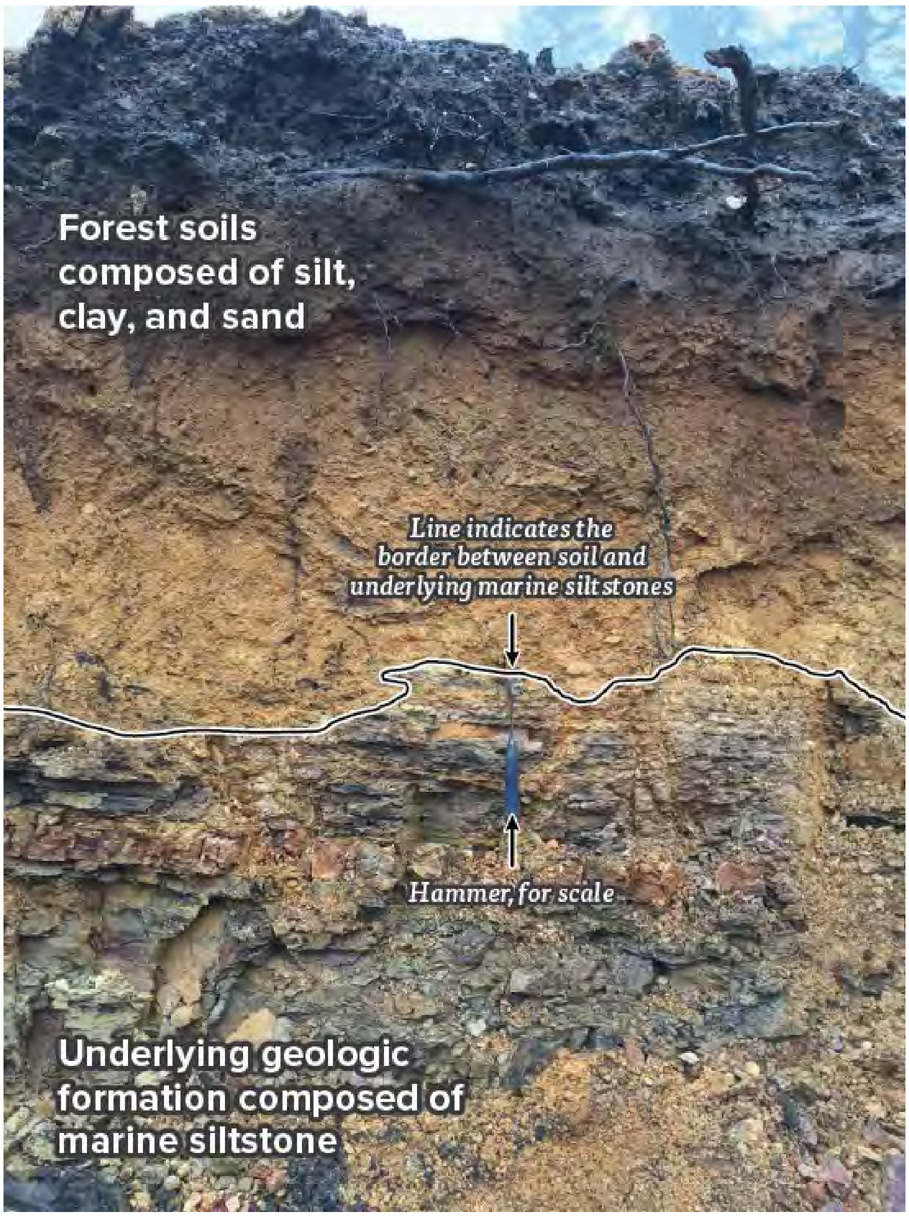
Soils

There are three general soil types: those formed from underlying volcanic formations, those from underlying marine formations, and those from alluvium (unconsolidated materials deposited by streams and rivers). Alluvial soils are a very minor portion of planning area soils and are wholly contained with RCAs. Soils are almost always thinner along ridgetops and thicker in *swales* due to faster and deeper weathering of underlying formations, which are wetter for longer periods, and gradual downslope soil movement, which increases soil depth in low areas. All soils contain organic and biological components in addition to ~~the mineral fraction described below~~minerals.

Soils formed on volcanic formations in the planning area are classed predominantly as gravels~~ with some sand and very few silt-sized materials~~. These soils are very well drained, often occur on the steepest slopes in the planning area, and tend to be thinner than soils formed from marine formations or alluvium. The highest concentration of volcanic soils is in the Tillamook Highlands, the Cascade foothills, and near the Columbia River. While these soils are still suitable for growing trees, they tend to be less productive than deeper soils that store more water and nutrients.

Soils formed on underlying marine sedimentary formations are predominantly silts, sands, and clays with minor amounts of gravel~~.~~ (Figure 3-6). These occur in many areas outside the Tillamook Highlands. These soils are well drained on hillslopes but can be wet most of the year in low-lying areas. Water permeates through these ~~fine-grained~~ soils much slower than the volcanic soils ~~owing. They occur on relatively flat locations in the planning area~~due to their fine-grained texture.
These soils tend to be highly productive, due their retention of water and nutrients.

FIGURE 3-6. Forest Soils Developed on Marine Siltstones in Less Rugged Coastal Areas. Past geologic processes create many different layers in the soil, which contribute to different forest types and management actions.

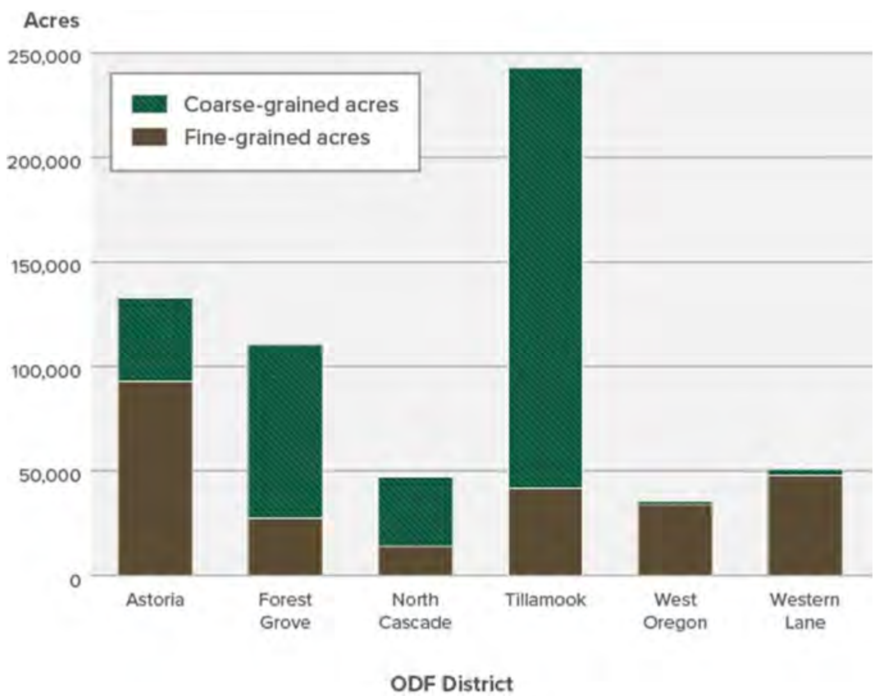


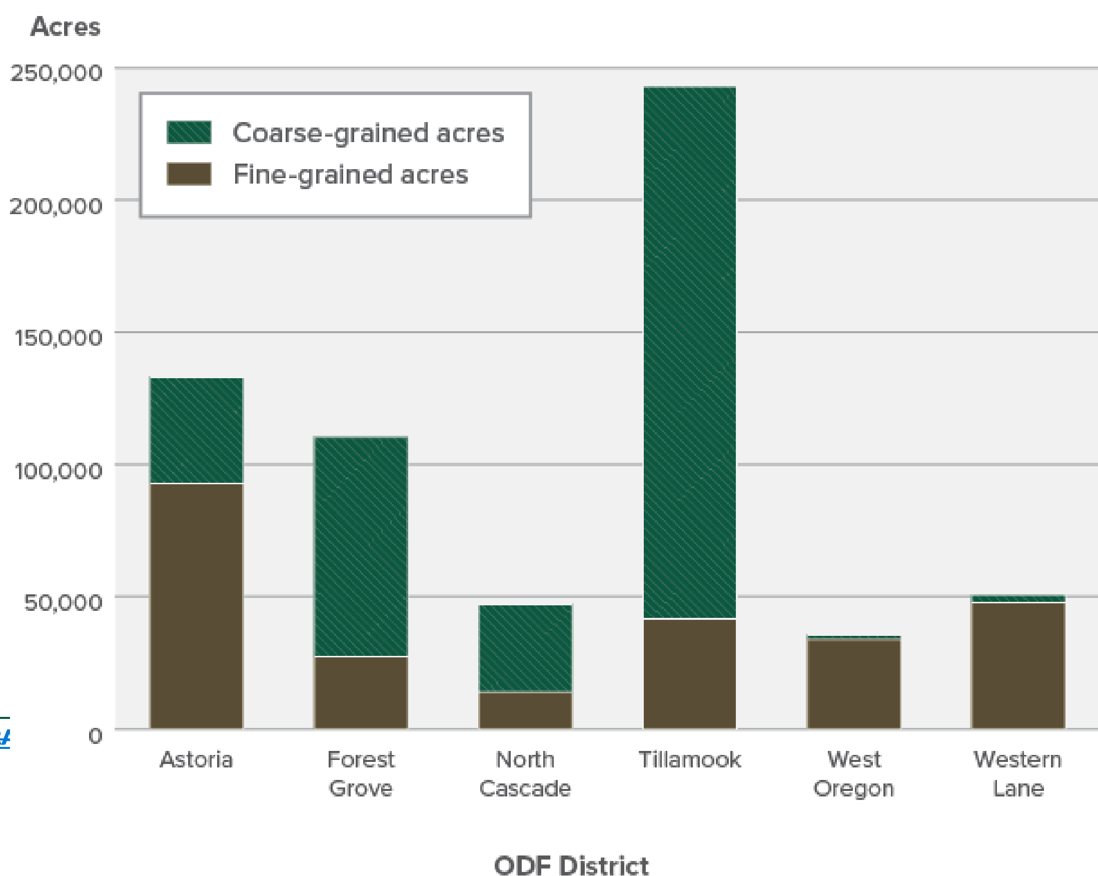
Source: ODF.

Due to the influence of ancient volcanism, the Forest Grove, North Cascade, and Tillamook Districts have predominantly coarse-grained soils, while the remaining districts' soils are fine-grained and were derived from softer marine sediments (Figure 3-~~8~~7).

FIGURE 3-~~8~~7

Fine- and Coarse-Grained Soils by District. The Tillamook District has the highest proportion of coarse-grained soils in the planning area.





Source: ODF analysis of underlying geology in Oregon Department of Geology and Mineral Industries (DOGAMI) 2015.

Some locations have the ability to grow timber more easily than others. Forest site productivity is controlled by a complex relationship among topography, slope, aspect, soil depth, porosity, biology, and the availability of nutrients in the soil. Dynamic processes, such as forest succession, wind, and fire affect the accumulation of organic matter ~~and available~~ nutrients in the soil. The amount and *composition* of organic matter affect soil fertility. Small materials such as needles and twigs have the highest concentration of nitrogen. Large materials such as downed trees influence soil ~~nutrient availability~~nutrients and soil moisture and can stabilize soils on moderate and steep slopes. *Downed wood* is an important component of forest soils, providing nutrients, habitat, carbon storage, and soil structure that promote both storage and transport of water. Retention standards for downed wood during timber harvest activities are detailed in the WOSF HCP.

~~Most of the Coast Range soils vary from “highly productive” (Site Class I) for Douglas-fir to “limited in potential productivity” (low Site Class III). However, there are Site Class IV and V soils, many of which are located on or near steep rocky outcrops. Soils in the western Cascades vary from high productivity~~

~~(Site Class II) to Site Class V for both Douglas-fir and western hemlock. *Site class* productivity depends largely on soil profile depth, gravel content, topographic position, and to some extent, soil parent material. However, in general, the parent materials of these soils all provide a potential basis for high productivity. Site class productivity has a more complex genesis than a simple relationship to geology and topography.~~

While forests in the Oregon Coast Range are widely recognized as some of the most productive in the world, there is local variation, based on the attributes discussed above. Productivity of locations along the Western Cascades can be slightly lower. The most productive sites have deeper, nutrient-rich soils, which remain moist during dry periods. The least productive sites occur on and near steep rock outcrops that lack organic nutrients and dry out quickly.

Slope Stability

~~All types of~~ Soil movement ~~occur~~, from gradual creep to landslides, occurs in both managed and unmanaged forests. Landslides ~~occur in both mature forest and recently harvested areas, sometimes in conjunction with other anthropogenic influences such as forest roads. Slides can deliver~~are a natural part of ecosystem processes, delivering woody debris along with gravels, sands, and silt-sized material to streams. These organic and inorganic components can contribute positively to the aquatic ecosystem.

~~Landslides occur when a mass of soil, rock, and debris moves downward, generally together, at similar rates. In forest management, it is useful to discuss two main categories: *shallow rapidly moving landslides* and *slow deep-seated landslides*. Examples of *mass wasting processes* of rapid and slow-moving~~ Landslides are ~~apparent across all areas, in all ownerships and management jurisdictions in northwest Oregon. Slides are the~~a dominant erosional process in the planning area~~.~~

~~Shallow rapidly moving landslides usually only involve soils and remove them entirely, along with the vegetation they support, from a steep slope. Underlying geologic formations usually form the base of these slides. Once the soil begins to move, the slide mass rapidly accelerates downslope, often entering a stream and traveling through the stream gully for thousands of feet. As the debris passes it scours soil and entrains boulders and woody debris, increasing in volume. These slides impart large forces when moving and can destroy, and sometimes remove, structures such as homes, concrete road barriers, and guardrails.~~

~~These slides then deposit material where the stream gradient becomes less steep, where the gully widens, or where a stream junction becomes too sharp for the *debris torrent* to make a turn. Often, the larger components of the resulting debris deposit may settle permanently due to the size of the host stream. In larger streams or rivers, the debris can shift and remobilize during subsequent high-water events, which will scatter the debris downstream over time.~~

~~Shallow, rapidly moving landslides can be caused or affected by forest management activities. Poor road-building practices with a major influence on *slope stability* include placement of fills on steep~~

~~slopes, ill-conceived *culvert* placement, poor maintenance, and failure to recognize and plan for landslide during road alignment planning and.~~, and timber harvest and road-building activities can increase the rate of occurrence of ~~these types of slides.~~landslides compared to unmanaged areas. This makes management around potential landslide areas a key focus for land managers. For a limited period after canopy removal, the frequency of slides increases in western Oregon (Turner et al. 2010; Robison et al. 1999). ~~Data from landslide inventories after the major precipitation events in 1996 (Table 3-2) illustrate the effect~~Slides that initiate and move through harvested terrain, may not deliver the same component of beneficial woody debris important for the aquatic system, depending on the amount of tree retention along the debris flow track during harvest. To mitigate this risk, ODF assesses potential landslide areas during the planning of management activities and applies standards described in the WOSF HCP to both reduce the risk of slope failure and ensure that landslides that may occur deliver woody debris to the aquatic system. Table 3-4 shows the landslide density associated with 100-year storm intensity as a function of stand age and slope ~~on landslides. Background landslide density can be inferred by examining data for the unmanaged stands (>100 years old).~~.

~~Between 13 and 26 slides per square mile occurred in the largest storms in stands over 100 years old.~~

~~Comparing unmanaged stands to those in the <10-year-old age class implies that slide densities can increase on recently harvested steep terrain.~~

TABLE 3-~~2~~4
Landslide Density Associated with 100-Year Storm Intensity as a Function of Stand Age and Slope. Both the age of a stand and the slope steepness affect the likelihood of slide initiation during large storms.

Stand Age (years)	Landslide Density per Square Mile (steepest slopes)	Landslide Density per Square Mile (all slopes)
0 to 9	51~~.2~~	~~12.9~~13
10 to 30	22~~.4~~	7~~.2~~
31 to 100	19~~.2~~	~~6.5~~7
Greater than 100	26~~.2~~	~~12.8~~13

Source: Robison et al. 1999.

~~The second type of landslide—slow-moving, deep-seated—can shift portions of the ground surface up to 20 feet each year. These phenomena commonly move 1,000 to tens of thousands of cubic yards of material, slowly changing drainage patterns, destroying road grades, and in some cases deforesting large areas.~~

Within the planning area there are also hundreds of~~ examples of these~~ deep-seated landslides, a few of which are active and many more that are prehistoric and presently not moving. Almost all of these examples ~~are~~were caused naturally~~ caused~~, many probably initiated by large ~~off-shore~~offshore earthquakes. However, some forest practices can affect the initiation and movement of these slides. ~~These practices include large topographic modification such as quarrying, *aggregate* stockpiling, placement of large fills, and construction of large road cuts, especially along the bottom edges of these features. Since these practices are relatively rare, the potential for destabilization of slopes and initiation of a deep-seated slide is low in northwest Oregon forests.~~These practices include large topographic modifications such as quarrying and stockpiling rock and creating large slope cuts or placing large amounts of fill material during road construction, especially along the bottom edges of these landslides. ODF mitigates these risks by assessing the landscape for the presence of deep-seated landslides and applies BMPs to avoid practices that might trigger their movement.

Goal: Soil Health

Maintain natural soil processes, protect soils from damage, and increase soil carbon and other nutrients.

Strategy: Soil Protection

Follow BMPs during forest operations, such as road building, timber harvesting, trail construction, and site preparation to ensure protection of soils against erosion and loss of organic materials and soil structure.

~~3.1.5 Carbon~~

~~**Growing trees sequester carbon. Forests provide long-term storage of carbon in trees, snags, downed wood, vegetation, and soils.**~~
~~Credit: ODF~~

a. Use BMPs to protect against erosion and loss of soil structure during harvesting, site preparation, and road and trail construction, improvement, and maintenance. Evaluate and refine the effectiveness of BMPs through adaptive management.

b. Implement downed wood, snag, and leave-tree retention practices as specified in the WOSF HCP to recruit organic content into soils across emphasis areas.

Intent

The intent of this strategy is to plan and implement management activities that protect and maintain the organic content of soils on a landscape scale and to increase carbon, water, and nutrient storage. Management activities protect against erosion and loss of soil structure by using BMPs during harvesting, site preparation, and road and trail construction, improvement, and maintenance. The effectiveness of BMPs is evaluated and refined through adaptive management.

This strategy applies across emphasis areas. For example, in General Stewardship areas, downed wood, snag, and leave-tree retention practices contribute to recruitment of organic content into soils as those materials break down over time. In areas with an environmental emphasis, stands remain largely intact with harvest prescriptions designed to increase the growth of large trees that will eventually die and decay resulting in continual recruitment of organic material into the soil. In HCAs, passive management plays a role through natural disturbances such as insect and disease processes, windthrow, and mass-wasting along with regular trees growth and senesce. RCAs also build soil stability through continued recruitment of large woody debris, mostly through passive management, as trees in these buffer zones grow large and slowly senesce over time.

Goal: Slope Stability

Minimize and mitigate negative impacts on public safety, transportation infrastructure, and aquatic resources from landslides that may be triggered by management activities.

Strategy: Landslide Evaluation and Protections

Use the planning and assessment tools described under the Transportation System goal and the WOSF HCP strategies as described under the Functional Aquatic and Riparian Habitat Resources FMP goal.

Intent

The intent of this strategy is to reduce risks to people and resources associated with landslides while supporting beneficial ecological outcomes in appropriate scenarios.

3.2.9 Forest Resource 9: Carbon

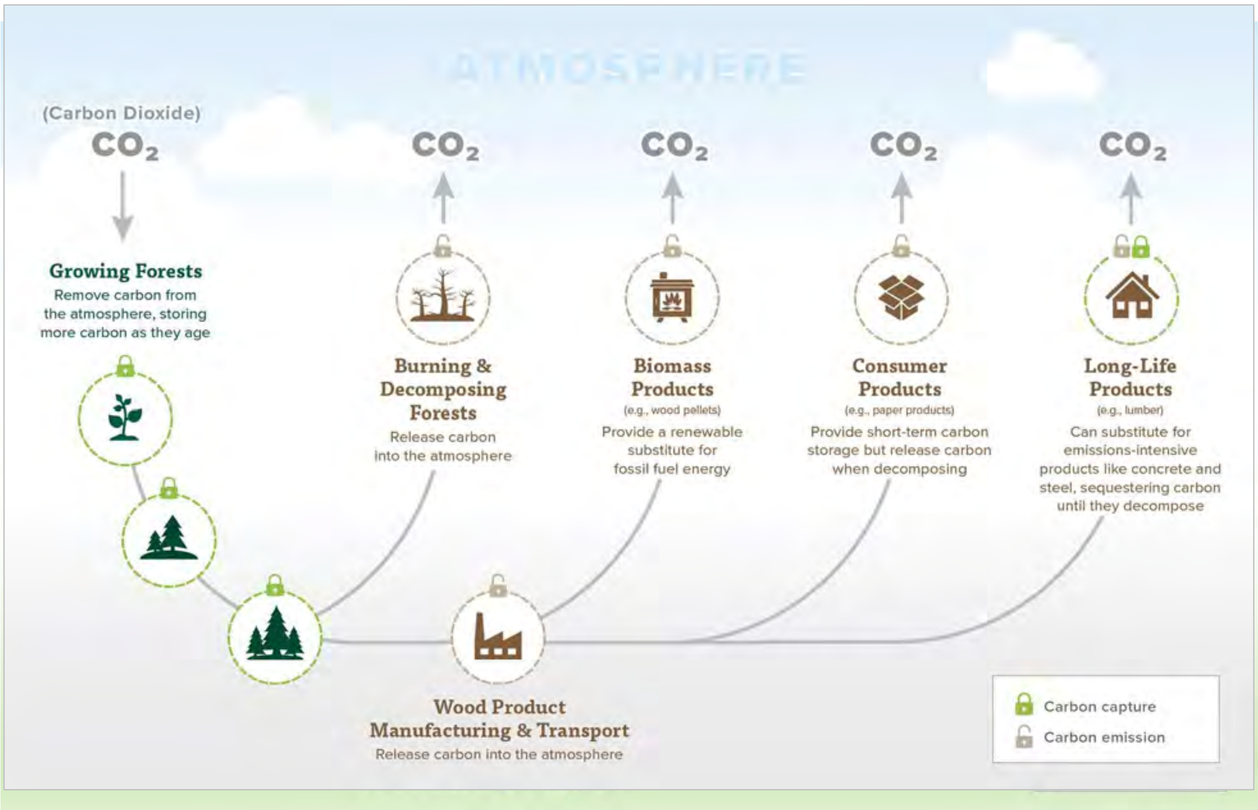
Growing trees sequester carbon. Forests provide long-term storage of carbon in trees, snags, downed wood, vegetation, and soils.
Credit: ODF.

Forests provide carbon storage and sequestration as ecosystem services. Carbon storage and sequestration help mitigate climate change by reducing the amount of greenhouse gases in the atmosphere. Greenhouse gas mitigation supports ~~sustainable GPV delivery~~resilient forest ecosystems by assisting with slowing the pace of climate change ~~to allow~~and allowing systems ~~time~~ to adapt to climate change consequences, such as ~~increased severity and frequency of drought~~droughts, extreme heat, wildfire, insect and disease outbreaks, and storms ~~that can otherwise damage timber, other plants, habitats, drinking water quality and quantity, air quality, infrastructure, and diminish human health and safety~~.

Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils~~. Areas managed as HCAs would be long-term stores for carbon dioxide. Areas of land managed for timber harvest have trees that actively sequester carbon while they grow and shift to static carbon storage as trees are harvested and transformed to wood products. Timber harvest will result in a portion of sequestered carbon released back into the atmosphere through burning or decay of harvest residuals and harvest operations~~ (Figure 3-~~9). Carbon stored in wood products can serve as short-term or longer-term sinks depending on their use and longevity. Harvesting trees reduces the *carbon sequestration* capacity of the forest, but replanting seeds and seedlings after harvest maintains a landscape of actively growing trees to again act as carbon sinks as they age.~~8).

Forests in the Oregon Coast Range and Western Cascades have the capacity to accumulate some of the highest densities of carbon on Earth through their productivity~~. *Forest carbon* is distributed among different *carbon pools*, of which~~ (Keith et al 2009). *Live trees* ~~is~~are the largest store of carbon (Table 3-5) and the component most affected by management ~~(Table 3-3).~~via timber harvest and reforestation.

FIGURE 3-~~9~~8
Paths of the Forest Carbon Cycle. Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils.



Source: **ODF.**

TABLE 3-~~3~~5
Forest Carbon Pools. Approximate percentage of carbon stored in each pool on state forest lands in the Oregon Coast Range.

Forest Carbon Pools	Description	Percentage [a]
Live trees	Roots, bole, branches, bark, and foliage of live trees	44.8%
Standing dead trees	Roots, bole, branches, and bark of snags	2.5%
Fallen dead trees	Logs and large branches lying on the forest floor, larger than 3 inches diameter	6.6%
Forest floor	Litter, duff, and low vegetation	2.8%
Soil	Organic material, excluding coarse roots	43.3%

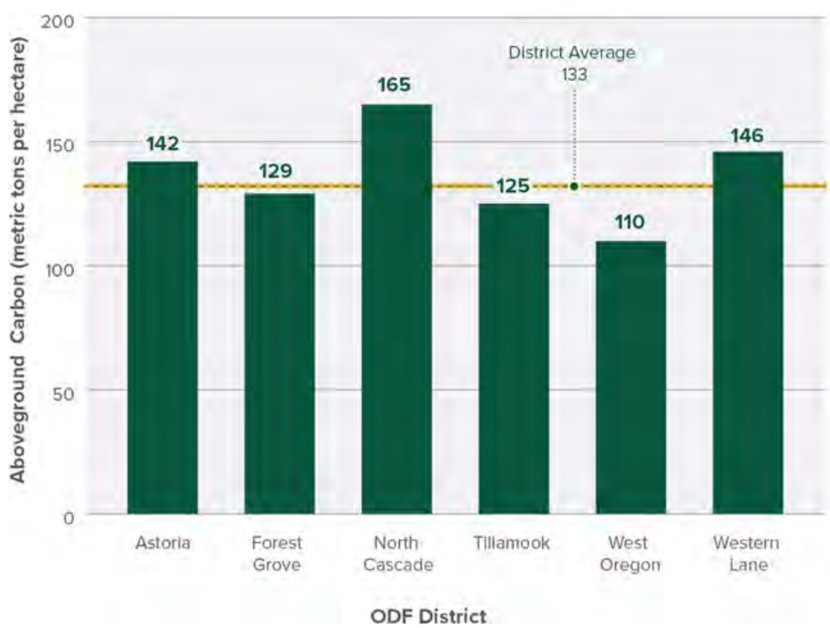
[a] Percentage ~~includes some~~calculation is from Forest Inventory and Analysis plots on ODF and other state-owned lands ~~outside of ODF jurisdiction.~~ in the Oregon Coast Range.

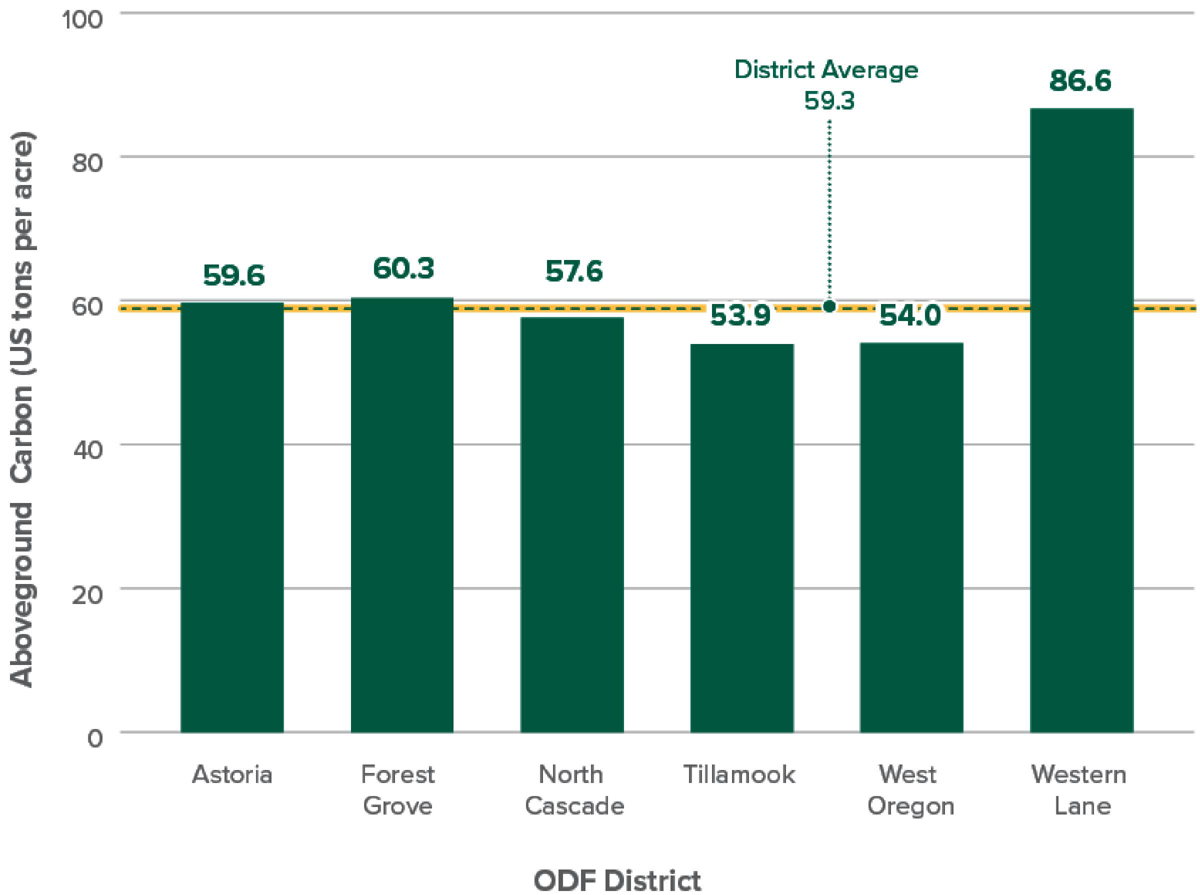
Source: Christensen et al. 2019

Forests continue to sequester carbon as trees grow. ~~State forest lands have~~Western Oregon state forests store an average of ~~132.5 metric~~
59.3 tons of carbon per acre aboveground ~~carbon per hectare (mT/ha) stored~~ in live trees. Estimates of average aboveground carbon storage varies by district due to stand types, ecoregions, and management history (Figure 3-~~10~~9).

~~Strategies for improving carbon storage could include older stands in HCAs and RCAs, and encouraging long-lived wood products, restoring underproductive stands, or treating harvest residuals differently. Across the landscape, *conservation areas* will sequester and store a substantial amount of carbon in the forest. In contrast, other areas have a production emphasis and are actively managed for wood product production, which sequester carbon as the forest regenerates. Restoring underproductive stands and treating harvest residuals differently can also increase carbon storage. These silvicultural strategies will interact with other forest resource goals through co-benefits and trade-offs, which are evaluated during implementation planning and adaptive management. Ecological silviculture practices that can be employed are planting alternative tree species, planting in alternative planting spaces and densities, planting multiple species, to increase the adaptability under changing climate, and maintaining sustainable forests that serve to sequester carbon.~~

FIGURE 3-~~10~~9
Estimated Average Aboveground Carbon in ~~Woody Biomass~~Live Trees across ODF Districts.
Data are based on the ~~2020~~2022 Forest Inventory and Analysis ~~Plots~~estimate on western Oregon state forests.





Note: Some data in this figure were collected prior to the 2020 Labor Day fires~~.~~, estimated from plots measured in 2013–2022.
Source: ~~ODF 2022b~~USFS 2024.

Goal: Carbon Sequestration and Storage

Contribute to climate change mitigation through carbon sequestration and storage on state forest lands and ~~carbon storage~~ in harvested wood products.

Strategy: Long-term Carbon Storage

Implement ~~silviculture treatments and~~ management ~~actions~~activities that improve long-term carbon storage~~. Evaluate proposed actions~~ in the forest and in harvested wood products.

a. Consider carbon sequestration as part of IP development. This can be done through modeling carbon processes in forest activity planning, restoring underproductive timber stands, and passively managing forests with ~~respect to~~high carbon storage ~~relative~~potential in HCAs and RCAs.

~~a.~~b. Include management options to promote adaptation to ~~baseline state forest land carbon inventory~~climate change in the management approach (Chapter 2, *Management Approach*, and Section 3.1.3, *Forest Resilience*). This includes managing stands to withstand drought and disturbances, maintain climate-adapted trees, and provide continuity of ecosystem services as the climate warms.

Intent

In alignment with the CCCP, the intent of this strategy is to ~~consider~~ promote climate change mitigation by integrating carbon sequestration and long-term carbon storage ~~impacts and benefits in the decision process in concert with other goals. Some areas of the forest will see limited or no harvest or timber management,~~ with other resource goals and strategies. Areas of land managed for timber production contain both trees that actively sequester and store carbon while they are growing, as well as trees that continue to store carbon when they are manufactured into wood products. Timber harvest results in a portion of sequestered carbon released back into the atmosphere through burning of fossil fuels during harvest operations and burning or decay of slash.

Carbon stored in wood products can serve as short-term or longer-term storage depending on their use and longevity. Harvesting trees reduces carbon storage in the forest in the short term, but reforestation after harvest maintains a landscape of actively growing trees to sequester and store carbon as they age. HCAs and RCAs can also serve as long-term stores for carbon as a co-benefit of managing for late-seral forest habitat conditions.

Strategy: Carbon Monitoring and Markets

Model the impact of management on carbon sequestration and storage in forest planning, monitor carbon pools through time, and explore additional potential revenue sources from carbon markets.

a. Forecast and monitor carbon sequestration and storage.

b. Where compatible with other forest resource goals, participate in carbon offset markets to diversify revenue streams. Share revenues derived from ODF participation in carbon offset markets or other carbon finance products with county partners pursuant to ORS 530.110, as described in the *Timber Management* section.

Intent

The intent of this strategy is to have predicted and monitored carbon sequestration and storage as a key component of state forests' inventory to inform forest planning and report the long-term carbon storage in the forest and harvested wood products. Participation in carbon markets or exploring other carbon finance products can help diversify revenue sources for state forests management and provide additional revenue to counties and local taxing districts while supporting many other ecosystem services (e.g., ~~HCAs, RCAs, and inoperable areas. Forest managers make decisions on silviculture treatments and the timing of harvest to best achieve a suite of goals and objectives.~~air quality, wildlife habitat).

~~3.2.7~~3.2.10 Forest Resource 10: Air Quality

A healthy and productive forest ecosystem provides clean air, which is an important ecosystem service that supports the health and ~~safety~~wellbeing of ~~affected communities~~Oregonians. In ~~addition~~contrast, if air quality is poor, ~~tourists may delay or cancel their visits, which could have~~ this has a negative impact on ~~the tourism economy in~~health, safety, and local ~~communities.~~

and state economies. Wildfires and *prescribed burns* can adversely affect air quality. Advanced planning and consideration of best burning practices during prescribed burns protect air quality and the associated health risks to the public.

Air quality is regulated under the federal *Clean Air Act*, the primary law regulating air quality. Under the law, the U.S. Environmental Protection Agency (EPA) sets the National Ambient Air Quality Standards (NAAQS). In Oregon, the Oregon Department of Environmental Quality (DEQ) develops and carries out the *State of Oregon Clean Air Act Implementation Plan* (OAR 340-200-0040) to meet the NAAQS. This State Implementation Plan also includes the Oregon Regional Haze Program (OAR 340-223), which protects visibility in *Class I areas*. Class I areas include national parks and certain wilderness areas (OAR 629-048-0005(5)).

Timber harvest results in a large quantity of ~~debris material, such as limbs,~~

~~tops, and non-merchantable material.~~slash.

This material is an important pool of carbon, serves as an input of organic matter to ~~humus and~~ soil, and provides habitat for a variety of organisms. In some cases, this leftover slash can be a barrier to tree planting, ~~be a~~increase fire ~~hazard~~risk, and increase the potential for pest infestations (Buhl et al. 2021). Where the quantity and ~~spatial~~ distribution of ~~residual debris poses enough of an impediment to achieving management goals, prescribed burns may be used as a tool to remove this material. This burning can affect air quality and is regulated under the federal *Clean Air Act*, the primary law regulating air quality.~~slash impedes

~~Under the law, the U.S. Environmental Protection Agency (EPA)~~

~~sets the National Ambient Air Quality Standards (NAAQS).~~

~~In Oregon, the Oregon Department of Environmental Quality (DEQ) develops and carries out programs to meet the NAAQS. Two air quality plans affect forest management directly: the *Oregon Smoke Management Plan* (OAR 629-048) and *Oregon Clean Air Act Implementation Plan* (OAR 340-200-0040). The *Oregon Smoke Management Plan* is intended to comply with the *Oregon Visibility Protection Plan* (OAR 340-200-0040 (5.2)).~~

~~The *Oregon Smoke Management Plan*~~

Mount Jefferson as seen from the Santiam State Forest on a high visibility day.
Credit: ODF.

achieving management goals, prescribed burns may be used as a tool to mitigate the impacts of slash accumulation.

ODF regulates prescribed burning on all forest lands in Oregon, including federal, state, and privately owned lands~~.~~ through the *Oregon Smoke Management Plan* (OAR 629-048). Some of its ~~objectives are to protect public health,~~

objectives are to protect public health, minimize smoke intrusions into designated population areas, reduce emissions from prescribed burning in western Oregon, and ~~protect visibility in *Class I areas*. Class I areas include national parks and certain wilderness areas (OAR 629-048-0005(5)).~~comply with state and federal air quality and visibility requirements.

Current annual levels of burning on state forest lands represent less than 10% of the total burning annually on all ownerships west of the Cascade Crest. Prescribed burning on state forest lands is estimated to contribute much less than 1% of the air pollution in western Oregon cities (ODF ~~2021~~2021b).

~~When burning is used on state forest lands, slash is typically piled on a landing and burned. This results in less burning overall and more woody debris left in *harvest units*. For units that are burned, the prescribed burns are generally scheduled in the fall.~~

Goal: Air Quality

Maintain and protect healthy air quality.

Strategy: Smoke Management

Follow ~~OAR 629-048 on~~ Smoke Management rules (OAR 629-048) and ~~*Air Quality Control Program*~~the *State ~~of Oregon Clean Air Act~~ Implementation Plan* (DEQ ~~2022a~~2022), which includes planning guidance, visibility objectives, and ~~best practices~~BMPs, as well as information on regulated and sensitive areas and special protection zones to reduce smoke and smoke-related consequences.

Intent

The intent of this strategy is to minimize the public's health risks related to smoke from prescribed burning by encouraging the minimization of emissions and the avoidance of smoke intrusions.

Strategy: ~~Reduce~~Slash Management and Alternative Burning Practices

~~Dispose of~~Treat slash and debris in ~~other~~ manners other than burning, when feasible.

a. Retain slash in harvest units where fire risk is low and complimentary to other forest resource goals (e.g., Soil Health)

~~a.~~b. Explore cost-effective alternatives to burning, such as selling to small-diameter timber markets, using high-efficiency incinerators, and exploring methods of converting slash to other uses, such as biofuels or *biochar*.

Intent

The intent of this strategy is to minimize the public's health risks from prescribed burning by minimizing emissions and avoiding smoke intrusions.

~~3.2.8~~3.2.11 Forest Resource 11: Aquatic and Riparian Resources

Juvenile coho salmon (*Oncorhynchus kisutch*). Aquatic and riparian ecosystems provide essential habitat and resources for many species, including food and drinking water for humans *(Homo sapiens)*.

~~Management of~~ Resilient and properly functioning aquatic and riparian ~~resources contributes to a sustainable forest ecosystem that protects ecological processes and ecosystem services, provides resilience to climate change, and serves~~ecosystems provide many ~~communities. Aquatic and riparian processes~~ co-benefits that support ~~all three types of~~ GPV. In addition to ~~the~~ environmental ~~benefit of providing life-sustaining habitat to many species, major~~benefits, social activities~~,~~ such as fishing, swimming, and sightseeing depend on healthy, functioning waterways. For example, the commercial and recreational fishing industry, which is a significant component of Oregon's regional economy, relies on healthy rivers and

Credit: Wild Salmon Center.

~~sightseeing, depend on these resources in the planning area. Whereas downstream, the commercial fishing industry, which is a major component of the regional economy, relies on spawning habitat and cold water sources, originating in headwater~~ streams ~~such as those found in the planning area.~~. Properly functioning aquatic and riparian systems also protect drinking water quality~~,~~, and quantity~~, and reduce flood risk to downstream infrastructure~~ by reducing erosion,

~~Forest Resources, Goals, and Strategies~~

~~attenuating peakflows, and providing shade, thereby sustaining additional social and economic benefits associated with access and public health.~~ regulating air and stream temperatures, and replenishing groundwater supplies. Aquatic resources include, but are not limited to, surface waters ~~such as~~

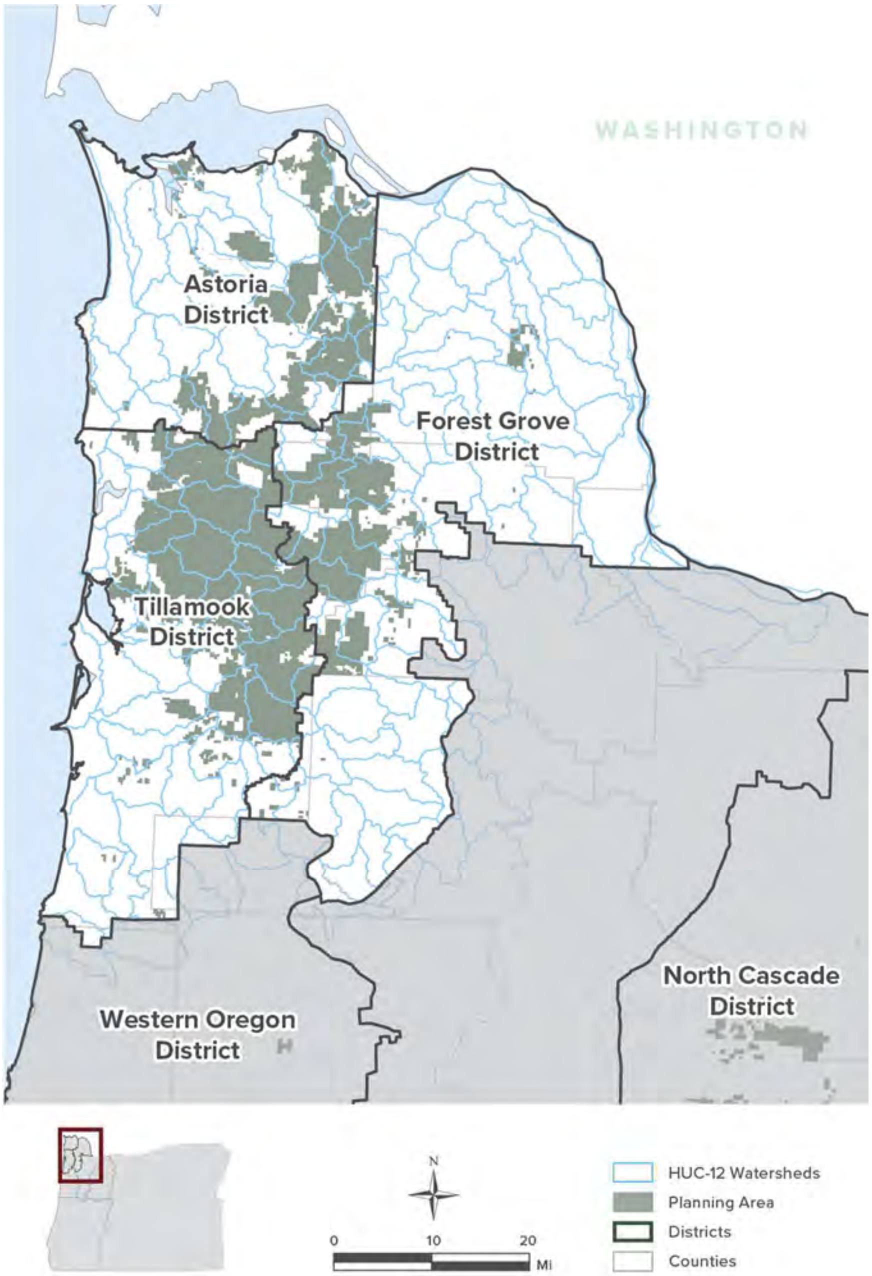
rivers, streams, lakes, springs, ~~seeps,~~ and *wetlands*, and subsurface waters contained in aquifers or subsoils. ~~Aquatic ecosystems interact closely with the surrounding terrestrial systems, both at the landscape scale and at the scale of *stream reaches* and~~ Riparian areas~~. The *riparian area* is the zone of influence~~ are transitional zones between ~~the~~ terrestrial and aquatic environments~~.~~ where the

~~In headwater streams, the riparian zone is particularly important as streams are narrow and riparian vegetation contributes strongly to shading and terrestrial organic inputs to the food web. From headwaters to downstream, riparian forests influence water temperature, filter contaminants (sediments, etc.), and provide inputs like woody debris and fine and course sediments that improve structure of habitat for some species and reduce erosion and downstream flood risk. Conversely, the structure and *composition* of riparian forests can be influenced by the aquatic environment, such as the influence of floods on forest dynamics and the *deposition* or erosion of material in the floodplain. Major disturbance events, such as floods and landslides, are natural processes that can add key elements, such as wood, boulders, and gravel, that maintain stream ecosystems. With climate change, stream temperature, floods, and droughts are expected to increase. A functioning riparian area increases the streams' adaptive capacity to deliver the multitude of ecosystem services derived from forest waterbodies. Therefore, the health of the aquatic system depends on forest management practices that recognize, maintain, and enhance the functions and processes that compose these terrestrial-aquatic interactions at a variety of spatial scales.~~

~~The level of influence ODF can have on protecting, restoring, and enhancing aquatic resources is commensurate with the proportion of the *watershed* it manages. Figure 3-11 depicts the distribution of ODF-managed lands across watersheds in the northwest districts, where ODF manages the most contiguous lands.~~

~~**FIGURE 3-11**~~

~~**Watersheds Overlapping with Northwest Districts and FMP Planning Area.** The median percentage of ODF-managed lands in northwest districts by HUC-12-sized[1] is 26% (range <1% to 100%).~~



~~[1] Hydrologic Unit Code (HUC)-12 watersheds are the smallest sized watershed delineated by the U.S. Geological Survey.~~

~~Waters and Protection Classification~~

~~At the time of FMP publication, the FPA Water Protection Rules classified waters for the purpose of applying protection measures, especially riparian buffers, in compliance with the *Clean Water Act* (OAR~~

~~629-635-0200; DEQ 2021, 2018). *Stream classification* is based on fish and drinking water use, persistence of flows, and stream discharge size. The total length of streams on state forest land in the planning area is approximately 8,500 miles. Approximately 40% of the streams are classified as perennial, and 15% are classified as fish-bearing. Within the planning area, almost 50% of all streams by length, with an estimated 3,500 miles, are in the Tillamook District. The Astoria and Forest Grove Districts have the second- and third-highest concentration of streams, with 1,911 and 1,297 miles of streams, respectively (ODF 2022c).~~

~~Headwater streams are small streams at the highest end of a watershed. Due to their smaller channel widths, headwater streams are especially sensitive to changes in the surrounding riparian areas. These small streams serve important functions in maintaining water quality and quantity, providing habitat for aquatic species (sometimes only seasonally), and contributing to watershed-level processes (Olson et al. 2007).~~

~~In both fish-bearing and non-fish-bearing waters, wood pieces can slow stream velocities, reduce soil erosion, trap and store sediment and organic matter, and store water higher in the overall watershed. In-stream wood recruitment and retention will facilitate the creation of steps and pools, which creates areas of slower water velocities where sediment sorting contributes to high-value habitat for fish, amphibians, and other aquatic organisms. Wood also creates cover from predation and complex habitats for all life histories of aquatic species. Forestry practices that promote wood recruitment include preserving riparian forest, retaining trees within harvested stands, and selective slope-buffering. Headwater streams can also serve as spawning areas, *refugia* from high water, and refugia from high stream temperatures particularly in summer for some *species of concern*.~~

Habitat Conditions

~~The current conditions in aquatic systems and riparian forests are a product of soils and hydrology, and have been shaped over time by disturbances, such as wildfire, windthrow, drought, landslides, logging, and road building. According to recent studies conducted by ODFW, the overall condition of riparian and stream habitats in Oregon's coastal streams, which include state forest lands, indicate a lack of woody debris in streams and large conifers in riparian areas, compared to historical values (ODFW 2019). These results are a legacy of the area's history of large fires and historic logging practices, which included harvest and road building in riparian forests and removal of woody debris from streams, resulting in an abundance of young riparian forests in many watersheds. Increased riparian protections and active stream restoration projects during recent decades have begun to ameliorate degraded conditions on state forestlands.~~

~~Riparian vegetation can help regulate water temperature and velocities, reduce sedimentation, provide habitat for aquatic associates and nutrients for aquatic systems.~~vegetation and microclimates are influenced by year-round, or seasonal water and soils that are saturated by flowing surface water for all or portions of the year.

Properly functioning riparian areas provide important ecosystem benefits and contribute to shading of surface waters that regulate water temperatures, bank stabilization, and enhanced water quality by filtering of water pollutants. Removal of riparian vegetation can increase water temperature and have cascading effects

on water quality and quantity that negatively affect ~~fish, recreation, and drinking water. Table 3-4 summarizes the extent of water temperature impairment in the planning area by district. Climate change is expected to exacerbate water quality issues by increasing stream temperature and decreasing summer low flows, which can concentrate other *pollutants*~~native aquatic species, recreation, and domestic drinking water. Natural disturbance in riparian areas such as high flow events, windstorms, debris flows, and other ecological processes create complex aquatic habitats by contributing woody debris, creating suitable fish spawning areas, and depositing organic materials that maintain properly functioning stream ecosystems.

Climate change models predict a rise in air and stream temperatures resulting in disrupted precipitation and streamflow, creating significant challenges to native aquatic species and their habitats. Changes may not occur evenly in all habitats or through time, but the occurrence of less-suitable environmental conditions for native species may increase overall.

Properly functioning riparian areas provide important ecosystem services, including creating complex habitats and regulating water quality.
Credit: Erik Moberly, ODF.

Maintaining and enhancing the functional components of aquatic ecosystems relies on strategic long-range planning and adaptive management approaches that focus on reducing the vulnerability of native aquatic species and their habitats to climate change. Aquatic enhancement projects support the persistence of native aquatic species by maintaining and restoring aquatic and riparian habitats to address impacts from climate change. Projects are prioritized to increase resistance to and resilience against the expected effects of climate change to achieve the greatest benefits to native aquatic species. In addition, ODF supports the implementation of aquatic enhancement projects through partnerships with local and regional stakeholders in the planning area. ODF's ability to directly influence aquatic conditions are tied to the portion of watershed it manages. Most of the subwatersheds with substantial ODF ownership are in the North Coast Districts as shown in Figure 3-10.

~~TABLE~~FIGURE 3-4~~10~~

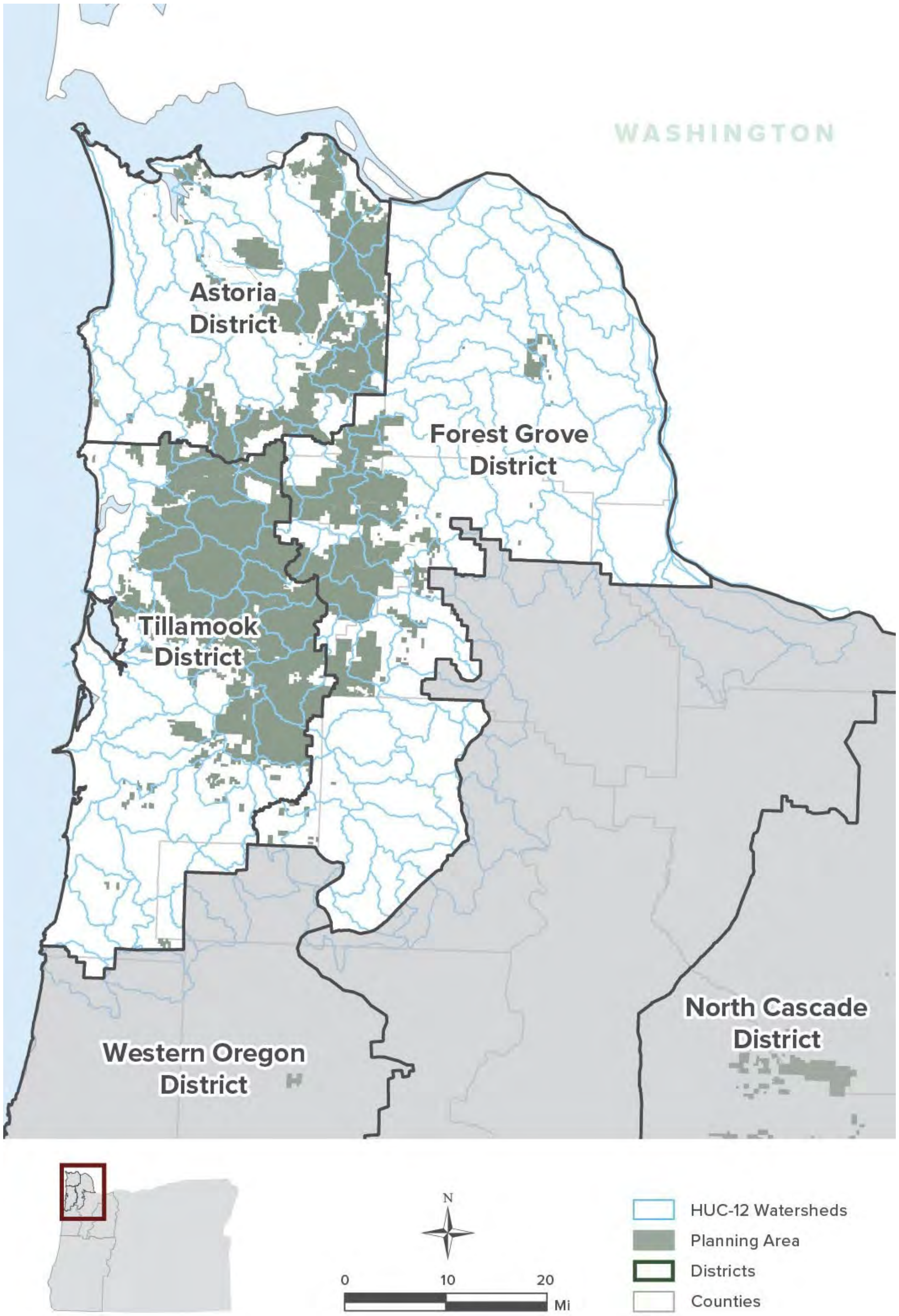
~~**Water Temperature Impairments.** Percentages of planning area within watersheds that have temperature impairment, indicating waters are warmer than DEQ standards for either part of the year, particularly during spawning of salmonids, or year-round.~~

~~District~~	~~Percent of Planning Area in Temperature Impaired Watersheds~~
~~Astoria~~	~~46%~~
~~Forest Grove~~	~~37%~~
~~North Cascade~~	~~9%[1]~~
~~Tillamook~~	~~18%~~
~~West Oregon~~	~~31%~~
~~Western Lane~~	~~18%~~

~~Source: DEQ 2022b.~~

~~[1] Water temperature impairment classifications in North Cascade District predate the 2020 wildfires.~~

Watersheds Overlapping with North Coast Districts and the Planning Area. The median percentage of ODF-managed lands in northwest districts by HUC-12-sized [a] subwatersheds is 26% (range <1% to 100%).



[a] Hydrologic Unit Code (HUC)-12 subwatersheds are the smallest-sized watershed delineated by the U.S. Geological Survey.

Classification of Waters for Protection

The FPA Water Protection Rules classifies waters by matching the physical characteristics and beneficial uses of a water body to a set of appropriate protection measures, in compliance with state regulations intended to meet the Clean Water Act (OAR 629-635-0200; DEQ 2021, 2018). Stream classification is based on flow permanence, fish presence, permitted private and public domestic water use, and average annual flow. For purposes of protection, streams are classified into five beneficial categories including fish use, non-fish use, perennial, seasonal, and domestic water use. Streams are also further classified by a waterbodies size including small, medium, and large. For purposes of classification, a stream is considered to have domestic water use only if a water use permit has been issued by the Oregon Water Resources Department (OWRD).

Aquatic and Riparian Habitat Conditions

Aquatic and riparian ecosystems occur adjacent to one another and have been shaped over time by human and natural disturbances. Physical habitat assessments conducted by ODFW indicated a lack of large wood in streams and large conifers in riparian areas compared to ideal large wood requirements (ODFW 2019). This is a result of the planning area's history of large fires, past logging practices, and in-stream large wood removal practices, resulting in younger riparian forests and a lack of large wood in streams and many riparian areas. Larger riparian buffer protections and an active stream restoration program during recent decades have begun to improve degraded historic conditions on aquatic and riparian ecosystems in the planning area.

ODF implements stream enhancement projects to improve the health of aquatic ecosystems benefit native aquatic species.
Credit: ODF.

Threatened ~~and~~or Endangered ~~Fish~~ Species and ~~Other Aquatic~~ Species of Conservation Concern

~~At least 28~~Numerous native aquatic species ~~of fish~~ occur either in the planning area or ~~downstream of~~adjacent to state forest lands ~~and, therefore, may be influenced by state forest management. Some *evolutionarily significant units* (ESUs) or~~. These include distinct populations of coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus* *mykiss*), and ~~Oregon chub (*Oregonichthys cramer*)~~chum salmon (*Oncorhynchus keta*), all of which are listed as threatened ~~or endangered~~ under the federal Endangered Species Act (ESA) or are under review for listing. ~~At least 32 species of reptiles and~~ Additionally, several native aquatic amphibians, such as torrent salamanders (*Rhyacotriton* spp.) and coastal tailed frog (*Ascaphus truei*) also occur in the planning area~~, including species~~. Many of ~~concern and species~~these are also under review for federal listing or are designated as sensitive species in the *Oregon Conservation Strategy* (~~Oregon Conservation Strategy~~ODFW 2016). ~~Approximately half of these species, such as torrent salamanders and the coastal tailed frog, depend on the aquatic environment for at least part of their life cycle. Of these fish and amphibian species, nine fish are listed as threatened or endangered under the state or federal ESA, two amphibians are state listed as sensitive species.~~

~~ODF's~~ ODF's species of concern policy and associated species ~~of concern~~ list was developed ~~using~~in 2010 and updated in 2025 and is used for identifying strategies for managing habitat for these species. The policy identifies aquatic and terrestrial species that need immediate and focused conservation efforts and informs the development of conservation tools. The species list was established from multiple sources including federal and state lists of threatened, endangered, and *candidate species*, as well as the *Oregon Conservation Strategy* (ODFW 2016) and ODFW's sensitive species list (ODFW 2021). ~~They identify species that need immediate and focused conservation effort. The list is a component of ODF's species of concern operational policies and is updated semi-regularly and will be~~The policy and associated list are updated as needed and captured in IPs as state and federal lists are updated, or as new data or science ~~becomes~~become available. ~~Species of concern identified as part of this FMP's associated policies are currently present or have the potential to be present on state forest lands.~~

~~Stream Restoration~~

~~Although protection of riparian areas improves conditions over the long term, direct restoration projects such as *culvert* replacements, road decommissioning, and in-stream placement of woody debris can accelerate the recovery of degraded aquatic systems (e.g. O'Neal et al. 2016; Hoffman and Dunham 2007; Whiteway et al. 2010). Recognizing American beavers (*Castor canadensis*) can enhance in-stream and riparian habitat through dam construction activities; stream restoration opportunities may also be~~

~~Improving~~ Aquatic ~~Organism Passage.~~ Habitat Enhancement

Culvert replacements like this one on Warner Creek (Astoria District) improve aquatic organism passage~~,~~ ~~which increases~~ and restore habitat ~~accessibility and habitat quality~~connectivity.

Credit: ODF.

~~identified in areas able to support beaver colonization where impounded water would benefit~~

Aquatic habitat enhancement projects focus on restoring ecosystem functions and accessibility for native aquatic species. The placement of appropriately sized wood in streams, addressing fish ~~and wildlife species.~~passage barriers, riparian planting, and road/trail im

projects that restore properly functioning fish habitat, fish passage, and water quality conditions. ODF is committed to enhancing aquatic habitats and has implemented thousands of aquatic habitat enhancement projects over the past few decades.

The Oregon Watershed Enhancement Board (OWEB) maintains the most comprehensive online reporting system to track projects that improve habitat for native

rrent information can be found on the Oregon Watershed OWEB. Activities on state forest lands that contribute to y ~~the Oregon Water Enhancement Board~~OWEB) include pitat, as well as and road-related projects that provide ect road-drainage systems from streams, and minimize 3-~~5~~11). For more information on the condition of road-stream interactions, see Forest Resource 2: *Transportation*.

~~information on the condition of road-stream interactions, see *Transportation*. ODF is committed to ongoing stream restoration on state forest lands as described in the HCP and the strategies below.~~

~~TABLE~~

Forest Resource, Goal

s, and Strategies

FIGURE 3-~~5~~

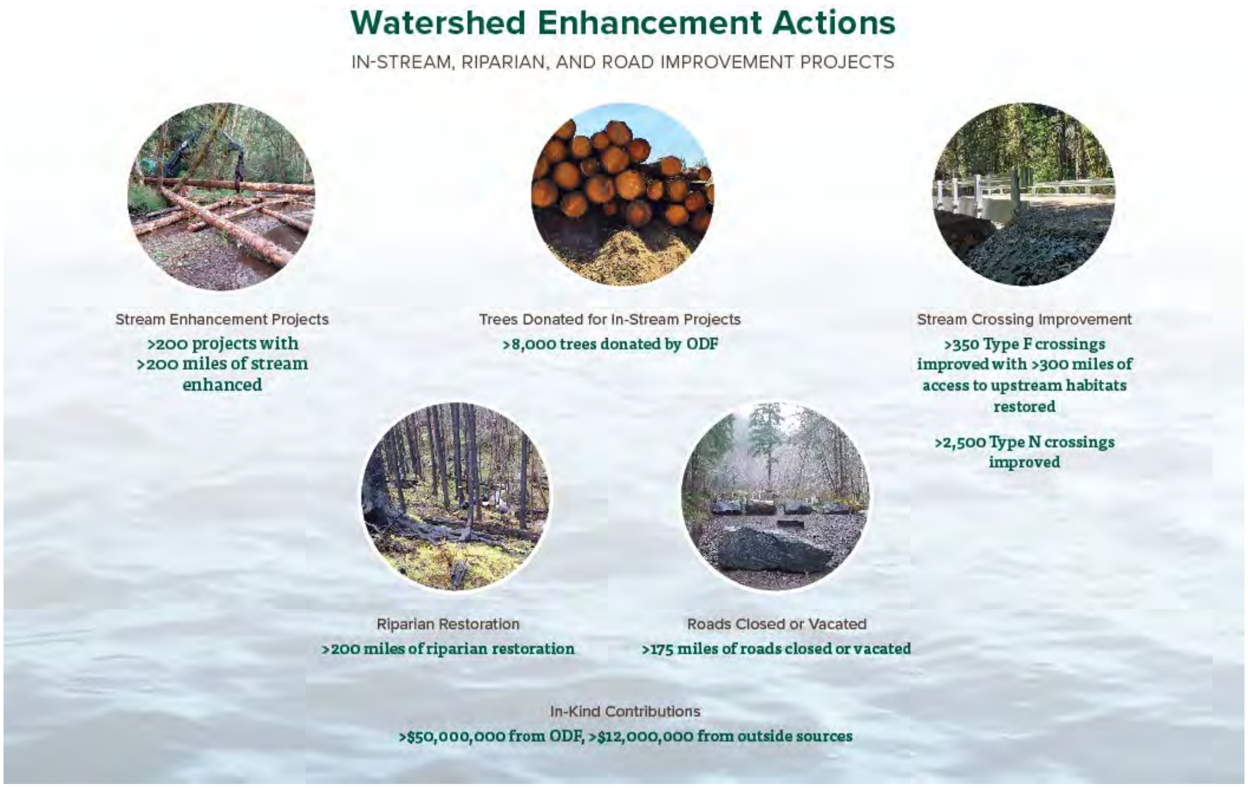
~~Selected In-Stream and Road Projects by District Reported to Oregon Water~~11 Watershed Enhancement ~~Board (~~Actions. In-stream, riparian, road improvement, and donations tracked by OWEB, 1995–**~~2020).~~** ~~The Oregon Water Enhancement Board maintains an inventory of Oregon watershed restoration actions intended to improve habitat for aquatic species and water quality~~2025.

~~Stream Enhancement Projects~~	~~District~~			
	~~AT, FG, TL~~	~~NC, WO~~	~~WL~~	~~Total~~
~~Number of In-stream Projects~~	~~106~~	~~29~~	~~66~~	~~201~~
~~Number of Trees Donated~~	~~3,874~~	~~1,362~~	~~2,382~~	~~7,618~~

~~Miles of Stream Enhanced~~	~~85~~	~~32~~	~~57~~	~~173~~
~~Number of Fish Barriers Removed~~	~~252~~	~~48~~	~~51~~	~~351~~
~~Miles of Fish Access Restored~~	~~192~~	~~44~~	~~50~~	~~286~~
~~Number of Type N Crossing Fixed~~	~~1,626~~	~~600~~	~~113~~	~~2,339~~
~~Number of Road Relief Culverts Installed~~	~~3,574~~	~~717~~	~~188~~	~~4,479~~
~~Miles of Road Closed or Vacated~~	~~113~~	~~11~~	~~43~~	~~167~~
~~Miles of Road Improved or Relocated~~	~~1,005~~	~~108~~	~~67~~	~~1,180~~
~~ODF In-kind Contribution ($)~~	~~$39,818,227~~	~~$4,446,162~~	~~$3,252,727~~	~~$47,517,116~~
~~Other Contributions ($)~~	~~$5,228,014~~	~~$885,347~~	~~$4,761,886~~	~~$10,875,247~~

~~Source: OWEB 2021~~

~~AT = Astoria; FG = Forest Grove; TL = Tillamook; NC = North Cascade; WO = West Oregon; WL = Western Lane~~



Drinking Water

~~Forests produce the highest quality and most sustainable sources of fresh water on Earth (NRC 2008; Neary et al. 2009; Creed et al. 2011). Oregon's extensive and diverse forests generally produce very high-quality water—~~An important ~~social, economic,~~component of aquatic and ~~environmental benefit.~~

~~Drinking water must meet specific regulatory and engineering standards. Timber harvest, road~~riparian area management~~, and related activities can affect the supply, storage, and quality of water through various mechanisms. These mechanisms include altering annual average water yield (Moore and Wondzell 2005); changing timing, duration, and magnitude of peak flows (Grant et al. 2008); severity of summer low flows (Coble et al. 2020); the quantity of sediment yield to intakes and reservoirs; and various water quality parameters (Institute for Natural Resources 2020). Thus, forest management has the potential to affect the operations and planning of water suppliers and their ability to provide clean water to their customers especially as climate changes.~~

~~Drinking water quality is regulated by EPA through the Safe Drinking Water Act. In Oregon, DEQ and the Oregon Health Authority (OHA) implement the Safe Drinking Water Act through a partnership instituted by the Drinking Water Protection Program (DEQ 2022c). While OHA ensures that customers receive drinking water that meets Safe Drinking Water Act standards, DEQ protects the sources of drinking water by implementing the Clean Water Act. DEQ assists~~ includes the protection of permitted private and public water ~~suppliers by identifying *source areas* of drinking water, developing source water assessments, and assisting in the development of place-based plans to reduce pollutants. A source area is the area in which a watershed delivers water to a water system.~~

~~The potential for ODF to affect drinking water in the planning area depends largely upon the percent of the drinking water source area under ODF management (Coble et al. 2020; Grant et al. 2008; Institute for Natural Resources 2020). Less than 1% of Oregon surface water drinking water source areas are located on ODF lands (DEQ 2017). It is possible to compare the planning area with the Drinking Water Protection Program's public water systems (PWS) (i.e., systems that serve more than three homes or connections) source areas to identify PWSs where ODF has the potential to affect public drinking water in the planning area. Three of Oregon's Public Water Systems have more than 45% of their source area on ODF lands: Timber Water Association, Hillsboro-Cherry Grove PWS' in Forest Grove District, and Jewell Sd #8 PWS in Astoria District (DEQ 2019). Very few community drinking water intakes are supplied from state forest lands. There are eight municipal or quasi-municipal~~ supplies. Stream ecosystems are dynamic and can experience fluctuations in water quality and quantity due to natural and human factors. Forest management activities can affect the quality, supply, and storage of this key ecosystem service through various mechanisms. Currently, there are 125 permitted private or public domestic points of diversion on ~~ODF lands: three in the Astoria District, three in the Tillamook District, one in the Forest Grove District, and one in the North Cascade District.~~

~~Although not regulated by EPA, *private and domestic drinking water* can also be affected by forest management. However, only approximately 6% of known private and domestic water system intakes in Oregon are located on state or locally~~ and adjacent ~~lands (OWRD 2023). There are 125 private or domestic points of diversion on ODF lands~~to state forest lands in six districts with Tillamook and Astoria Districts having the most ~~at 62 and 32, respectively (OWRD 2023). While these numbers are based on the most current data available, the number of drinking water intakes and source areas may change over time.~~(OWRD 2023).

~~The FPA contains rules and the HCP contains conservation strategies that protect water quality. The FPA protects both private and domestic drinking water intakes and prevents *non-point source* pollution from entering water supplies. DEQ reviews the FPA for sufficiency to implement the Clean Water Act (DEQ 2021). By protecting riparian and aquatic ecosystems, many of the HCP conservation strategies are also protecting drinking water quality.~~

~~At the time of writing, the FPA water protection rules and the HCP conservation strategies pertain to water quality and sediment delivery, but not to annual average water supply or to the timing, magnitude, or duration of peak and low flows. In cases where state water quality standards are not met, DEQ may issue additional requirements, such as total maximum daily loads (TMDLs). The following goal and strategies serve to ensure that management is more aware of their potential impact on drinking water and coordinates with DEQ where waters may be impaired.~~

EPA provides federal oversight and approves water quality standards that are used to assess whether the quality of Oregon's rivers and lakes is adequate for drinking water and other beneficial uses such as recreation and fisheries. The Clean Water Act requires states to adopt water quality standards designating beneficial uses of the state's waters, including drinking water, and to set criteria designed to protect those uses. Surface and groundwater quality standards are regulated by DEQ.

Any forest operations on forestlands within the state must be conducted in full compliance with the rules and standards of the Environmental Quality Commission related to air and water pollution control (ORS 527.724). ODF is a Designated Management Agency for discharges of pollutants from *non-point sources* from forest operations, such as sediment from forest roads (OAR 340-042-0080(2)). The FPA contains rules that regulate harvest practices, road construction and maintenance, and the use of chemicals and other petroleum products on state forest lands to minimize the likelihood of management activities adversely affecting water quality. Forest operations are also subject to other laws and rules administered by state agencies to protect the beneficial uses of waters of the state.

Goal: Functional Aquatic and Riparian Habitat Resources

Protect, maintain, and enhance aquatic and riparian ~~resources,~~systems that support ~~the life history needs of~~native aquatic and riparian~~-dependent fish and wildlife~~ species.

Strategy: Aquatic and Riparian Habitat Improvements

c. Limit management activities in RCAs as described in the WOSF HCP.

d. Plan forest management activities that protect, maintain, and enhance riparian habitat function.

e. Design aquatic habitat enhancement projects that restore in-stream habitat processes, features, and complexity.

f. Manage stream temperatures by planting trees and riparian plants as needed to improve stream shading.

g. Plant species favored by American beaver (*Castor canadensis*) in appropriate locations to promote dam construction that improves aquatic condition and function.

h. Control the introduction and establishment of non-native plant species.

Intent

The intention of this strategy is to promote properly functioning and resilient in-stream and riparian habitats for native fish and wildlife species. Riparian management strategies, detailed in the WOSF HCP, ensure ecosystem processes and resilience are maintained to support increased stream shading, contributions of organic matter, sediment trapping and chemical filtration, and bank stabilization. Biological and ecosystem responses resulting from riparian management strategies, such as moderating and reducing fluctuations in water temperatures, large wood inputs, reducing sediment delivery, and resilience to climate-driven stressors and disturbance events effectively improves water quality and creates suitable habitats for native fish and wildlife species.

Stream enhancement projects increase the quality and quantity of important habitat elements such as pools, spawning gravels, and off-channel habitats creating more productive rearing, spawning, and refugia habitats for aquatic ~~and riparian-dependent species~~species. Biological and ecosystem responses resulting from stream enhancement projects, such as increased growth and survival rates, reproductive success, and resilience to climate-driven stressors and disturbance events, increase overall aquatic species production in the planning area.

Strategy: Aquatic Organism Passage

Maintain and improve stream-crossing structures like culverts and bridges, to support native aquatic species, improve hydrologic processes, and increase stream connectivity.

a. Follow a prioritization process for stream-crossing upgrades based on physical and biological elements.

b. Identify and evaluate stream-crossing upgrades and end-of-life replacements as part of the IP process and/or in collaboration with local and regional partners.

c. Design and maintain all new and replacement fish passage projects to meet or exceed state and federal fish passage criteria.

Intent

The intent of this strategy is to ensure stream-crossing structures provide unimpeded upstream and downstream passage to maintain habitat connectivity for native resident and *anadromous* fish and other aquatic organisms while providing sufficient transport of expected flows, woody debris, and other materials. Reconnecting fragmented aquatic habitats allows fish to access previously blocked spawning and rearing habitat, promotes biodiversity and genetic flow, supports nutrient cycling, and acts as refugia from warmer downstream water temperatures and high-water events.

Strategy: Headwater Processes

Maintain the hydrologic, *geomorphic*, and ~~enhance headwater~~ ecological processes of *headwater* systems that ~~collectively trap~~shape the physical and ~~store~~biological communities of aquatic and riparian ecosystems.

d. Support the long-term addition of woody debris, coarse and fine sediment, nutrients, and other organic materials to aquatic and riparian ecosystems over time.

e. Minimize direct impacts from forest management activities.

f. Acquire greater scientific understanding of rare and *endemic species* occurrences and habitat use in headwater streams.

Intent

The intent of this strategy is to protect the critical ecological functions of headwater systems. Headwater streams comprise most of the overall length of the stream networks in the planning area. Their critical ecological functions include trapping sediments and pollutants, which result in improved water quality and sustain the health of the entire watershed. Headwater streams also capture large amounts of organic matter~~, and export wood, substrate, and food to~~ and nutrients, which support healthy microbial communities and populations of macroinvertebrates, which, in turn, support production of fish and wildlife species downstream~~ reaches~~. In most cases, headwaters are fed by groundwater, which provides unique cold-water refugia for many aquatic species.

Strategy: ~~Functional~~ Landslide Processes

~~Maintain functional~~Protect landslide-prone areas to reduce the risk of landslides triggered by management activities and ensure that landslides that do occur contain large wood, in order to reduce adverse impacts of landslides on water quality and aquatic habitat and promote development of downstream physical habitat and biological communities of aquatic and riparian ecosystems.

a. Protect slope features that are potential sources of debris flows using the steep slope strategies detailed in the WOSF HCP.

b. Facilitate landslide processes ~~including sediment routing and~~ that contribute to the development of complex aquatic and riparian habitats.

Intent

The intent of this strategy is avoid triggering landslides and to promote the delivery of woody debris ~~supply~~, course sediment, and other organic materials to aquatic systems that facilitate the creation of complex habitats for ~~slopes that could fail by identifying slopes that could fail and retaining trees on those slopes~~aquatic species and recycle fresh minerals and nutrients back into the ecosystem where landslides occur. The assessment of slope hazards and the potential for delivery uses the best science, professional expertise, and field observations to assess risk of failure.

Strategy: Wetlands and Lakes

Maintain the ~~natural functions~~ ecological function and ~~attributes~~value of wetlands~~, allow for new wetlands to form over time,~~ and ~~restore degraded wetlands where~~lakes.

a. Avoid and minimize disturbances to soil conditions, bank stability, and drainage patterns during management activities.

b. Apply appropriate live tree, vegetation, and snag and downed wood retention measures consistent with ~~other resource goals~~the FPA.

Intent

The intent of this strategy is to protect and maintain the unique hydrological and habitat functions of wetlands and lakes such as sediment trapping, nutrient absorption, flow regulation, and groundwater recharge. Intact and functional wetlands and lakes provide vast amounts of resources for resident and migratory fish and wildlife species and are home to various endemic flora and fauna. Minimizing disturbances to vegetation, live trees, snags, and downed wood, and preventing the drainage or alteration of wetlands and lakes provides invaluable benefits to aquatic and terrestrial species that rely upon the functionality of these unique habitat features on the landscape.

Strategy: Threatened and Endangered Species and Other Species of Conservation Concern

Protect, maintain, and enhance habitat structure and function for threatened and endangered species and other *species of conservation concern*. ~~The following considerations are used to implement this strategy.~~

a. Comply with state and federal ESA requirements ~~and~~, recovery plans, and implementation of WOSF HCP conservation actions.

~~a.~~b. Adopt management approaches that contribute to the ~~persistence~~survival and recovery of threatened and endangered species and other species of conservation concern.

- ~~Implement the HCP and associated conservation actions targeted to benefit the species covered under the *Incidental Take Permit*.~~

~~b.~~c. Conduct species assessments during IP development and related revisions to determine which species warrant special consideration and whether existing conservation measures are adequate.

~~Strategy: Aquatic Organisms~~

d. ~~Incorporate~~Collaborate across ownership boundaries to meet common aquatic ~~organism passage considerations into transportation planning and engineering design processes to meet~~ conservation goals.

Intent

The intent of this strategy is to contribute to the recovery and long-term persistence of threatened, endangered, and other species of conservation concern by complying with state and federal ~~passage criteria~~ESA requirements. Implementation of this strategy and conservation actions identified in the WOSF HCP ensure that aquatic and riparian habitats are managed in a way that meets all legal requirements and that listed and imperiled species persist in the planning area. Determining whether conservation actions, as described in the WOSF HCP, are contributing to species recovery is addressed through effectiveness monitoring. Staying informed about potential future ESA candidate species or other species of conservation concern helps plan for future habitat conservation requirements.

Strategy: Partnerships ~~for Habitat~~

~~Foster~~Promote and support partnerships with ~~other~~ state and federal government agencies, ~~Tribes, universities, and~~ Tribal Partners, academic institutions, non-governmental organizations, adjacent landowners, and the forest industry to plan~~,~~ and implement~~, and monitor~~ aquatic and riparian habitat improvement and effectiveness monitoring projects.

a. Collaborate with local stakeholders and regional partners to develop and implement watershed planning initiatives and strategic action plans.

b. Implement conservation actions that benefit native aquatic and riparian habitats ~~and ecosystem function, and to conduct~~.

Intent

The intent of this strategy is to protect and enhance aquatic and riparian habitats through voluntary and mutually beneficial partnerships. Collaborative processes create greater alignment of each stakeholder's vision and responsibilities associated with planning and implementing complex ecological outcomes than those achieved by a single organization. Partnerships with stakeholders holding different regulatory authorities allow for more efficient navigation of multi-layered regulatory landscapes, improve compliance efficiency, and accelerate project timelines. Leveraging financial resources, promoting sound science and data sharing, and providing professional expertise and guidance provide partnerships the ability to enhance larger areas rather than fragmented patches across the planning area.

Goal: Water Quality and Quantity

Protect, maintain, and enhance water quality and quantity for native fish and wildlife species and permitted private and public domestic drinking water sources.

Strategy: Water Quality Standards

Ensure state and federal water quality standards support the beneficial uses of waters of the state.

a. Limit forest management activities in RCAs as detailed in the WOSF HCP.

b. Improve road and trail system drainage to avoid transporting fine sediments and contaminants from roads and trails to streams.

c. Establish measurable goals to meet state and federal water quality standards.

~~a.~~d. Support research ~~that fills gaps in scientific knowledge~~and monitoring to better understand the interactions between forest vegetation conditions and water quality.

~~Goal~~*Intent*

The intent of this strategy is to minimize adverse impacts on water quality through conservation actions detailed in the WOSF HCP. Management standards that are designed to maintain and improve water quality through reducing sediment inputs to streams, reducing stream temperatures, and reducing erosion support healthier ecosystems that contribute to high-quality aquatic habitats for fish and other species. Degraded water quality can have detrimental effects on metabolism and growth, reproduction, and disease resistance often resulting in reduced production and survival of aquatic organisms.

Strategy: Total Maximum Daily Loads

Ensure Total Maximum Daily Load (TMDL) standards are met to maintain and restore water quality.

a. Control water pollution and improve impaired waterways by limiting management in RCAs as detailed in the WOSF HCP and applying BMPs for transportation system and forest management.

b. Monitor forest management activities that have the potential to contribute pollutants to waterways and implement mitigative measures where necessary.

Intent

The intent of this strategy is to reduce non-point source pollution from waters of the state through reducing pollutants identified in TMDL IPs that direct management strategies. Conservation actions identified in the WOSF HCP protect and improve impaired waters of the state by reducing solar radiation and sediment inputs into streams, support in-stream enhancement projects, and adhere to BMPs and other pollutant control measures associated with forest management activities.

Strategy: Drinking Water

Protect~~, maintain, and enhance~~ forest ~~drinking water sources for private and domestic use.~~

~~*Strategy: Drinking Water Effects Analysis*~~

~~Develop and incorporate~~ drinking water ~~effects analysis into planning processes to identify and protect~~ sources for permitted private and public domestic drinking water ~~source catchments~~use.

a. Ensure permitted domestic drinking water sources are integrated into planning forest management activities.

b. Limit forest management activities in RCAs.

c. Hydrologically disconnect road and trail systems from streams.

d. Ensure chemical application on state forests complies with the FPA and EPA labeling to prevent harm to human health, non-target vegetation, and other forest resources.

e. Engage with local community members to communicate drinking water protection approaches and provide information regarding planned forest management activities.

Intent

The intent of this strategy is to minimize sediment and pollutants from entering streams that overlap with ~~the planning area~~permitted private and public domestic drinking water sources. Reducing organic and inorganic pollutants from entering streams and adversely affecting water quality is be achieved through conservation actions detailed in the WOSF HCP and Division 620 of the FPA reducing the costs associated with treatment and public safety risks.

~~***Strategy: Department of Environmental Quality Total Maximum Daily Loads***~~

~~Follow DEQ-issued TMDLs, including any additional site- or source-specific DEQ TMDL Implementation Plans, and *monitoring* and reporting requirements.~~

~~3.2.9~~3.2.12 Forest Resource 12: Wildlife

~~**Blacktail deer near Roseburg, Oregon. Many species of wildlife are found in Oregon's state forest lands—individual species use different stand types and habitat features at varying spatial scales.**~~
~~Credit: ODF~~

Blacktail deer near Roseburg, Oregon. Many species of wildlife are found in Oregon's state forest lands.
Credit: ODF.

Like aquatic and riparian resources, management of wildlife habitat contributes to ~~all three types of~~ resilient forest ecosystems and GPV. Protecting and enhancing wildlife habitat not only sustains the wildlife communities themselves but also the social and economic benefits derived from them. Abundant wildlife enhances recreation, subsistence, and cultural activities such as bird-watching and hunting. These activities contribute to the local tourism economy and tax revenues from ~~licensing fees.~~ licensing fees.

Habitat Condition

The amount and quality of habitat for different species results from interactions between natural processes and management history. Environmental gradients, underlying geology, species distributions, and natural disturbance have always provided for variability in vegetation types across state forest lands in western Oregon. Extensive disturbances, such as wildfire and windstorms, ~~continue to~~also influence ~~species' habitat.~~habitats. Disturbances over smaller areas, such as insect and disease outbreaks, create spatial heterogeneity within and among individual forest stands.

~~Forest Resource, Goals, and Strategies~~

As described in Section 3.1.1, *Forest Condition*, many of the state forest lands in western Oregon have a legacy of repeated, large wildfires or had been extensively logged prior to acquisition by the State. Managing the current landscape for multiple values including timber production, forest health, aquatic systems, and wildlife habitat has ultimately produced a complex mosaic of stand types and ages and within-stand habitat features. The variety of stand types resulting from ODF's management of state forest lands provide well-dispersed diverse habitat across the landscape at regional scales, and broad *connectivity* to and between older forests on federal lands, as well as habitats where comparatively little other public forest lands exist (e.g., on the North Coast including the Tillamook and Clatsop State ~~Forest~~Forests). Young stands and associated early-seral characteristics are important for diverse game and non-game wildlife species, including many species of state or federal concern (Swanson et al. 2014). Older stands ~~on the landscape~~ foster and support a variety of late-seral associates, such as northern spotted owls (*Strix occidentalis caurina*), marbled murrelets (*Brachyramphus marmoratus*), and red tree voles (*Arborimus longicaudus*). Forests in mid-*seral stages* (e.g., 30–80 years old) provide habitat for most native forest species, including early and late-seral associates, and enhance broader landscape function (Swanson et al. 2014). Current ODF forest inventory data document the age class distribution of state forest lands and provide insight into the range of habitat types provided in them (Section 3.1.1, *Forest Condition*).

~~Current ODF forest inventory data document the age class distribution of state forest lands and provide insight into the range of habitat types provided therein (*Forest Condition*).~~ Additional variation in stand composition and structure due to stand development, management history, site productivity, topography, region, and numerous other factors contribute to diversity across spatial scales. For example, rare or unique habitats, such as talus slopes and caves, add to landscape diversity, the broader ecological function, and resilience. There is considerable variation both within and among districts in the relative proportions of tree age classes and associated habitat types on the landscape. Individual species use different stand types and habitat features at varying spatial scales. Thus, state forest lands provide for diverse habitat across the landscape. Recent harvest practices in young stands have promoted high-quality, complex early-seral habitat. This is important because complex early-seral habitats can support a diverse and unique array of wildlife species from insect pollinators and insect-eating songbirds, to hunting opportunities for forest raptors along *edges* adjacent to older forest stands.

~~Harvest strategies, practices, and prescriptions in young stands have promoted high-quality, complex early seral habitat. This is important because complex early seral habitats can support a diverse and unique array of wildlife species from insect pollinators to a variety of insect-eating songbirds; to hunting opportunities for forest raptors along *edges* adjacent to older stands. With adequate snag retention in harvested units, complex early seral habitats can even~~When adequate numbers of snags are retained in harvested units, young forest habitats can provide denning and nesting cavities for sensitive species, such as fisher (*Pekania pennanti*), ringtail (*Bassariscus astutus*), purple martin (*Progne subis*), and ~~bluebirds~~western bluebird (*Sialia mexicana*).

Mid-seral stands are highly variable in habitat structure and function depending on natural disturbance, management history, and other factors, but all provide some degree of habitat to meet various ~~life-history~~ needs of native wildlife species~~, and~~; they also provide connectivity between other habitat types and across ~~basins~~the landscape. Mid-seral habitat can provide for dispersal and foraging habitat for resident raptors, as well as cover and overall landscape connectivity for movement of forest carnivores and herbivores. Terrestrial salamanders can also be supported in early and mid-seral landscapes where adequate downed wood is retained (Kluber et al. 2008).

Large-diameter snag previously used as a black bear den, as evidenced by the numerous claw and bite marks surrounding the cavity's entrance.

Credit: ODF.

Late-seral habitats provide for associated wildlife when arranged in a manner that maximizes interior forest, reduces edge effects, and ~~are arranged in a way that~~ minimizes the ~~distance~~distances between *patches* to

maintain connectivity ~~between mid-seral habitats and older stands~~. The recruitment and retention of large-diameter snags and downed wood is key for all seral stages and patch sizes across the landscape. ~~The data also suggest state~~

ODF forest ~~lands may~~inventory data indicate a lack of habitat on state forests to support ~~late-seral~~old forest-adapted species, such as northern spotted owls and marbled murrelets. Approximately 87% of state forest lands are less than 80 years old. In general, the districts in the central and southern Oregon Coast Range and the Santiam State Forest have a greater proportion of total acreage in older stands. The Tillamook and Clatsop State Forests have comparatively little older forest, largely ~~due to~~because of the extensive fires and logging that occurred prior to state acquisition. Despite large improvements in habitat diversity and quality since then, the state forests’ habitat story ~~largely~~ remains one of restoration, rehabilitation, and enhancement in a young forest landscape (Figure 3-1).

General Wildlife Species

Western Oregon state forest lands currently have habitat suitable for most native species found in forests of the Oregon Coast Range and ~~West~~Western Cascades. Vertebrate species known or suspected to be found on, adjacent to, or in some cases, downstream of, state forest lands in both aquatic and terrestrial environments include approximately 270 species, including 63 mammals, 147 birds, 32 amphibians and reptiles, and 28 fishes. This excludes the many species of marine fishes, birds, and mammals that may be found in the estuaries adjacent to state forest lands, unless they use state forest lands for some portion of their life ~~history requirements~~.

Wide-ranging mammals such as deer (*Cervida*e), elk (*Cervus canadensis roosevelti*), American black bear (*Ursus americanus*), cougar (*Puma concolor*), and bobcat (*Lynx rufus*) ~~make~~ use ~~of~~ a variety of habitats in and near state forest lands to meet their ~~life history~~ needs. ~~Forests~~Forest stands are host to most native weasel species (*Mustelidae*), skunks (*Mephitidae*), squirrels (*Sciuridae*), voles (*Microtus*), mice (*Mus*), and other forest-floor small mammals. ~~The full native assemblages of forest~~Native resident and migratory songbirds and raptors, including rare and sensitive species, are present on state forest lands. Upland game birds, such as grouse (*Tetraoninae*), quail (*Odontophoridae*), and Rio Grande wild turkeys (*Meleagris gallopavo intermedia*) are also present. Resident and migratory waterfowl and other aquatic birds ~~are dependent~~depend on riparian, aquatic, and wetland habitats within state forest lands. Mammals such as river otters (*Lontra canadensis*) and American beavers ~~(*Castor canadensis*)~~ make almost exclusive use of these habitats. Many amphibians are associated with aquatic habitats, such as tailed frog (*Ascaphus*) and torrent salamanders ~~(*Rhyacotritonidae*), yet~~. Other amphibians use terrestrial habitats and are strongly tied to the abundance and quality of downed wood ~~(lungless or~~, such as plethodontid salamanders~~; e.g.,~~ ~~(~~Oregon slender salamander [*Batrachoseps wright*~~],~~] and clouded salamander [*Aneides ferreus*]). Many birds, reptiles, and some mammals use rocky habitats (including caves or rock

Aquatic Habitat Modified by American Beaver Damming Activity Benefits a Multitude of Aquatic and Terrestrial Wildlife Species.
Credit: ODF.

outcrops) for a variety of ~~life history~~

their needs. Bats (*Chiroptera*) make use of many structures throughout the forest for roosting and hibernation and forage over nearby aquatic habitats.

Threats to wildlife on state forest lands include poaching, illegal dumping, habitat destruction and modification from management activities or public misuse, and extreme natural disturbances. Many of these issues can be addressed via forest planning and management in collaboration with other agencies and stakeholders. The long-term effects of climate change on wildlife are more difficult to assess and address by management. Changes in temperature, precipitation, and other aspects of climate are will likely to alter the quantity and quality of many species' habitats.

~~address by management. Changes in temperature, precipitation, and other aspects of climate will likely alter the quantity and quality of many species' habitats.~~

~~Under GPV,~~ The overarching goal of ODF's strategies for wildlife is to protect, maintain, and enhance habitat for native wildlife species. Restoration and enhancement needs ~~remain~~exist where fire and subsequent salvage logging or reforestation have reduced the extent or quality of habitat for some species (e.g., in the Tillamook Burn). Vegetation complexity and ~~late-seral~~old forest features, in particular, ~~will~~ take many decades to develop through both passive and active management. While moving the landscape toward more diverse habitat conditions, some individual species of conservation concern, and their habitats may require special consideration.

Species of Conservation Concern

Species of conservation concern are wildlife species ~~that have been identified as~~ whose long-term persistence is at risk due to declining populations, rarity, or other factors (e.g., having a limited range). ~~Some~~ There are many species of conservation concern that are not protected by federal or state ESAs including birds, bats, and aquatic amphibians. Habitat needs vary for each species; some of these species are associated with late-seral habitats, others (e.g., flycatchers and warblers) are associated more with complex early-seral habitats, and some (e.g., bats) are associated with more specific habitat elements like suitable roost structures or hibernacula. Some species, such as coastal marten and Pacific fisher~~)~~, appear to be ~~largely~~ missing from forests in the region although habitat for the species seems to be present. ~~These and many others are species of concern to~~ State and federal managers and the public~~.~~ recognize the importance of conserving these species to aid in maintaining ecological integrity and biodiversity.

Numerous public and private entities designate wildlife species of conservation concern ~~for conservation and management~~, from local to global scales. The U.S. Fish and Wildlife Service, U.S. Forest Service, and U.S. Bureau of Land Management publish relevant lists for the Oregon Coast Range and Cascade Mountains Districts. At the state level, ODFW and the Oregon Biodiversity Information Center (ORBIC) (formerly Oregon Natural Heritage Program) publish ~~state-wide~~statewide and county lists. ODF's species of conservation concern list was developed with federal and state lists of threatened, endangered, and candidate species, as well as ~~the~~species not protected by federal or state ESAs but included in the *Oregon Conservation Strategy* (ODFW 2016) and ODFW's sensitive species list (ODFW 2021). ~~They~~These documents identify species that need immediate and focused conservation ~~effort~~efforts. The list is a component of ODF's species of conservation concern operational policies and is updated semi-regularly and ~~will be~~is captured in ~~the~~ IPs as state and federal lists are updated or new data or scientific understanding become available. ~~Species of~~

There are many species of conservation concern that are not protected by federal or state ESAs including birds, bats, and aquatic amphibians. Habitat needs vary for each species; some of these species are associated with late-seral habitats, others (e.g., flycatchers and warblers) are associated more with complex early-seral habitats, and some (e.g., bats) are associated with more specific habitat elements like suitable roost structures or hibernacula. Species of conservation concern identified as part of this FMP's associated policies are currently present or have the potential to be present on state forest lands.

Threatened or Endangered Species

Forest management activities must comply with all federal and state laws, including those related to the protection and conservation of wildlife populations and their habitat (e.g., ~~the~~ state and federal ESAs, federal Bald and Golden Eagle Protection Act, federal Migratory Bird Treaty Act, FPA). Although many laws apply to the management of state forest lands, legal requirements for protection of threatened or endangered species can have ~~some of the most significant effects on planning and operations~~significant effects on planning and operations. The WOSF HCP describes the status and occurrence of three wildlife species listed under state and federal endangered species protection acts, and how management operations are conducted to protect them. These species include northern spotted owl, marbled murrelet, and coastal marten. Threatened or endangered fish species are discussed under *Forest Resource 11: Aquatic and Riparian Resources*.

Coastal marten captured with a wildlife camera on the southern Oregon coastline.
Credit: ODF.

ODF has an extensive survey history for ESA-*listed species* (i.e., northern spotted owls and marbled murrelets) and continues to monitor activity at known sites on an annual basis. ODF, in various capacities over time, has supported research related to habitat relationships of numerous species (e.g., deer, elk, owls, murrelets, early-seral birds, tree voles) and wildlife responses to forest management practices. (songbirds, small mammals, amphibians). ~~However, because relatively little inventory or monitoring work has been conducted on state lands for non-game~~Some species~~,~~ ~~some species may be present~~

~~WESTERN OREGON STATE FORESTS MANAGEMENT PLAN~~

may be present that have not been detected or documented yet (e.g., coastal marten~~).~~), while other listed species are not currently known to be present but could become re-established as a result of habitat improvements, regional population recovery, or potential re-introductions (e.g., ~~Pacific fisher,~~ Oregon spotted frog).

~~The HCP (ODF 2022d) describes the status and occurrence of five wildlife species listed under state and federal endangered species protection acts. Species include northern spotted owl, marbled murrelet, Oregon slender salamander, coastal marten, and red tree vole. Fish are discussed under *Aquatic and Riparian Resources*. There are many other species of concern including birds, bats, and aquatic amphibians. Habitat needs vary for listed species of concern. Some species of concern are associated with late-seral habitats, others (e.g., flycatchers and warblers) are associated more with complex early seral habitats, and others (e.g., bats) are associated with more specific habitat elements like suitable roost structures or hibernacula.~~

Goal: Wildlife

Maintain, protect, and enhance functional and resilient landscapes that provide the variety and quality of habitat types and features necessary for long-term persistence of all native wildlife species.

Strategy: Habitat Diversity

Manage for diverse habitats across the landscape and over time.

a. Manage for a diverse array of seral stages.

b. Protect, maintain, and enhance habitats that account for the range of forest types~~,~~ topography (slopes, aspects, elevations), and habitat features at the district level.

c. Identify and protect rare and unique habitats, particularly those that are fragile, sensitive, or potentially vulnerable to climate change.

Intent

The intent of this strategy is to conserve and enhance diversity as it promotes resilience and ecosystem function, which provides for many ecosystem services (e.g., pest control, pollination) and ~~public~~ co-benefits (hunting, fishing, birding, existence value). Managing for diversity helps ensure the full suite of habitats for native wildlife persist on the landscape in spite of short-term disturbances or chronic perturbations.

HCAs ~~will~~ provide the majority of late-seral stands and the total amount of late-seral forest increases therein over time. Early- and mid-seral stands ~~will~~ exist both inside and outside of HCAs and contribute to the diversity of habitat types on the landscape. Treatment of 30,000 acres of SNC and hardwood-dominant stands over the first 30 years of the WOSF HCP permit ~~will provide~~provides a complex early-seral component in HCAs~~, as will natural disturbances.~~ that is positioned to mature into diverse mid-seral habitat by the end of the WOSF HCP permit term. RCAs and leave-tree strategies provide for some older habitat components outside of HCAs.
Operationally limited areas contribute to diversity and older age classes outside of HCAs. HCAs ~~were~~are designed to account for the range of forest types and topography and most habitat features at the district level. Rare, unique, and otherwise vulnerable habitat types and features outside of HCAs can be addressed with ~~fine-filter~~focused strategies (e.g., bat hibernacula) and other policies (e.g., wetlands).

This strategy is also intended to reduce threats to biodiversity by ensuring rare and unique habitats, which often occur in patchy and isolated locations on the landscape, are protected and continue to support the life history needs of vulnerable species. Protecting and maintaining the functionality of these habitats supports the delivery of ecosystem services across state forest lands by providing important resources for highly specialized species of conservation concern.

Strategy: Habitat Complexity

Manage for complex habitats of all ages and types.

a. Promote structural complexity, compositional diversity, and spatial heterogeneity at stand and landscape scales.

b. Adapt standards to regional and stand-level goals (e.g., habitat enhancement, forest restoration, fuels and fire risk, timber production, harvest age), and over time as stand and landscape conditions change.

c. Protect, maintain, and enhance legacy structures, including *old growth* trees, retained green trees, snags, and downed wood. Allow exceptions for hazard tree removal for public safety.

d. Promote vertical canopy layering where habitat restoration or enhancement are primary concerns.

Intent

The intent of this strategy is to conserve and manage for habitat complexity as it enhances function of many ecosystem processes and services. Complexity is a key feature of high-quality habitat at all spatial scales for many species of conservation concern and contributes to forest and habitat resiliency through time~~. The following considerations are used to implement this strategy~~.

- ~~Protect, maintain, and enhance *legacy structures*, including remnant old growth trees, residual green trees, snags, and downed wood. Allow exceptions for public safety.~~
- ~~Promote vertical layering where habitat restoration or enhancement are primary concerns or compatible with other goals and where species composition makes this strategy reasonably attainable.~~

Stands in HCAs are the foundation for this strategy and ~~will~~ provide the majority of complex stands of mid-to late-seral forest. Management in HCAs (~~thinnings~~variable retention harvests and regeneration harvest of SNC and alder) ~~will enhance~~enhances complexity over time and ~~provide~~provides for a complex early-seral component. Outside of HCAs, leave-tree strategies, RCAs, and operationally limited areas contribute to stand and landscape complexity. Multi-species plantings inside and outside of HCAs further promote complexity and resilience. Silvicultural prescriptions ~~will~~ vary at the stand-level based on past management, current conditions, and desired ~~future condition~~stand goals (e.g., production-emphasis versus habitat emphasis, fuels reduction management needs). These ~~will~~ also vary by district based on forest types, WOSF HCP covered species distribution, ownership patterns, and forest health concerns. Natural disturbances across the planning area introduce complexity and heterogeneity at stand, watershed, and landscape scales.

Strategy: Functional Landscapes

Manage for functional landscapes for native wildlife.

a. Create a variety of patch types, ~~patch~~ sizes, and ~~patch arrangement~~arrangements over time.

b. Provide for adequate interior forest habitats.

c. Maintain connectivity between habitats~~,~~ and broad landscape permeability, ~~for~~to allow for dispersal and migration of diverse wildlife species including species of conservation concern.

d. Foster and maintain redundancy at various ecological scales (e.g., species, stand types).

e. Incorporate WOSF HCP conservation actions inside and outside of HCAs.

Intent

The intent of this strategy is to ~~develop~~have functional patches and resource arrangements with redundancy to help ensure ~~resistance, resilience, and long-term persistence~~resilient, functioning ecosystems that ~~meets~~ persist to provide GPV ~~with climate~~ as environmental conditions continue to change ~~and long-term sustainability in mind. The following considerations are used to implement this strategy~~.

~~This strategy will mostly be achieved by HCP conservation actions inside and outside of HCAs.~~ HCAs ~~were~~are designed to provide for functional landscapes for the covered species. As habitat develops therein, it ~~will promote~~promotes a variety of patch types, sizes, and arrangement, adequate interior forest habitat, and broadscale connectivity. Outside of HCAs, leave-tree strategies, RCAs, and inoperable areas further enhance landscape function, habitat distribution, and connectivity. Northern spotted owl dispersal habitat connectivity requirements further enhance the function of the areas outside of HCAs. Age -class structure outside of HCAs contributes to the variety of patch types on the landscape~~.~~ ~~Redundancy occurs both inside and outside of HCAs and contributes to forest resilience~~.

Female northern spotted owl monitored at a known active site located inside an HCA. Maintaining dispersal habitat outside HCAs facilitates spotted owl movement across the landscape, supporting survival, reproduction, and successful colonization.

Credit: Turnstone Environmental Consultants Inc.

~~***Strategy: Rare***~~Redundancy occurs both inside and ~~***Unique Habitats***~~ ~~Identify, protect,~~outside of HCAs and ~~restore rare and unique habitats, particularly those that are fragile, sensitive, or potentially vulnerable~~contributes to ~~climate change~~forest resilience.

~~The intent of this strategy is to target locations on the landscape that are unique and support the life history needs of vulnerable species.~~

Strategy: Threatened and Endangered Wildlife Species and Other Species of Conservation Concern

Protect, maintain, and enhance habitat for threatened and endangered species and other species of ~~concern. Use the following considerations to implement this strategy.~~conservation concern.

a. Comply with state and federal ESA requirements and adopt management approaches that contribute to the survival and recovery of threatened and endangered species and other species of conservation concern.

b. Implement the WOSF HCP and associated conservation actions targeted to benefit the species covered under the Incidental Take Permit.

c. Conduct species assessments during IP development and related revisions to determine which species warrant special consideration and whether existing conservation measures are adequate.

d. Collaborate across ownership boundaries to meet common wildlife conservation goals.

e. Support habitats beneficial to pollinator species (including invertebrates) by integrating alternative management practices, where appropriate.

Intent

Fine filters include creating suitable nesting structures like this snag patch in an open, upland meadow restoration site to aid long-term occupancy of purple martin. Artificial nest boxes were also installed to provide immediate nesting opportunities until woodpeckers excavate natural nesting cavities in the decaying wood.
Credit: ODF.

The intent of this strategy is to comply with state and federal ESA requirements and the HCP, while also managing for other species of conservation concern. ~~ODF will implement~~Implementation of this strategy includes management approaches that contribute to the persistence of threatened and endangered wildlife species. Where appropriate, ~~ODF will also apply~~ these approaches can also be applied to ~~the~~species of conservation ~~of species of~~ concern not formally listed under state or federal ESA. Implementation ensures that wildlife habitats are managed in a way that meets all legal requirements and that listed and imperiled species ~~will~~ persist on the landscape using the conservation actions specified in the HCP. While the HCP captures currently listed and some candidate species, ODF will continue to remain informed about any potential future candidate species and species listings.

Applying the above considerations to

management approaches provides a *coarse filter* ~~–~~ – *fine filter* approach to addressing species of conservation concern, while following the directions within the HCP ensures ESA compliance. Other species of conservation concern are determined through regular policy review with assessment of

need for additional fine filter strategies beyond FMP and HCP commitments. This strategy ensures ODF is managing habitat for all native species as required under the GPV rule, while also working to prevent future listings.

HCP commitments provide the majority of ~~tactics needed~~conservation measures to achieve this goal. The ~~HCAs'~~HCAs, leave-tree ~~strategies,~~standards, and northern spotted owl dispersal habitat outside of HCAs~~,~~ and RCAs are the primary coarse filters ~~for~~that address the needs of a variety of species of conservation concern at the landscape level. Additional fine filters are added during IP development and implementation to address species of conservation concern that have habitat requirements inadequately addressed by coarse filters. Fine filters are species- and site-specific, and generally of minor/minimal impact or complementary to operations. Examples include 1) protecting rock outcrops and caves of known use by Townsend's big-eared bats; 2) creating/retaining smaller-diameter, short snags on ridgetops in areas of known purple martin occupancy; and 3) implementing seasonal restrictions near known active peregrine falcon nests.

ODF considers pollinator habitat as part of wildlife habitat restoration efforts for species of conservation concern. Pollination is an important ecosystem service that benefits forest health and resiliency. Pollinators have more specialized habitat needs that can be pursued alongside other management objectives with small shifts in practices or in areas unsuitable for timber production (Buhl et al 2021). In general, pollinator abundance and diversity may benefit from more open forest canopies and from native plant communities (Hanula et al. 2016). Focus for these practices could be within HCAs and stewardship classes with a subclass designation of cultural resources, plants, research/monitoring, unique threatened or endangered plants, or wildlife subclasses. Where practices are implemented, pollinators would provide ecosystem services to adjacent stewardship areas and nearby agricultural lands (Rivers 2018).

~~3.2.10~~3.2.13 Forest Resource 13: Sensitive Plants

S nts. Native plants fill many roles in the forest e soils, influence ~~micro-climate~~temperature and m of the surrounding area, support native pollinators, contribute to biodiversity, and are used as cover and forage by many animals. In addition to their ecological functions, some plant species are harvested commercially or for cultural uses. Commercial and cultural uses of understory plants are discussed in the *Special Forest Products* ~~section. This section focuses on threatened, endangered or rare plants (collectively, *sensitive plants*), as listed under the state of Oregon's ESA and administratively protected by the Oregon~~and *Cultural and Historic Resources* sections, respectively.

~~**Coast Range fawn lily (*Erythronium elegans*). Sensitive and rare plants provide environmental and social benefits and are protected by the Oregon Department of Agriculture Native Plant Conservation Program.**~~

~~Credit: ODF~~

This section focuses on Oregon's ESA-listed threatened and endangered plant species

Coast Range fawn lily (*Erythronium elegans*). Sensitive and rare plants provide environmental and social benefits and are protected by the Oregon Department of Agriculture Native Plant Conservation Program.

Credit: ODF.

administratively protected by the ODA Native Plant Conservation Program (ORS 564.105; OAR 603-073), and candidate plant species considered for ESA listing (collectively, *sensitive plants*).

~~Center~~Threats to sensitive plants on state forest lands include habitat loss and fragmentation from

~~The Oregon Biodiversity Information~~

management activities, public misuse (i.e., illegal collection), and competition with invasive species. Many of these issues can be addressed via forest planning and management in collaboration with other agencies and stakeholders. The long-term effects of climate change on sensitive plants are more difficult to assess and address by management. Shifts in temperature, precipitation, and other aspects of climate that reduce water availability and disrupt growing seasons likely alter the habitats that support sensitive plants.

ORBIC provides a list of sensitive plants that may be found on state forest lands, as well as records of known locations. ~~Most~~Many of these species occur in non-forested areas, such as open, high-elevation rocky areas; open meadows; bluffs; and coastal areas. ~~Six~~ Examples of currently known sensitive plant species ~~are known to be present~~ on state forest lands~~:~~ include Coast Range fawn lily (*Erythronium elegans*), Nelson's checkermallow (*Sidalcea nelsoniana*), Saddle Mountain bittercress (*Cardamine pattersonii*), cold-water corydalis (*Corydalis caseana* ssp. *Aquae-gelidae*), Chambers' paintbrush (*Castilleja chambersii*), and frigid ~~shootingstar (*Dodecatheon austrofrigidum*). ODF is not aware of any other state-listed plant species that are likely to occur on state forest lands.~~

shootingstar (*Dodecatheon austrofrigidum*) (ORBIC 2023). ODF is not aware of any other sensitive plant species that are likely to occur on state forest lands.

ODF protects listed plant species in accordance with ~~the~~ state and federal ~~ESAs.~~ESA requirements. ODF has identified ESA-listed species that occur, or are suspected to occur, on state forest lands and continues to update these lists ~~(listings and occurrences)~~ in consultation with the ODA's Native Plant Conservation Program. During operations planning, the districts determine if ESA-listed species occur or are likely to occur on lands where management activities are planned. If so, the district ~~will determine~~then determines whether the proposed management activities are consistent with the conservation program for the ESA-listed species and whether specific protection or mitigation measures are ~~warranted~~needed.

Goal: Sensitive Plants

Ensure the long-term persistence of sensitive plant species.

Strategy: Sensitive Plants

Identify, protect, maintain, and enhance~~, and adaptively manage~~ sensitive plant species populations.

a. During operations planning, determine if ESA-listed plant species occur or are likely to occur on lands where management activities are planned. Implement protection measures as needed.

b. Coordinate with ODA and other agencies as needed to identify sensitive plant occurrences during planning.

c. Coordinate with the Native Plant Conservation Program to remain informed concerning future candidate species and species listings.

Intent

The intent of the strategy is to comply with state and federal ESA requirements, while also managing for other sensitive species. Implementation of this strategy includes management approaches that contribute to the persistence of threatened and endangered plant species. Where appropriate, these approaches can also be applied to the conservation of sensitive species not formally listed under state or federal ESA. Conserving sensitive plant species where they occur on state forest lands promotes genetic diversity that is crucial for maintaining plant survival and adaptability to various environmental conditions. Supporting diverse sensitive plant populations is essential for maintaining the services and resilience of ecosystems.

This chapter described the forest resource conditions and laid out the forest resource management goals and strategies at a high level. Chapter 4, *Guidelines*, provides guidelines on how to implement the goals and strategies.

CHAPTER 4

Guidelines

~~This chapter describes the processes for implementation and revision of the Western Oregon State Forests Management Plan (FMP).~~

Implementation of the *Western Oregon State Forests Management Plan* (FMP) is grounded in the themes established in Chapter 1, *Introduction*, including *greatest permanent value*[1] (GPV), consideration of and *engagement* with all Oregonians, climate *resilience*, *sustainability*, and *adaptive management*. The management approach in Chapter 2, *Management Approach*, together with the *goals* and *strategies* outlined in Chapter 3, *Forest Resources, Goals, and Strategies*, provide strategic direction for carrying out this work. This chapter provides actionable guidance that defines the processes, supporting plans, and engagement mechanisms necessary for asset management, effective implementation, and adaptive management. This guidance will help to ensure that management actions are aligned with the plan's intent, informed by ongoing *monitoring* and evaluation, and responsive to changing conditions.

4.1 Asset Management Guidelines

Assets,~~1~~ as they are discussed in this section, are the tangible resources and infrastructure (e.g., parcels of land, *forest products*~~,~~, and forest roads~~ and related improvements~~, trails, and campground facilities) on state forest lands.

Maintaining or enhancing the value of the assets described in this plan is fundamental to long-term *sustainability* of ~~resources~~benefits described in the ~~*greatest permanent value* (~~GPV~~)~~ rule (Oregon Administrative ~~Rule~~Rules [OAR] 629-035-0020) such as ~~timber,~~forest products that generate *revenue*, *special forest products*, *aquatic* and wildlife *habitat*, and ~~recreation. The~~recreational uses. ODF developed asset management *guidelines* ~~discussed in~~for this ~~section align~~FMP in alignment with the Oregon Revised Statutes (ORS), OAR, and Oregon Department of Forestry (ODF) *policy*.

Implementation of the FMP ~~will be~~ consistent with ~~these~~the following asset management guidelines ~~to ensure~~ensures that the asset value of the forest is maintained or enhanced.~~ The guidelines are influenced by the following implementation priorities under which the State Forests Division (Division) is~~

~~operating.~~

- Conserve forest lands by maintaining the state forest land base.

[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.

- Maintain a land exchange and acquisition program to consolidate state forest lands for management efficiencies, economic values, or enhanced *stewardship*.
- Implement marketing strategies that increase the value of forest products.

~~[1] Terms italicized in this document are defined in the Glossary. Defined terms are italicized at the first instance in each chapter.~~

- Prioritize and invest in *stand management* activities that increase the quality and quantity of timber and enhance other *ecosystem services*.
- Maintain, develop, and protect investments in infrastructure such as roads, bridges, and facilities, while recognizing that in some cases investments may need to be moved, removed, or decommissioned.
- Maintain existing assets that support recreation, education, and interpretation activities, while recognizing that in some cases investments may need to be moved, removed, or decommissioned.
- Maintain investments in forest inventory, *geographic information system* (GIS) technologies, and timber harvest-tracking technologies that support planning and implementation processes ~~and~~, contribute to *adaptive management*, and improve overall efficiency and transparency.
- Prioritize and undertake investments in research and monitoring consistent with Section 4.3, *~~Decision-Making,~~ Adaptive Management~~, Monitoring, and Research~~ Guidelines*.
- Maintain ~~a~~ budgeting and financial management system and practices that ~~tracks~~track *revenues* and expenses and aids in financial decision-making, and provide transparency to the public.
- Implement and maintain accountability strategies and systems ~~that~~to ensure ~~the state and other beneficiaries receive~~ anticipated financial and ~~other~~environmental benefits from the forest are tracked and reported accurately.

4.1.1 ~~Implementation~~Investment Priorities

Funding levels for plan implementation vary with cyclical economic trends. FMP implementation is primarily funded through timber harvest revenues. There may be periods where revenues limit funding. Annual budget instructions for developing fiscal budgets reflect the *Forest Development Fund* (FDF) balance and the projected FDF balance. The highest level of implementation and investment occurs when the FDF balance exceeds 12 months of operating expenses, and the balance is forecast to be relatively steady or increasing. The lowest level occurs when the FDF balance ~~is~~has less than 6 months of operating expenses, and the balance is forecast to decrease (Table 4-1). To avoid service level decreases, ODF may seek external federal, state, and non-governmental organization ~~(NGO)~~ funding sources, such as grants or legislative funding through policy option packages or legislative concepts. External opportunities will be considered at any investment level to diversify funding streams and reduce risk associated with poor timber markets. Table 4-1 shows the forest management investment levels based on the revenue forecast and FDF balance.

TABLE 4-1
Forest Management Investment-Level Guidance Based on Revenue Forecast and FDF Balance

	Increasing 3-Year Revenue Forecast	**Decreasing 3-Year Revenue Forecast**
FDF Contains Greater than 12 Months of Operating Expenses	Level 1: Maintain or expand existing investments and fund new strategic investments.	Level 2: Maintain or expand existing investments and explore additional strategic investments.
FDF Contains 6 to 12 Months of Operating Expenses	Level 2: Maintain or expand existing investments and explore additional strategic investments.	Level 3: Invest in deferred maintenance and maintain select strategic investments.
FDF Contains Less than 6 Months of Operating Expenses	Level 3: Invest in deferred maintenance and maintain select strategic investments.	Level 4: Maintain core business and meet legal obligations; no new investments.

Note: Level 1 is the highest level of investment, while level 4 is the lowest.

~~External funding sources should be considered at investment level 2 and pursued if the investment level is projected to be at level 3 or level 4.~~

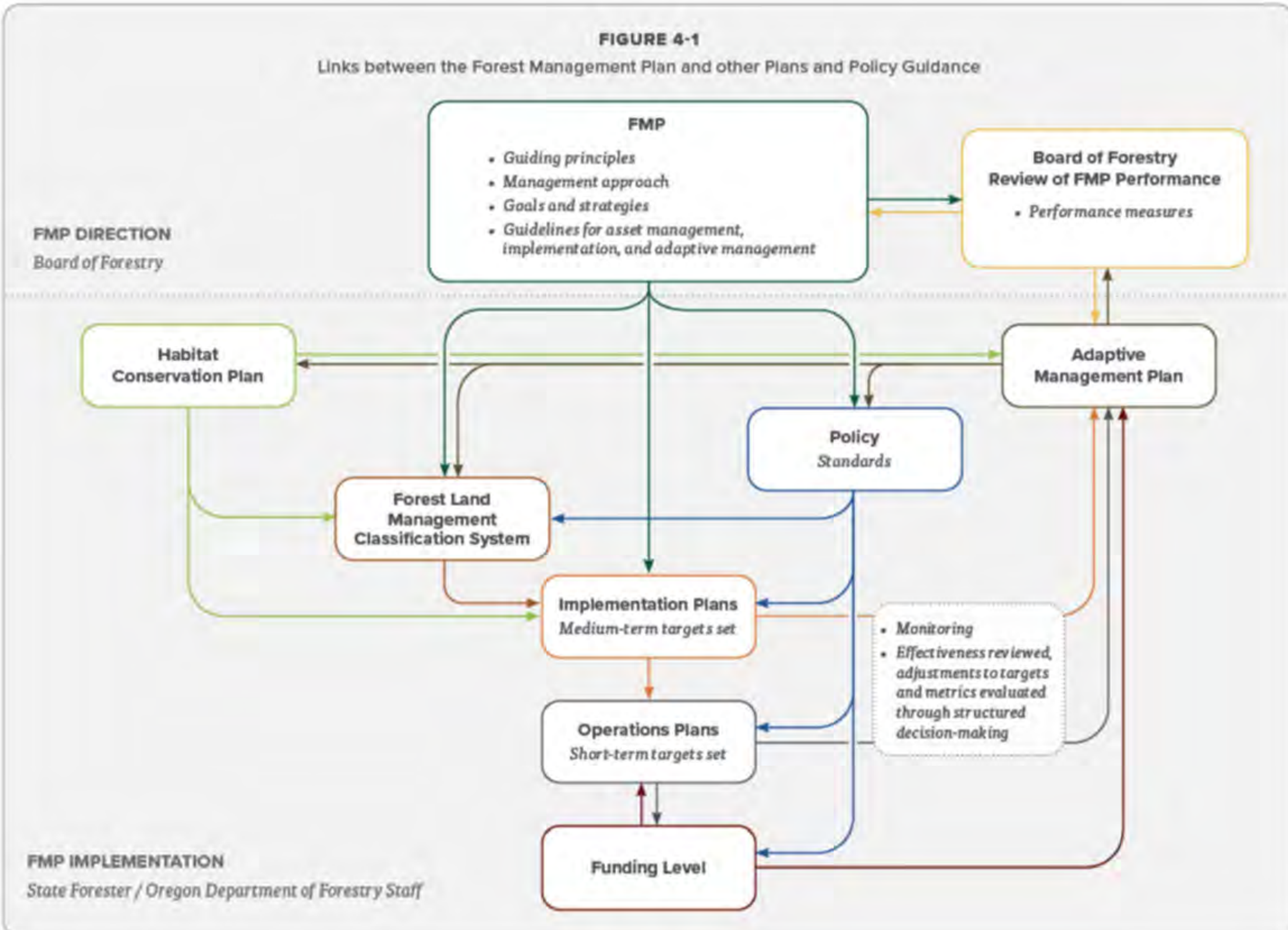
4.2 Implementation Guidelines

~~The~~ FMP~~, approved by the *Board of Forestry* (the BOF), identifies the resource management *goals* and strategies~~ implementation is carried out through *Implementation Plans* (IPs) that set mid-term (typically 10-year) *objectives*, which are ~~intended to achieve an appropriate blend of resources. GPV is~~then achieved through ~~integration of forest~~on-the-ground management activities ~~through ecologically sustainable management and using an~~described in *Operations Plans* (OPs). Monitoring and reporting are incorporated into all planning levels to inform future planning cycles and practice adaptive ~~framework across~~ management. The *standards*, requirements, and operational direction underpinning these plans are detailed in applicable laws and regulations, the *Western Oregon State Forests*~~. The FMP does not focus on a single *objective*, but considers several key social, environmental, and economic goals at different scales.~~ *Habitat Conservation Plan* (WOSF HCP), *Oregon Board of Forestry* (the BOF) policies (e.g., *Vision for Oregon's Forests* (VOF), *Climate Change and Carbon Plan* [CCCP]), *performance measures, operational policies*, the Forest Land ~~managers are tasked with considering all of the goals and strategies, identifying~~Management Classification System (FLMCS), and ~~addressing *trade-offs*~~other guidance.

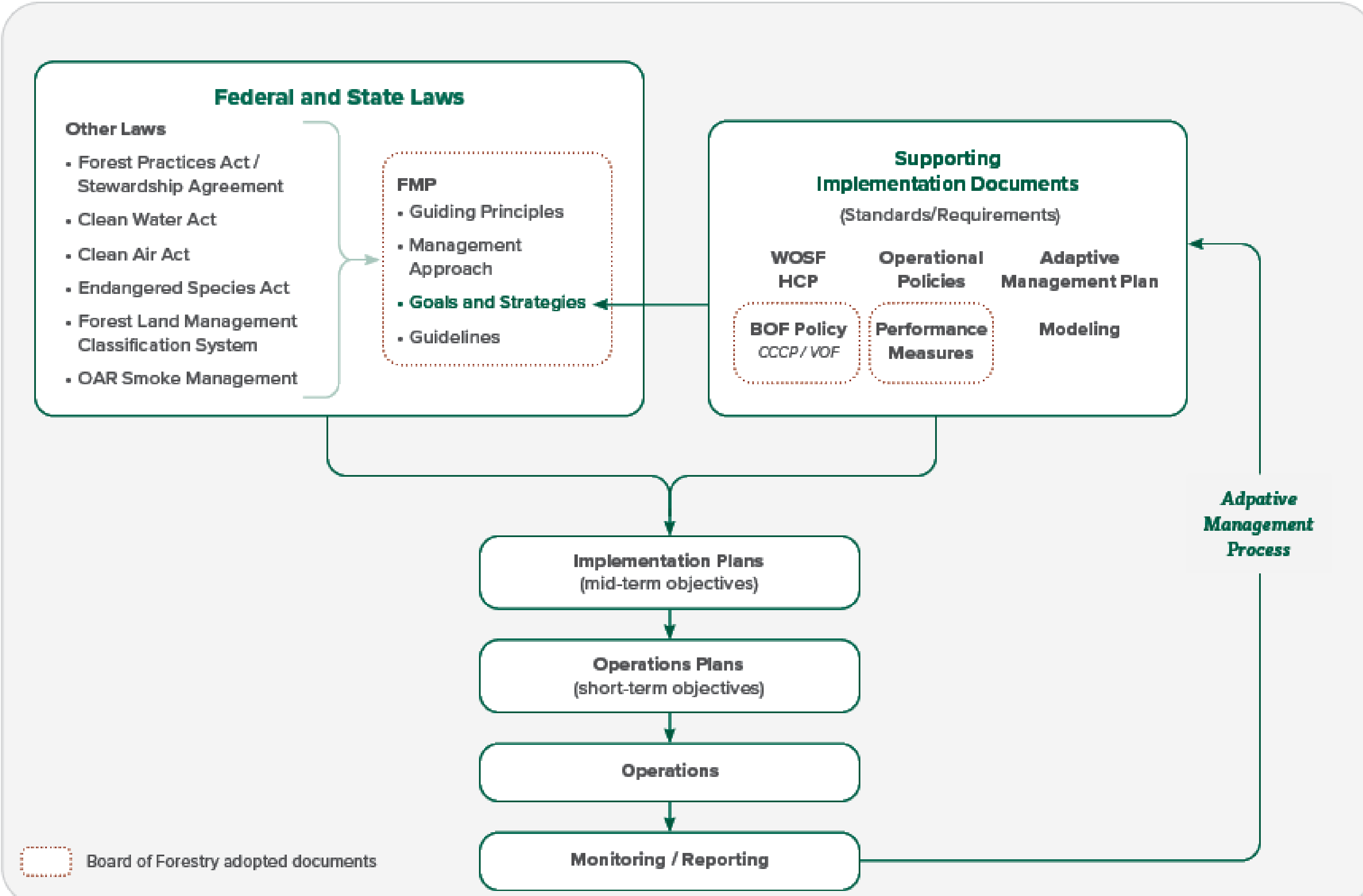
These tiered planning levels ensure consistent, compliant, and ~~meeting GPV when implementing goal-~~driven implementation of the FMP across the ~~FMP. The process for implementing the FMP relies on the following set of tools and processes presented in~~ landscape. Figure 4-1 shows the connections among these plans and the overall implementation process.

FIGURE 4-1

Links among the FMP ~~and~~, Major Example Laws, Other Plans, and Policy Guidance



. This figure provides additional detail of the laws and supporting documents that inform the FMP and implementation ~~is supported by the following elements~~.



Note: The other laws listed in this figure are an example subset of all applicable federal and state laws.

The following planning elements depicted in Figure 4-1 are key to development of the IPs and OPs, and inform monitoring, reporting, and the adaptive management process.

- ***Western Oregon State Forests Habitat Conservation Plan*** ~~**(HCP)**~~**..** The WOSF HCP enables ODF to comply with the federal *Endangered Species Act* ~~(ESA)~~ for certain covered *species* while conducting land management activities on state forest lands west of the Cascade crest. ~~During the development of the HCP, land managers, and partners identified and provided feedback on trade-offs. The~~The WOSF HCP biological goals and objectives ~~document these decisions, which are~~ will be implemented through ~~*Implementation Plans* (IPs) and *Operations Plans* (OPs).~~

- ~~**Performance measures.** *Performance measures* and their targets are developed with direct input from the BOF. Performance measures are monitored and enable the BOF~~IPs and ~~others to track progress toward FMP goals and to maintain accountability~~OPs. The conservation actions within the WOSF HCP provide requirements and standards for ~~management commitments~~a wide range of forest management activities such as retention of *biological legacies* (green trees, *snags*, and *downed wood*); *stream* buffers; steep slope protections; habitat *restoration*; and aquatic passage. These actions also promote forest diversity, complexity, and *connectivity* across the landscape, reinforcing ecological resilience, maintaining *ecosystem functions*, and contributing to the sustainable delivery of ecosystem services and GPV.

- **Operational policies.** ~~While~~The FMP establishes overall goals and strategies; however, the ~~FMP sets certain management~~specific standards~~, primarily associated with~~ for resource protection~~, there are many instances where different management options may achieve FMP goals and IP objectives.~~ are found in other documents that support implementation (Figure 4-1). Operational policies guide decisions within ~~this~~the range of options by ~~defining~~outlining specific procedures and *best management practices* (BMPs) that allow for management flexibility, while ensuring sound management and resource protection. Operational ~~standards describe~~policies include quantitative ~~measures tied to~~standards (e.g., *riparian* buffer widths, upland leave tree requirements) that align with laws and regulations, and FMP and WOSF HCP goals and strategies~~, such as minimum leave trees~~. These policies and standards enable forest managers to develop IPs and OPs and to evaluate *trade-offs*~~.~~ when a range of management options will achieve FMP goals. Operational policies are developed within the State Forests Division ~~at~~(Division) under the direction of the *State Forests Division Chief*.

- ~~**Modeling.** Modeling is used as a decision-support tool to evaluate trade-offs and objective levels at various spatial and temporal scales, and the costs and outputs associated with each scenario. Modeling aids forest managers in evaluating potential effects and making decisions about allocation of resources across uses.~~

- ~~**Implementation Plans.** IPs quantify shorter time periods (for example 8–12 years) associated with objectives for each resource at the district or multiple district-level. IPs describe the management approaches and activities designed to achieve the FMP goals and the HCP goals and objectives. IPs provide linkages among the FMP, HCP, operational policies, and on-the-ground activities that are described in OPs. Trade-offs are assessed and considered at the *landscape* level and are then incorporated into the IPs.~~

- **Board of Forestry policies.** The BOF is mandated to supervise all matters of forest policy and management under state jurisdiction (ORS 526.016). In carrying out this duty, the BOF may establish policies to guide ODF decisions. These policies may have broader applicability and apply to multiple operational divisions (e.g., the VOF and CCCP) or be limited to one division.

- **Performance measures.** *Performance measures* are selected by the BOF, based on *metrics* that the BOF considers key to ensuring progress toward FMP resource management goals, maintaining accountability for management commitments, supporting the adaptive management process, and aligning with IP and WOSF HCP reporting timelines (Section 4.3, *Adaptive Management Guidelines*).
- **Forest Land Management Classification System ~~(FLMCS).~~.** As ~~codified~~described in OAR 629-035-0050, the FLMCS is a method of mapping and describing the *management emphasis* of ~~parcels~~specific areas of state forest lands. ~~The FLMCS is recorded as a GIS layer.~~ The management emphasis ~~identifies the extent to which a parcel of land can be managed for a variety of~~provides context for management activities based on *forest resources* that are present in specific areas. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority as ~~designated~~described by this FMP, the WOSF HCP, ~~and~~ other laws or commitments~~.~~, and policy choices. This information is used in the development of IPs and ~~during operational planning~~OPs.
- **Modeling.** Modeling is used as a decision-support tool to ensure sustainable harvest over time, evaluate management trade-offs, inform targets for forest resource goals at various spatial and temporal scales, and quantify the costs and outputs associated with management scenarios. Modeling aids forest managers in evaluating potential effects and making decisions about allocation of resources across the landscape.
- **Adaptive Management Plan.** The *Adaptive Management Plan* (AMP) describes the monitoring and reporting process that will ensure FMP resource goals are met during implementation of the FMP.

The AMP grounds monitoring and reporting within an adaptive management framework to inform management decisions and align with IP and WOSF HCP reporting timelines (Section 4.3, *Adaptive Management Guidelines*).

Most of these documents are publicly available on the ODF website.

4.2.1 Implementation Plans

IPs are mid-term (typically 10-year) plans that outline how the FMP strategies will be implemented at a *district* or multi-district scale. These plans integrate the strategies for forest resource goals described in Chapter 3, *Forest Resources, Goals, and Strategies*, and provide additional detail on objectives, management approaches, and activities that will be used. IPs integrate district operations and are used to develop annual OPs and budgets, and to assess progress toward meeting the goals identified in the FMP. Based on monitoring and reporting, IPs will be evaluated and revised to reflect key recommendations from the adaptive management process. IPs will be revised for the next implementation cycle, but may also be revised during a current IP cycle, depending on monitoring *outcomes* or unforeseen circumstances (e.g., large-scale *disturbance* events).

IPs will include the following information.

- Current condition of forest resources.
- Activity levels expressed as objectives to be achieved during the implementation period such as an average annual harvest volume of timber offered for sale.
- Some anticipated management activities are more difficult to quantify over the course of the IP, such as restoration thinning or cultural burning to improve habitat, because they are dependent on external partnerships or reliant on funding that is less certain.
- A description of specific monitoring activities over the course of the IP.

~~4.2.1~~4.2.2 Operations Plans

- ~~.~~OPs describe ~~individual~~the specific projects ~~for achieving expected FMP~~ and ~~HCP *outcomes*,~~activities over the ~~near~~short term (~~for example~~e.g., 1 to 2 years~~),~~) that align with fiscal budgets and ~~IPs.~~

are consistent with IP objectives. Planned activities and projects may include timber harvest operations; road construction, improvement, and vacating; *reforestation* and *young stand management*; aquatic habitat restoration; development or maintenance of recreational trails or facilities; or monitoring projects. OPs prioritize activities and investments in the forests ~~(e.g., inventory, young stand management, recreation development) on the basis of implementation~~ based on investment levels as described in Section 4.1, *Asset Management Guidelines*.

- ~~**Adaptive Management Plan (AMP).** The AMP describes the adaptive management process used to monitor outcomes, evaluate trade-offs, determine if the strategies are meeting the goals of the FMP and HCP, determine if assumptions used in developing the strategies need to be updated, and inform management decisions.~~

~~4.2.2~~4.2.3 Implementation Responsibilities

ODF implements the FMP and WOSF HCP through IPs and OPs. The State Forests Division Chief ~~and~~, *Area Directors* ~~provide guidance for implementing the FMP and HCP through IPs and OPs. They~~ , *and District Foresters* review IPs, which are approved and signed by the *State Forester*. District Foresters implement the FMP and WOSF HCP within their districts through the approval and oversight of OPs. Table 4-2 describes the tasks and responsibilities for IP and OP ~~development are described in Table 4-2.~~approval and implementation.

TABLE 4-2
Roles and Responsibilities of Decision-Makers in the Implementation, Operations, and Revision Approval Process

Task	Responsible Party
Approves FMP and performance measures and requests and approve FMP/performance measure revisions	Board of Forestry
Approves IPs and major revisions to FLMCS	State Forester
~~Approves OPs~~Approves Operational Policies specific to the State Forests Division	~~District Forester~~State Forests Division Chief
Approves minor revisions to FLMCS	Area Director
~~Implements IPs~~Approves and implements OPs	District Forester

4.3 ~~Decision-Making,~~ Adaptive Management~~, Monitoring, and Research~~ Guidelines

Adaptive management is "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 (OAR 629-035-0000(2))."

Meeting the goals of the FMP in a changing environment requires "learning by doing," in which ODF assesses and updates the strategies, operational policies, and BMPs through adaptive management ~~within a decision-making framework.~~. The adaptive management ~~is "the process of implementing plans in a scientifically based, systematically structured~~ approach ~~that tests and monitors assumptions and predictions in management plans and uses~~directs the ~~resulting information~~ monitoring process to ~~improve the plans or management practices used to implement them (OAR 629-035-0000(2)).”~~

~~*Adaptive management* is "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 (OAR 629-035-0000(2))."~~

~~These guidelines describe how adaptive management informs decisions~~document legal and policy compliance, determines whether strategies are meeting FMP goals, and tests ~~if~~whether the assumptions used in the development of the FMP strategies ~~need updating.~~

~~The land manager's dedication to learning from management, applying new findings, and acknowledging uncertainty is key to maintaining the social, economic, and environmental benefits of forests (Bormann et al. 2017). While the language of adaptive management is widespread in natural resource management, it is often difficult in practice to change course or evaluate whether an alternative will improve management. More monitoring or greater scientific understanding may not translate into improved management—the uncertainty of outcomes and *diversity* of values and objectives hinder decision-makers (Gregory et al. 2012). Adaptive management needs to be tailored to the agency's mandate and the social decision-making processes within the institution (Minkova and Arnold 2020). Adaptive management, which includes monitoring and research, supports~~remain valid under a ~~decision-making framework that guides the use of new information within the agency.~~

~~The guidelines for decision-making, adaptive management, monitoring, and research are presented in this section. They are followed by an outline of the accompanying AMP, which describes how ODF integrates new information, designs monitoring projects, reports on *metrics*, and facilitates decision-making. The AMP may be changed as we learn how to improve~~changing climate. The process ~~to work more effectively.~~

~~4.3.1 Decision-Making Framework~~

~~ODF will improve its management by applying *decision analysis*, a process used to simplify decisions by breaking them down into key parts to work through in sequence (Hemming et al. 2022). The PrOACT acronym (Problem, Objectives, Alternatives, Consequences, and Trade-offs) is a popular ordering of the components that go into making a decision (Hammond et al. 2002). These steps for decision analysis have been adapted to many disciplines, and *structured decision-making* (SDM) is the predominant process in natural resource management for making complex, multi-objective decisions that emphasize deliberation, estimating outcomes of alternative actions, and clarifying choices upon which the decision-maker can act (Figure 4-2) (Gregory et al. 2012). One benefit of SDM is that it scales to the decision's complexity, proving useful for a single person or small group brainstorming management alternatives, for a facilitated process~~begins with ~~public input at the level of an IP, or for the BOF evaluating the FMP success through performance measures.~~

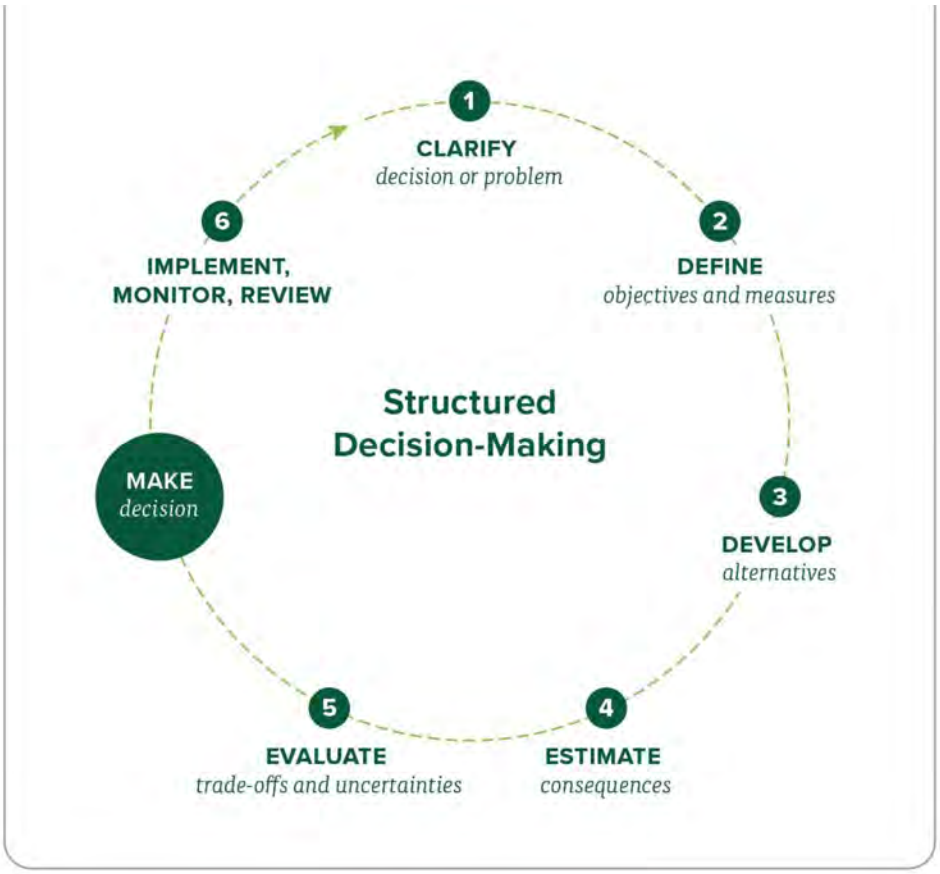
~~The decision-making framework assesses management questions and trade-offs across multiple objectives for different forest resources; addresses adaptive management needs described in~~ IPs, which quantify specific, measurable resource objectives based on the FMP~~, HCP, and other policy documents; and updates the learning process following advances in forest management and decision science.~~ goals and strategies, that are achievable within the next 10 years. Monitoring assesses if IP targets are being met and if plans or operational policies could be improved to better meet the IP targets and achieve the goals in the FMP. The resulting information is used by the appropriate decision-makers to revise management plans (Section 4.4, *Decision Authority and Revision Guidelines*).

4.3.1 Performance Measures

Performance measures are a select set of metrics the BOF uses to direct the State Forester on expectations for management of state forests and to evaluate management outcomes to ensure that the FMP continues to provide GPV. The BOF defines the specific measured components that make up the performance measures. Although the BOF does not approve IPs, desired targets or trends expressed in performance measures will be used to guide ODF's implementation of the FMP. ODF monitors these components and reports the results to the BOF and the public via the BOF webpage. While performance

~~**FIGURE 4-2**~~

~~**Structured Decision-Making Process**. The process supports multi-objective decision-making based on deliberation, estimated outcomes of alternative actions, and clear choices upon which decision-makers can act.~~



~~Adapted from Gregory et al. 2012 Figure 1.1.~~

~~The SDM process (Figure 4-2), whether conducted with ODF staff or external interested parties, has six steps. Previous steps can be revisited during the process to make refinements as needed.~~

- ~~**Step 1.** Clarify the decision by determining its scope, the relevant management objectives, and the decision-makers.~~
- ~~**Step 2**. Define the objectives (i.e., "what matters") and the measures that will be assessed if the objectives are met.~~
- ~~**Step 3.** Develop meaningful management alternatives that approach the problem from different angles that may prioritize different objectives.~~
- ~~**Step 4**. Estimate the potential consequences, including the uncertainty, of each alternative using technical analysis or expert judgment.~~
- ~~**Step 5**. Evaluate the trade-offs across multiple objectives and select the preferred alternatives, which may differ among participants, to present to the decision-maker.~~

- ~~**Step 6.** Monitor the outcomes after the decision is implemented to inform the next iteration of the decision-making process.~~

~~*Engagement* in the SDM process depends on the scope and impact of the decision, with greater public outreach for more significant decisions. Public and Tribal participation provides feedback to the technical working group on objectives, alternatives, consequences and trade-offs.~~

~~Adaptive Management~~

~~Adaptive management is most relevant to decision-making when management has a high impact on the resource objective, the consequences of management alternatives are uncertain, and resolution of uncertainty affects management decisions (Williams et al. 2009). In this case, the time dedicated to learning from different management treatments reaps benefits that outweigh the potential delay in meeting the resource objective. In a situation where the uncertainty about the effects of management is low or has little effect on decision-making, adaptive management is not as useful. Assessing the potential costs and benefits of engaging in adaptive management can be part of the SDM process. In other words, SDM addresses a wider variety of decision-making situations than adaptive management (Gregory et al. 2012).~~

~~Adaptive management can vary in effort and experimental design, but the key component is learning from alternative management treatments (Williams et al. 2009). Generally, *active adaptive management* is for cases with high uncertainty and a need for learning about the cause-and-effect relationship of management on the resource objective. Active adaptive management uses a statistically robust experimental design to evaluate alternative management approaches. In *passive adaptive management*, monitoring data are collected to evaluate the effects of management on a resource. The experiment may not include controls, replicates, or randomized application of *management prescriptions*, so it is more difficult to establish cause and effect (Williams 2011).~~

~~Monitoring~~

~~There are a variety of monitoring approaches the Division uses depending on the objectives.~~measures do not encompass all aspects of ODF monitoring and reporting (Section 4.3.2, *Adaptive Management Plan*), their purpose is to provide an up-to-date dashboard for the BOF and the public to easily track management outcomes across a broad range of key ecosystem services provided by state forests. The BOF can evaluate and make recommendations based on the performance reports depending on the need (Section 4.4, *Decision Authority and Revision Guidelines*).

4.3.2 Adaptive Management Plan

The AMP is a separate document from the FMP that provides monitoring workflows and reporting requirements that support implementation of the FMP. The need for an AMP comes from the expanded scope of this FMP that includes adaptive management as a key theme, the WOSF HCP extensive monitoring requirements, and a commitment to accountability to the BOF and all Oregonians.

Monitoring and reporting is updated in the AMP to enable timely management responses to new information. The schedule of specific monitoring and reporting varies, depending on the time frame required to detect change. Reports of monitoring results will be available on the ODF website.

Monitoring Approaches

ODF monitors the management of state forests for compliance and effectiveness. Compliance monitoring (i.e., *implementation monitoring*) involves gathering information to determine ~~whether~~if the rules, regulations, ~~or requirements~~and policies are being followed during implementation. *Effectiveness monitoring* assesses ~~whether~~if the implementation of management actions ~~has~~produces the intended outcomes, such as ~~tracking whether~~measuring if forest treatments increase ~~occupied habitat of a species of concern. Effectiveness monitoring may require *status monitoring* or *trend monitoring* to judge management success. Status monitoring involves determining the state of a resource (e.g., spotted owl occupancy, snag density) at a point in time. Trend monitoring is an extension of status monitoring, where the change in status over time is examined. Trend monitoring can be used to assess whether management thresholds are being breached (e.g., spread of invasive weeds increased beyond a target density) or whether there appears to be a pattern of change across time (e.g.,~~ habitat quality ~~is increasing) (Hilton et al. 2022).~~or quantity over time for a *species of conservation concern*.

~~Decision-making processes such as SDM may include a monitoring component to evaluate the effects of the decision and the state of the resource. The outcomes of monitoring inform the next iteration of decision-making. The ideal monitoring approach may change with time. As resource~~

~~objectives, monitoring technology, and the understanding of the system change over time, the accompanying monitoring efforts also need to adjust to continue providing reliable and relevant information. *Adaptive monitoring* is a framework that reassesses monitoring questions and protocols in light of these changes while maintaining the integrity of long-term records (Lindenmayer and Likens 2009).~~

~~As an example of how new monitoring may be planned, a snapshot estimate (status monitoring) of a resource is compared with the desired state of the resource to determine if a problem exists (Nichols and Williams 2006). Before monitoring begins, hypotheses are developed about how the larger system affects the resource. The differences among the hypotheses capture the range of possibilities about how the system *functions*. The hypotheses can also affect where and how frequently data are collected. This thoughtful approach helps ensure that the monitoring provides useful information—both an estimate of the resource condition and a test of which hypothesis is best supported. The resource estimate allows the condition of the resource to be evaluated in the absence of temporal data demonstrating a trend, thereby helping to determine whether a management intervention or more targeted monitoring is needed.~~

The WOSF HCP commitments guide much of the monitoring and span many FMP goals and strategies. Additional monitoring for adaptive management of FMP goals is tracked in the AMP, with prioritization of monitoring projects and expected outcomes developed alongside the IP.

Reporting

The AMP coordinates monitoring projects with their reporting commitments for different plans, such as annual, 5- and 10-year reports for the WOSF HCP, progress toward IP objectives, and performance measures reported to the BOF.

~~4.3.1~~4.3.3 Research

Research in the context of the FMP is intended to generate reliable scientific information to guide management actions. New research performed by ~~the agency would be~~ODF is designed within ~~a decision~~an adaptive management framework. ~~The agency~~In addition, ODF supports and relies on several research cooperative partnerships to advance scientific understanding in strategic areas~~ important for achieving management objectives.~~, such as planting tree species outside their normal range to account for forecast changes in climate, suitable forest *composition* for ecosystem service delivery, and improvements to landscape design to balance benefits across space and time. ODF offers planning support and special use permitting for research performed on state forest lands by scientists outside of the agency.

~~The decision-making framework describes the process for incorporating new information to ensure that the FMP is using the best available science. Peer-reviewed, published research may change the credibility or applicability of the assumptions that were used to develop the FMP strategies. New information fits into the SDM cycle when assessing the management alternatives, consequences, trade-offs, and uncertainty. Revisiting prior steps in the decision-making cycle is expected when new information is incorporated.~~

~~4.3.2 Adaptive Management Plan~~

~~The AMP offers direction and administration for (1) facilitating decision analysis and adaptive management; (2) designing monitoring; (3) reporting monitoring results, analyses, and decisions; and (4) identifying and integrating information and decision needs within state forest lands.~~

~~The AMP is a separate document from the FMP that provides a current roadmap for monitoring that supports the implementation of the FMP and improves management over time (see box at right). The need for an AMP comes from the expanded scope of this FMP that includes adaptive management as a key tenet of its management approach, a companion HCP with extensive monitoring requirements, and a commitment to accountability to the BOF and all Oregonians. Monitoring, reporting, and decision-making support will be continuously updated in the AMP and reported in a more nimble and integrative manner that enables timely management responses to new information.~~

Vision for the Adaptive Management Plan

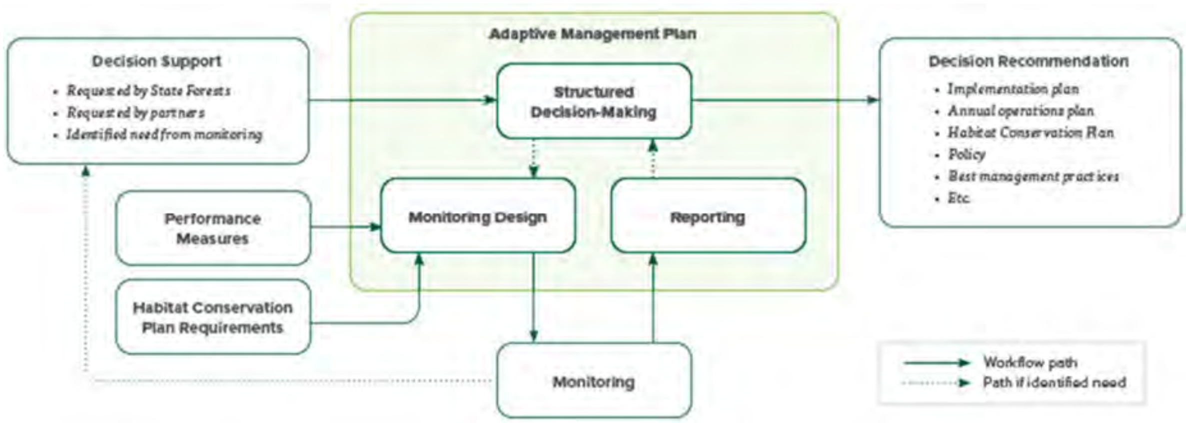
- **Transparent.** Interested parties and ODF staff can easily access current work plans and planning documents for decision-making processes and anticipated timelines for delivering results.
- **Understood.** Interested parties and ODF staff know about the AMP and understand its mission and purpose, and the AMP is written in plain language.
- **Effective.** State Forests manages its lands to achieve Greatest Permanent Value and can make changes to management practices based on new information.
- **Inclusive.** The AMP invites interested and affected parties and ODF staff into its processes and incorporates their feedback.
- **Efficient and timely.** The AMP focuses on informing planning and management via developing adaptive monitoring efforts that deliver useable results as quickly as possible.
- **Responsive.** When State Forests detects issues through monitoring, it works to address manage ment problems creatively, transparently, and effectively.
- **Valued.** Interested parties and State Forests recognize the social and technical benefit that AMP products provides to State Forests and all Oregonians.
- **Reliable.** Decision analysis and monitoring design use the best available science to produce reliable metrics.

~~Workflows for Decision Analysis, Monitoring, and Assessment of Information Needs~~

~~The AMP serves as a hub for information gatheri~~ ... ~~d plans that incorporate adaptive management in their objectives. With support from the AMP, decisions are made by individuals or groups at the relevant planning level. For example, if monitoring shows the need for a fundamental change in FMP strategies, the decision would be made by the BOF after a formal public involvement process and codified through OARs. A smaller change, for instance in operational policy or management standards, could be made by the State Forests Division Chief after engaging interested parties through the decision-making process, which may suggest monitoring or adaptive management be included.~~

~~In the examples shown in the workflow diagram (Figure 4-3), a need for decision support may be identified by State Forests, interested parties, or metrics falling outside a range of acceptable targets identified in the HCP or performance measures adopted by the BOF. The AMP guides the SDM process (Figure 4-2) to develop recommendations for the decision-maker to consider. As shown by the dashed lines in Figure 4-2, SDM may include designing new monitoring and reporting results as needed for decision support. Decisions may affect IPs and OPs through the process described in Section 4.2, *Implementation Guidelines*.~~

~~**FIGURE 4-3**~~
Adaptive Management Plan Workflow. ~~This workflow shows key AMP roles and how they can affect FMP implementation through decision support, monitoring, and reporting.~~



~~Key Monitoring Needs~~

~~The AMP designs monitoring, provides reporting, and responds to needs for additional decision support. Monitoring will include HCP compliance and effectiveness monitoring, BOF performance measures, monitoring of FMP strategies, and adaptive management monitoring recommended through potential SDM processes. These measures are called reporting metrics in the AMP, which describes the *strategy* for developing new metrics and tracks how data are collected, analyzed, and reported for each metric. Many reporting metrics will have quantifiable targets and acceptable ranges designated to assess whether management is meeting the desired outcomes that were monitored (i.e., lagging indicators) or that are predicted from modeling (i.e., leading indicators). Monitoring and reporting for the HCP and BOF-adopted performance measures are two major commitments addressed in the AMP (Figure 4-3).~~

~~Implementation of the HCP requires a detailed program of monitoring and adaptive management to ensure compliance and verify progress toward achieving the biological goals and objectives (HCP Chapter 6, *Monitoring and Adaptive Management*). The AMP serves as the structure for the adaptive management program required by the HCP to assess data gaps and scientific uncertainty that could affect how species are managed and monitored over time. The *HCP Administrator* at ODF serves as the key coordinator to initiate the process when triggers for action are identified from either over- or under-accomplishment of biological goals and objectives, or when alternative conservation~~

practices are available. The HCP adaptive management process fits well within the decision-making framework described in Section 4.3.1, *Decision-Making Framework,* with additional regulatory considerations and involvement with the federal permitting agencies.

The performance measures assess the impact state forest lands have on social, economic, and environmental wellbeing. Performance measures adopted by the BOF will include targets and acceptable ranges that will increase the likelihood of progress toward FMP goals. Some performance measures may be supported through new or existing monitoring programs, which will be organized through the AMP. The AMP develops reporting dashboards to track performance measures for the BOF and public and Tribal engagement.

Project Prioritization and Timeline

The AMP contains a broad suite of monitoring and reporting needs to implement, which may be dependent on the Division's resources. Multiple sources (public and Tribal engagement, the Division's business needs, the HCP, and the BOF) identify needs for decision analysis, adaptive management, or monitoring that will be integrated and prioritized for efficiency.

The AMP sets priorities to develop workplans based on the following criteria comparing potential projects.

- Regulatory requirements, such as HCP compliance monitoring.
- Potential impact on GPV.
- Likelihood of influencing future management decisions.
- Degree of uncertainty or knowledge gap.
- Capacity or feasibility of getting answers in reasonable time and at a reasonable cost.
- Efficient integration with ongoing or planned monitoring.
- Potential for research partnerships.

The timeline for reporting decision analysis products and monitoring results aims to complement IP revisions and comprehensive reviews of HCP implementation. The IP is the key opportunity for the decision-making process, public and Tribal engagement, and adaptive management changes based on monitoring. The AMP workflow focuses on IP information needs in the 2 years leading up to planned IP revisions. New information needs will occur outside of the IP and HCP cycles; the AMP is responsive to opportunities to integrate decision analysis into other Division needs.

4.3.3 Performance Measures

Performance measures are a select set of metrics that the BOF will use to evaluate management outcomes with respect to the objectives and intent expressed through the FMP guiding principles, management approach, and goals (Figure 4-1). The performance measures have specific components that will be monitored and reported under the process described in the AMP. Quantifiable targets and acceptable ranges designated by the BOF for performance measures'

~~components will indicate whether FMP strategies are working as intended to provide GPV. While performance measures do not encompass all aspects of ODF monitoring and reporting, their purpose is to provide an up-to-date dashboard for the BOF and the public to track management outcomes readily across a broad range of key ecosystem services provided by State Forests.~~

4.3.4 Process Improvement

ODF pursues process improvements to data collection, monitoring, and reporting to provide high-quality and accessible information to ODF staff, the BOF, and the public. This forms the basis for effective planning and assessing progress toward plan goals to ensure continued resilience of state forests in response to known and emerging stressors. Within the limits of budgetary constraints, ODF leverages new technologies to provide increasingly precise and accurate assessments of forest ecosystem conditions at multiple spatial and temporal scales to inform all levels of management, from site-specific operations to overarching policy.

4.4 Decision Authority and Revision Guidelines

As the environment changes, revisions to plans and processes may be necessary to implement adaptive management and ~~to~~ incorporate new information. Different policy contexts and planning levels dictate the process involved, including appropriate authorities.

4.4.1 Forest Management Plan

The BOF reviews ~~the management focus of~~ the FMP no less than every 10 years in light of current social, economic, scientific, and *silvicultural* considerations (OAR 629-035-0020). ~~It may require 10 years or more for monitoring to establish trends. As new information becomes available, it is evaluated~~The BOF evaluates new information in the context of the *guiding principles*, goals, and strategies of the FMP. If implementation of the FMP is not achieving the BOF's desired results~~, as~~ (e.g., indicated ~~by the~~ from monitoring and reporting of performance measures~~, the Division will revise~~), the BOF may respond by directing the State Forester to change implementation of the FMP through revising operational policies~~. If poor performance~~ or BMPs or adjusting implementation focus. The BOF may initiate an FMP revision if outcomes cannot be ~~corrected through revised operational policies, or if research or monitoring shows the need for a fundamental change in FMP strategies,~~improved by implementation changes alone. The BOF and the State Forester ~~will weigh~~engage county partners, Tribes, other federal and state agencies, stakeholders and the ~~scientific, operational, Tribal, and~~ public to gather input ~~in a transparent and formal public process to determine if changes are needed to~~ on the ~~FMP. Any changes will then be codified through OARs~~proposed revision.

4.4.2 Habitat Conservation Plan

The WOSF HCP ~~modification~~amendment process is described in the WOSF HCP ~~Chapter 8, *Implementation*.~~document. Amendments to the WOSF HCP or ~~permit modifications~~*Incidental Take Permits* are expected to be rare and informed by the adaptive management process as outlined in ~~HCP Chapter 6, *Monitoring and Adaptive Management*.~~the WOSF HCP. ODF, the U.S. Fish and Wildlife Service, and the National ~~Oceanic Atmospheric Administration~~Marine Fisheries Service are key decision-makers in the modification process.

4.4.3 Implementation Plan

As new information becomes available through monitoring and reporting, the State Forester may revise IPs in response to changing or unforeseen conditions (e.g., large-scale disturbance events) or development of new or better approaches to implementation identified through adaptive management. Table 4-2 outlines the key decision-makers.

~~4.4.3~~4.4.4 Operational Policy

~~Changes to~~The State Forester or State Forests Division Chief may change operational ~~policy occur~~policies as needed, in response to information from the adaptive management process, changing laws or conditions, new technology, improved management strategies, or new direction from the BOF or ODF leadership. ~~Key decision-makers depend on the policy~~Specific approval authorities depend on the scope of the policy in question, with the State Forester approval of policies that apply broadly to the agency, and State Forests Division Chief approval of policies confined to the State Forests Division. Most operational policies related to the management of state forests under this FMP fall under the authority of the State Forests Division Chief.

~~4.3.4 Implementation Plan~~

~~As new information becomes available, the IP may be revised in response to changing conditions or development of new or better implementation strategies identified through adaptive management. Revisions made at the IP level may include the types or amounts of management opportunities and their spatial arrangement. Key decision-makers are outlined in Table 4-2.~~

~~4.4.4~~4.4.5 Forest Land Management Classification System

Revisions may be needed to the FLMCS when there is a change to the management emphasis on ~~a parcel~~an area of land. Examples of such changes include the development of a new campground, a new wild and *scenic river* designation, or the removal of a research area after completion of a project. The District Forester recommends revisions to the Area Director, who may approve minor revisions or review and recommend major revisions to the State Forester for approval. While revisions may take place at any time, major revisions are usually carried out during IP development, and minor revisions are typically applied during OP development. A complete description of the process, including public comment periods can be found in OAR 629-035-0060.
~~Definitions of minor and major revisions can be found in OAR 629-035-0060.~~

4.5 Engagement Guidelines

The goals for public involvement in forest land planning are outlined in OAR 629-035-~~080~~0080 and include providing information, seeking insight, building understanding, and providing public comment opportunities. ~~The goals~~ For tribal engagement, the goals and strategies are outlined in Chapter 3, *Forest ~~Resource~~Resources, Goals, and Strategies*, and implementation is described in the IPs and OPs.

The purpose of public engagement is to create a relationship that provides meaningful opportunities to contribute to planning decisions. Engagement is most beneficial during the IP process, when input can have the most influence on the ~~levels and~~ types and location of planned management activities. Engagement opportunities for the IPs occur during the public comment period, which generally occurs during the IP development process, prior to final approval. Input may contribute to setting priorities and identifying general locations of management activities. ~~Input provided at~~For the ~~Operations Plan level would focus~~OPs, engagement opportunities occur during the annual or biennial public comment period, where input typically focuses on ~~small~~specific operations or activities, minor changes, refinements, or clarification of the plan. Additional opportunities for public input occur through BOF meetings. Table 4-3 shows the engagement opportunities, forums, and frequency by plan level and provides examples of types of input received during past engagement.

TABLE 4-3
Engagement Opportunities and Examples

Plan Level Venue	Engagement Areas	Topic	Example Comment
~~AMP~~**FMP Performance Measures** BOF meetings	• ~~Feedback and participation in the SDM process with regard to objectives, alternatives, consequences, and trade-offs~~ • Performance measures adopted for the purpose of BOF ~~to assess~~assessment of the FMP • Reports on performance measure trends	~~**SDM public engagement**~~Performance measures	• ~~Our user group would like XYZ objectives included in the decision analysis, and this is how the impact of management alternatives on our user group could be measured.~~The best available science has changed the understanding of the *adaptive capacity* of forests. The BOF should change the way adaptive capacity is measured and reported by ODF.
		~~**BOF public meeting**~~Performance measure trends	~~The BOF should request an evaluation of the trend in the XYZ Performance Measure reported on the public dashboard because objectives for XYZ resource are not being met and management may need to change.~~ ~~The BOF should promote the development and implementation of Tribal engagement policies to ensure ongoing consultation and coordination regarding potential impacts from forest~~ • ~~management activities at every level.~~The reported trend in *carbon sequestration* is insufficient. We think the BOF should adopt a carbon sequestration target for ODF.

IP Public comment period	• Harvest types, priorities, and general locations • Recreation, education, and interpretation development/activity levels, types, priorities, and general locations • Stream enhancement types, priorities, and general locations • Road assessments, project types, priorities, and general locations • Monitoring and adaptive management priorities	~~**Monitoring prioritization**~~Management activity type and location	• ~~Recreational surveys~~I would like more mountain biking trails, preferably built inside habitat conservation areas to reduce potential conflicts with harvesting. • Harvest objectives need to be increased to provide better economic opportunities in rural communities. • I would like to see more species diversity in newly planted *stands* including hardwoods. • I think reducing road density within a certain *watershed* should be prioritized ~~during this IP to gather information that may be used to reduce conflict between user groups~~. • ~~Integrate Tribal Partners' priorities and practices to ensure protection and proliferation of cultural and natural resources.~~Harvests within habitat conservation areas should focus on young stand thinning. • I recommend managing for complex early-*seral* conditions after *regeneration harvest* in specific watersheds.
		Stream enhancement/road project priority and location	• I propose a specific watershed as a high priority for stream enhancement to align with work being done by a local Watershed Council in the next 5 years to replace non-fish-passable *culverts* and enhance 5 miles of a specific stream.

Plan Level Venue	Engagement Areas	Topic	Example Comment
~~IP~~OP Public comment period (annual or biannual)	• ~~Harvest levels, harvest types, priorities, and general locations~~ • ~~Recreation, education, and interpretation development/activity levels, types, priorities, and general locations~~ • ~~Stream enhancement levels, types, priorities, and general locations~~ • ~~Road project levels, types, priorities, and general locations~~ • ~~Monitoring and~~	~~Management activity type and location~~Efficiency / site-specific information	~~I would like more mountain biking trails, preferably built inside HCAs to reduce potential conflicts with harvesting.~~ • ~~Work with Tribal Partners to integrate~~ The boundary of a specific timber sale could be extended to the southwest where the terrain flattens out. Extending the boundary would eliminate the need to work through young stands while harvesting the timber during future sales. A specific sale has a potential culturally ~~important plant and animal species (such as bear grass, camas, and spruce root).~~ ~~Work with Tribal Partners to encourage access and co-management opportunities, including cultivation techniques that promote culturally~~/historic significant ~~attributes, and sharing native seed sources and native seedlings.~~ • ~~Coordinate with Tribal Partners to identify sales that may affect ancestral lands, level significance, and potential~~site that requires certain protection measures ~~that may be needed to protect culturally significant resources~~.
		Clarification	• I don't understand the terminology being used in this plan. Can you include definitions for BA, shelterwood and MBF in the document? • I'm uncertain about what exactly the stream enhancement entails. Can you provide more details on the project?

	~~adaptive management priorities~~Ensured consistency with the IP and/or FMP • Improved efficiency or effectiveness • Clarified description of planned operations • Additional information or correction of an error • Solution-oriented comments to achieve GPV goals and objectives	~~**Stream enhancement/road project priority and location**~~Solutions-oriented	~~I propose the "generic" watershed as a high priority for stream enhancement and road improvement projects to align with work being done by the "Generic" Watershed Council in the next 5 years to replace non-fish-passable culverts and enhance 5 miles of the "generic" stream.~~ • ~~Engage Tribal Partners in prioritizing and identifying partnership opportunities to protect culturally significant aquatic species, such as salmonids and lamprey.~~This sale area will affect approximately 1 mile of the existing trail. Is it possible to have trails open for use on the weekends? • I am concerned with the amount of dust that comes off the road during log hauling. Can you please use dust abatement measures on the gravel road in front of my house to limit the impact? • This sale includes a domestic water source. I recommend leaving additional leave trees around no-harvest buffers for additional protection. • I am concerned that the proposed timber harvest treatment will not improve habitat for covered species. I recommend increasing leave tree densities to meet specific habitat goals.

~~Plan Level~~	~~Engagement Areas~~	~~Topic~~	~~Example Comme~~
~~OP~~	• ~~Ensured consistency with the IP and/or FMP~~ • ~~Improved efficiency or effectiveness~~ • ~~Clarified description of planned operations~~ • ~~Additional information or correction of an error~~ • ~~Solution-oriented comments to increase the probability of achieving GPV goals and objectives~~	**~~Efficiency/effectiveness~~**	~~The boundary of XYZ sale could b southwest where the terrain flatt the boundary would eliminate through young stands while har during future sal~~ ~~The XYZ sale includes a cultura that requires coordination wi implement XYZ protection~~
		~~Clarification~~	~~I don't understand the terminol this plan. Can you include de shelterwood and MBF in th~~ ~~XYZ Tribe did not have awarene has potential concerns and w information.~~
		~~Solutions-oriented~~	~~The XYZ sale area will affect ap mile of the existing trail. I realize working forest and ask for considerations: Limit the timin operation is not active during p season (July–Sept). If this is not trees away from the trail whene all slash removed from the trai equal or better shape than pre-h Have trails open for use on wee~~

Guidelines

This chapter provided the overarching guidelines for implementing the FMP, evaluating whether the strategies are meeting the goals, and adapting the plans to better meet the goals. Details on how ODF engaged county partners, other state agencies, interested parties, the public, and the *nine federally recognized tribes in Oregon* in the development of the FMP can be found in Appendix A, *Engagement*. Maps of the planning area and district boundaries are found in Appendix B, *Maps*. Visually impaired readers can find descriptions of all FMP figures in Appendix C, *Alternative Text to Figures*. For additional information on supporting plans, policies, tiered planning documents, and reports, please visit the ODF website.

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List of Acronyms and Abbreviations

Acronym	Definition
AMP	Adaptive Management Plan
BMP	best management practice
the BOF	Oregon Board of Forestry
BOFL	Oregon Board of Forestry Lands
CCCP	Climate Change and Carbon Plan
CSFL	Common School Forest Lands
DEQ	Oregon Department of Environmental Quality
Division	State Forests Division
DOGAMI	Oregon Department of Geology and Mineral Industries
DSL	Oregon Department of State Lands
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDF	Forest Development Fund
FLMCS	Forest Land Management Classification System
FMP	Western Oregon State Forests Management Plan
FPA	Oregon Forest Practices Act
GIS	geographic information system
GPV	greatest permanent value
HCA	habitat conservation area
HUC	Hydrologic Unit Code
HVCA	High Value Conservation Area
IP	Implementation Plan
ITECK	Indigenous Traditional Ecological and Cultural Knowledge
NAAQS	National Ambient Air Quality Standards
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture

Acronym	Definition
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OHV	off-highway vehicle
OP	Operations Plan
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statutes
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department
RCA	riparian conservation area
SB	Senate Bill
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SNC	Swiss needle cast
TMDL	Total Maximum Daily Load
VOF	Vision for Oregon's Forests
WOSF HCP	Western Oregon State Forests Habitat Conservation Plan

Glossary

A

Term	Definition
abiotic	Non-living components of an ecosystem.
active management, actively managed	~~Active~~Purposeful application of silvicultural prescriptions and other activities, like reforestation and young stand management, in accordance with the future objectives and current characteristics of forest stands. In contrast, see *passive management*.
adaptation silviculture, adaptive silviculture	Use of silvicultural techniques to increase the forest's ability to adapt to changing conditions and continue to deliver ecosystem services.
adaptive capacity (of ecosystems)	The ability of the system to sustain delivery of desirable ecosystem services under changed climate conditions and other disturbances via resistance and resilience to disturbance or transformative change to an acceptable new equilibrium. The Intergovernmental Panel on Climate Change defines adaptive capacity as the degree to which adjustments in practices, processes, or structures can moderate or offset the potential for damage or take advantage of opportunities created by a given change in climate.
adaptive management	A systematic and rigorous approach to learning from actions, improving management, and accommodating change. Adaptive management is defined as 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 (Oregon Administrative Rule [OAR] 629-035-0000). • ~~active adaptive management - A range of alternative management strategies are implemented in an experimental framework so that learning is a primary objective. Even though some alternatives may be suboptimal in achieving management objectives, decision-makers can identify and refine an optimal management strategy through a targeted study that reduces uncertainty~~ ~~passive adaptive management - Outcomes of a single course of action are monitored and the management decisions are adjusted, if needed, based on the results of the monitoring. Learning, or reducing uncertainty, is a secondary objective and alternatives are not tested experimentally.~~

Adaptive Management Plan (AMP)	Describes the monitoring and reporting process that will ensure Western Oregon State Forests Management Plan (FMP) resource goals are met during implementation of the FMP. The AMP grounds monitoring and reporting within an adaptive management framework to inform management decisions and align with Implementation Plan (IP) and *Western Oregon State Forests Habitat Conservation Plan* (HCP) reporting timelines.

~~Adaptive Management Plan (AMP)~~Term	~~Describes the adaptive management process used to monitor outcomes, evaluate trade-offs, determine if the strategies are meeting the goals of the Western Oregon State Forests Management Plan (FMP) and *Western Oregon State Forests Habitat Conservation Plan* (HCP), determine if assumptions used in developing the strategies need to be updated, and inform management decisions.~~**Definition**
~~adaptive monitoring~~	~~Iterative evolution of a monitoring program in response to new management questions; new or changing environmental or socioeconomic conditions, improved monitoring methods, models, and tools; and experience implementing the monitoring program. See definition for *monitoring*.~~
~~adaptation silviculture, adaptive silviculture~~	~~Use of silvicultural techniques to increase the forest's ability to adapt to changing conditions and continue to deliver ecosystem services.~~
administrative ~~sites~~site(s)	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 (OAR 629-035-0055 39(c)(B)(i).
aggregate	Sand and pebbles added to cement to make concrete, or that are used in road construction.
~~archaeological and historic resources~~	~~Sites, buildings, structures, and artifacts that possess material evidence of human life and culture of the prehistoric and historic past.~~
~~archaeological or historic object~~anadromous	~~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 (Oregon Revised Statutes [ORS] 358.905).~~Species, such as salmon, that are born in freshwater, migrate to the ocean to grow into adults, and return to freshwater to spawn.

~~**archaeological or historic 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 with biotic or geological remains or deposits (ORS 358.905). Specific types of sites, as defined in Oregon law, are:~~ • ~~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 belowground and/or aboveground diminishing remains.~~ • ~~historic site - Created and/or used by humans since the time of Euro-American inhabitance; usually aboveground structurally intact remains.~~ • ~~site of archaeological significance - Any archaeological site in, or eligible for inclusion in, 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).~~
aquatic	In or on the water; aquatic habitats are in streams or other bodies of water, as contrasted with riparian habitats, which are near water.
aquatic organism passage, passage, fish passage	Aquatic organism passage is the term for removal or improvement of structures that ~~restricts~~restrict the movement of aquatic animals, such as fish, turtles, amphibians, and insects within and between streams.
aquifer	A sand, gravel, or rock formation that is capable of storing or transporting water below the surface of the ground.
archaeological and/or historic object(s)	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).
archaeological and historic resource(s)	Sites, buildings, structures, and artifacts that possess material evidence of human life and culture of the prehistoric and historic past.

~~area directors~~archaeological and historic site(s)	~~Leads of the two administrative areas covered by this FMP: northwest and southern Oregon. The northwest Oregon area covers Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade Districts. The southern Oregon area covers the Western Lane district.~~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 with biotic or geological remains or deposits (ORS 358.905). Specific types of sites, as defined in Oregon law: • Pre-historic archaeological site - Created and/or used by humans indigenous to the area before Euro-American inhabitance.

Term	Definition
	• Historic archaeological site - Created and/or used by humans since the time of Euro-American inhabitance; usually belowground and/or aboveground diminishing remains. • Historic Site - Created and/or used by humans since the time of Euro-American inhabitance; usually aboveground structurally intact remains. • Site of archaeological significance - Any archaeological site in, or eligible for inclusion in, 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).
Area Director(s)	Lead managers of the two administrative areas covered by this FMP: northwest and southern Oregon. The northwest Oregon area covers Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade Districts. The southern Oregon area covers the Western Lane district.
asset(s)	Tangible resources and infrastructure on state forest lands.

~~B~~

B

Term	Definition
basal area	Cross-sectional area of a standing tree bole at breast height. Basal area per acre of all trees in a stand is an important measure of stand density and is related to stand volume.
best management practices (BMPs)	Oregon Forest Practices Act (FPA) rules adopted by the Board of Forestry (BOF) 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.~~natural resources, such as water quality or air quality, or human safety, such as trail users.

Term	Definition
biochar	Charred forest material, such as slash or dead plants, which can improve soil productivity and water quality and sequester carbon. The practice of charring forest material and mixing it with soil was used for thousands of years by indigenous people in the Amazonian basin. The practice created rich soils, called “terra preta de Indio”, in otherwise infertile soils. Modern technologies use pyrolysis to produce biochar. Pyrolysis prevents harmful emissions and produces valuable byproducts in addition to biochar. Pyrolysis is the thermal decomposition of plant material in the absence of oxygen, which prevents combustion (burning). By preventing combustion, the production process prevents the release of greenhouse gases, particulates, and other toxicants to the atmosphere and instead produces bio-oil and synthesis gas, which are captured and can be used as fuel or precursors to other chemical products. Like coal, biochar is a stable form of carbon that can store carbon in the soil for hundreds to thousands of years.
biodiversity ~~or~~, biological diversity	The genetic variation and the variety of microbial, fungal, plant, and animal life.
biotic	Any living aspect of the planet.
Board of Forestry (BOF)	The BOF is a seven-member citizen board appointed by the governor and confirmed by the Oregon State Senate. ~~At least one member must reside in each of the state’s three administrative regions (east, south, and northwest). No more than three members may receive any significant portion of their income from the forest products industry.~~ The BOF supervises all matters of forest policy in Oregon~~; appoints the state forester~~; adopts rules regulating forest practices; and provides general supervision of the state forester’s management of the Oregon Department of Forestry (ODF). The BOF authorizes and directs the State Forester in the management of state forests.

Board of Forestry Lands (BOFL)	BOFL were acquired by the BOF under ORS 530.010–530.040. Most were transferred from counties to the BOF in exchange for a portion of future revenue from the lands. Some lands were acquired by direct purchase.

C

~~C~~Term	Definition
candidate species	Species being considered by the Secretary of the Interior for listing under the Endangered Species Act as an endangered or a threatened species, but not yet the subject of a proposed rule.
~~**carbon pools**~~	~~Reservoirs of carbon that have the capacity to both take in and release carbon.~~
~~**carbon sequestration, carbon storage**~~	~~The process of capturing and storing atmospheric carbon dioxide.~~
~~**Class I areas**~~	~~National park lands and some wilderness areas are designated as federal mandatory Class I areas under the Clean Air Act.~~

Term	Definition
carbon pools	Categories of carbon reservoirs, such as soil, tree roots, aboveground tree boles, or harvested wood products, that have the capacity to both take in and release carbon.
carbon sequestration	The process of capturing atmospheric carbon dioxide, removing it from the atmosphere where it contributed to global warming. In the forest, sequestration is primarily measured in trees sequestering carbon in their wood through their use of carbon dioxide in photosynthesis
carbon storage	Sequestered carbon is a stable component of various carbon pools within the forest and in wood products, contributing to climate change mitigation by preventing carbon dioxide from being released into the atmosphere. See *carbon pools*.
Class I area(s)	National park lands and some wilderness areas are designated as federal mandatory Class I areas under the Clean Air Act.
Clean Air Act	Federal law passed in 1970 and amended several times since. The authority to implement the act is delegated to states. The Clean Air Act is implemented, in part, through a permit system.
Clean Water Act	Federal law was passed in 1948 under the Federal Water Pollution Control Act but was significantly reorganized and expanded in 1972 and has been known as the Clean Water Act since then. This act, which has been amended several times since 1972 as well, establishes the basic structure for regulating discharges of pollutants into the waters of the United States; states may have their own Clean Water Acts whose standards must meet or exceed the federal mandates.
~~clearcut~~climate change	~~Traditionally, a silvicultural system in which the entire stand of trees is cleared from an area at one time. Some residual trees, snags, and downed wood from the existing stand are retained to meet HCP goals and objectives and FPA requirements. Clearcutting and planting (if needed) result in the establishment of a new even-aged stand of trees.~~Per the United Nations, involves long-term shifts in temperatures and weather patterns. Some shifts are natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping greenhouse gases that build up in the Earth's atmosphere, causing average temperatures around the globe to increase ("global warming").

~~climate change~~Term	~~Per the United Nations, involves long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping gases.~~**Definition**
climate change mitigation	Reducing heat-trapping greenhouse gases ~~in~~added to the atmosphere by reducing production from sources (e.g., the burning of fossil fuels for electricity, heat, or transport) ~~of~~ and/or sequestering these gases from the atmosphere, such as through tree growth.
climate-smart forestry	An extension of sustainable forest management developed to guide management of forests in ways specific to climate change adaptation and mitigation efforts and to support climate-affected communities. Climate-smart forestry principles can be enacted through climate-informed silviculture, ~~such as~~which may include reforestation using alternative tree species; reforestation using alternative planting spacings and densities; reforestation using diverse species mix (bet hedging); and leaving legacy trees and downed wood to store carbon on the landscape.
coarse filter~~–~~, fine filter	An operational approach for managing ~~for~~ biological diversity. 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. Fine-filter management ~~superimposes~~adds specific management actions for individual species or habitats that require special consideration, such as species with unique or limited distributions.
cohort	A group of trees regenerating after a single disturbance. The age range within a cohort may be as narrow as 1 year (typical with planting under active management) or as wide as several decades~~, depending on how long trees continue invading after a disturbance.~~ (with natural regeneration under passive management).
Common School Fund	A permanent fund or account managed to provide revenues to the common schools. The State Land Board (governor, secretary of state, and treasurer) is the trustee of the ~~Common School Fund (CSF).~~fund.

Term	Definition
Common School Forest Lands (CSFL)	Common School trust lands that have been listed by the State Land Board for the primary goal of managing these lands for 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 nature of something's ingredients or constituents; the way in which a whole or mixture is made up.~~ For an ecosystem, composition refers to the different species of plants and animals that live therein. The dynamic attributes of a forest ecosystem are composition, function, and structure. Composition is the proportion of various species. In contrast, *function* is the processes taking place in the system~~.~~, while *structure* includes kinds and distribution of stand components such as trees, snags, and logs of various sizes and shape.
~~**concept(s)**~~	~~An abstract or generic idea generalized from particular instances.~~
confidential	Limited to persons authorized or entrusted with the information.
conifer forest	These stands occupy most of the state forest lands. ODF classifies conifer stands as those in which conifer tree species compose 50 percent or more of the basal area. Although conifers are the principal species with economic value in these stands, the stands may also include substantial amounts of other vegetation types such as hardwoods, ~~brush, grass~~shrubs, grasses, and ferns, which contribute to a diverse forest ecosystem. These types are either intermixed with the conifers or are in clumps too small to map and inventory separately.
connectivity	A measure of how well different areas (patches) of a landscape are connected by linkages~~, such as~~. For wildlife, habitat patches ~~or~~could be connected by corridors~~.~~ of forest used to move between patches. At a landscape level, the connectivity of ecosystem functions and processes is ~~of equal importance~~considered in addition to the connectivity of habitats, by the spatial arrangement and pacing of management activities.

~~**conservation area(s)**~~**Term**	~~Designated land where conservation strategies are applied for the purpose of attaining specific conservation objectives; this may include cultural or biological aspects. In State Forests, conservation areas include habitats used by northern spotted owls and marbled murrelets, riparian conservation areas, rare or unique habitats, and areas requiring special protection for other resource values.~~ ~~Management within conservation areas is aimed at maintaining desired conditions.~~**Definition**
~~**cultural resources**~~**conservation area(s)**	~~An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource may be tangible, a place or space, or a cultural practice. Tangible cultural resources are categorized as sites, buildings, structures, and objects for listing in the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. A cultural place or space may include areas containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures. Cultural practices may be associated with plant and animal communities or particular places, acknowledge past events or people, and have significant meaning to practitioners.~~Designated land where conservation strategies are applied for the purpose of attaining specific conservation objectives such as maintaining or improving conditions for species of conservation concern. In State Forests, conservation areas include habitats used by northern spotted owls and marbled murrelets, riparian conservation areas, rare or unique habitats, and areas requiring special protection for other resource values. Habitat conservation areas and riparian conservation areas are defined below and dictated by the WOSF HCP.

~~**culvert**~~**cultural resource(s)**	~~Structure that channels water past an obstacle, under a roadway, or to a subterranean waterway. Typically surrounded by soil or road fill (embedded), a culvert may be made from a pipe, reinforced concrete, or other material.~~An aspect of a cultural system that is valued by or significantly representative of a culture or that contains significant information about a culture. A cultural resource may be tangible, a place or space, or a cultural practice. Tangible cultural resources are categorized as sites, buildings, structures, and objects for listing in the National Register of Historic Places and as archeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. A cultural place or space may include areas containing a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures. Cultural practices may be associated with plant and animal communities or particular places, acknowledge past events or people, and have significant meaning to practitioners.
~~**D**~~**culvert(s)**	Structure that channels water past an obstacle, under a roadway, or to a subterranean waterway. Typically surrounded by soil or road fill (embedded), a culvert may be made from a pipe, reinforced concrete, or other material.

D

Term	Definition
debris torrent, debris flow	Rapid movement of a large quantity of materials, including wood and sediment, down a stream channel. This generally occurs in smaller streams during storms or floods, which scours the streambed.
~~**decision analysis**~~	~~A process used to simplify decisions by breaking them down into key parts to work through in sequence.~~

~~**deep-seated landslide**~~**Term**	~~Slides in which the bulk of the slide plane lies below the roots of the forest trees, with a depth ranging from 10 feet to several hundreds of feet. These slides are usually caused by a change in the geologic and hydrologic processes in the area of the landslide, such as seismic shaking or increased levels of groundwater. Once formed, deep-seated landslides can persist for a few years or even centuries. See definition for *landslide*.~~**Definition**
degraded forest lands, degraded watersheds	~~Degraded forest land conditions are those~~Areas where the forest's biodiversity and ecological processes are diminished or severely constrained. These conditions may exist because of past management practices or large-scale disturbances such as fire, windstorms, floods, and outbreaks of insects or pathogens. ~~Degraded forest land conditions may exist because of past management practices or natural disturbances such as fire, windstorm, floods, and outbreaks of insect or pathogens.~~
demographics	~~Demographics is~~ The collection and analysis of general characteristics about groups of people and populations, such as age, gender, and income.
demonstration ~~forests~~forest(s)	Timberland ~~that is~~ managed for forestry education, research, and recreation. It demonstrates innovations in forest management, watershed protection and restoration, and environmentally sensitive timber harvesting techniques.
deposition	When rocks or particles of soil or silt are carried from one location and placed in another, usually by moving water or wind. The wind or water can physically pick up and carry small particles, and these particles are deposited when there is not enough energy to carry them any longer.
~~**density**~~**desired stand goal**	~~The average number of individuals or units per unit of space. In terms of forestry, density is often the number or size of a population (trees, species, etc.) in relation to a unit of space. In silviculture, stand density is measured as the amount of tree biomass per unit area of land. This can be measured as the number of trees, basal area, wood volume, or foliage cover. Also see "stand density" and "stand density index."~~A planning goal that describes the conditions land managers are attempting to achieve over a specified period of time in a given geographic area. In some cases, the land may already be in the desired condition and land managers would focus on maintaining those conditions. If the natural area is not currently in the desired condition, managers may take actions to encourage a different pattern of change over time to reach the desired stand goals. The desired stand goals describe the land or resource conditions of the forest

	given implementation of management direction contained in the plan if goals and objectives are fully achieved.
~~deposition~~dispersal habitat	~~Deposition is when rocks or particles of soil or silt are carried from one location and placed in another, usually by moving water or wind. The wind or water can physically pick up and carry small particles, and these particles are deposited when there is not enough energy to carry them any longer.~~For northern spotted owls, can be conifer and mixed mature conifer-hardwood stands with a canopy cover greater than or equal to 40 percent but without suitable nesting habitat and contains understory features that inhibits foraging both through decreased visibility of prey (overgrown vegetation or high twig density) or inadequate understory vegetation to support prey species. (Habitat neither suitable for nesting nor foraging.)
dispersed recreation	Areas where camping and hiking are allowed in undeveloped areas, where there are no trail or camping facilities or infrastructure.

~~**desired future condition**~~**Term**	~~A planning goal that describes the conditions land managers are attempting to achieve over a specified period of time in a given geographic area. In some cases, the land may already be in the desired condition and land managers would focus on maintaining those conditions. If the natural area is not currently in the desired condition, managers may take actions to encourage a different pattern of change over time to reach the desired conditions. The desired future condition describes the land or resource conditions of the forest given implementation of management direction contained in the plan if goals and objectives are fully achieved.~~**Definition**
~~**dispersal habitat**~~	~~For northern spotted owls', can be conifer and mixed mature conifer-hardwood stands with a canopy cover greater than or equal to 40 percent but has no suitable nesting habitat and contains understory features that inhibits foraging both through decreased visibility of prey (overgrown vegetation or high twig density) or inadequate understory vegetation to support prey species. (Habitat neither suitable for nesting nor foraging.)~~
dissected	A landscape that has been cut into hills and valleys by the process of erosion.
district(s)	The FMP planning area is organized into management districts. Northwest area districts are Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade. The Western Lane District includes all state forests in Lane County and southwest Oregon.
District Forester	The lead forester for an ODF ~~district. See definition for *field districts* and *ODF*~~management district.
disturbance(s)	A force that causes significant change in an ecosystem's structure and/or composition. Disturbance can be caused by natural events such as fires, floods, extreme winds, earthquakes, and insect or disease outbreaks, or by human activities.
domestic water use	The use of water for human consumption and other household human use.
~~**diversity**~~**dominant, co-dominant**	~~Variety encompassed within a group. In terms of diversity, equity and inclusion (DEI), diversity means honoring and including people of different backgrounds, identities, and experiences collectively and as individuals. It emphasizes the need for sharing power and increasing representation of communities that are systemically underrepresented and under-resourced. These differences are strengths that maximize the state's competitive advantage through innovation, effectiveness, and adaptability.~~The largest-sized trees in a stand with crowns in the forest canopy that receive direct sunlight. Co-dominant implies that multiple species contribute to the dominant canopy layer. Also used as a synonym for primary, for example, in

	describing the most common component of a stand or ecosystem process.
downed wood, woody debris	Fallen trees or pieces of trees on the forest floor or in the stream channel that provide many important functions such as ~~mineral cycling,~~ nutrient ~~mobilization~~cycling, maintenance of site productivity, natural forest regeneration (nurse logs), substrates for mycorrhizal fungal network formation, and diverse ~~habitats~~habitat elements for fish and wildlife species.

E

Term	Definition
ecological silviculture	Silvicultural practices that promote within-stand diversity and complexity found in unmanaged older forests by emulating the stand initiation and development processes that result from small-scale natural disturbances (e.g., windthrow, lightning, insects, disease).

~~E~~

~~**ecological silviculture**~~**Term**	~~Based on the spatial heterogeneity found in unmanaged old forests and seeks to emulate stand initiation and development processes that result from small-scale natural disturbances (e.g., windthrow, lightning, insects, disease) to promote within-stand diversity and complexity.~~**Definition**
ecologically sustainable forest management~~,~~ ~~**ecologically sustainable approach**~~	A management approach that focuses on ~~supporting the function of forest ecosystems and processes, to improve capacity to adapt and~~the sustainable delivery of ecosystem services while maintaining the integrity and improving the resilience of the ecosystem.
ecology	The ~~biological science that deals with~~ study of the ~~relations~~interactions of organisms to one another and ~~to~~with their physical environment.
~~**ecosystem function(s) or functioning**~~	~~The many and varied biotic and abiotic processes that make an ecosystem capable of reproducing outcomes over time (e.g., biogeochemical processes, nutrient cycling, decomposition, regeneration, and succession that supports survival of a common set of species over time).~~
~~**ecosystem goods and services**~~	~~Goods produced by ecosystems such as water, food, medicine, fuel, construction materials; and services produced by ecosystems such as clean air, clean water, heat mitigation, flood risk mitigation, water storage, and erosion control.~~
ecosystem(s)	A complex system comprising populations of organisms considered together with their physical environment and the interacting processes that exchange energy and matter between them (e.g., marsh, watershed, lake ecosystems). Ecosystems do not have boundaries fixed in time or space, or fixed biological or physical compositions, because the form and function of ecosystems change at various rates, depending on prevailing environmental factors and their resistance and resilience to disturbances.
ecosystem function(s) or functioning	The many, interacting biotic and abiotic processes that occur within an ecosystem (e.g., biogeochemical processes, nutrient cycling, decomposition, regeneration, and succession).
ecosystem goods and services	Goods produced by ecosystems such as water, food, medicine, fuel, construction materials; and services produced by ecosystems such as clean air, clean water, heat mitigation, flood risk mitigation, water storage, and erosion control.

edge(s)	The point where two different plant communities (different vegetation types, successional stages, or conditions) meet. Edges may be created by a soil or topographical feature of the site, or where short-term effects are created by natural or human-caused disturbances.
effectiveness monitoring	Monitoring designed to evaluate whether a given management action was effective in meeting a stated management objective. See definition for *monitoring*.

emphasis ~~areas~~area(s)	Spatially explicit areas managed with an emphasis ~~in~~on certain resource goals or benefits, such as wildlife habitat improvement or timber production. See *Forest Land Management Classification System (FLMCS)* and Chapter 2 for how the designation, distribution, and management ~~to achieve different combinations of resources goals. Layout~~ of emphasis areas ~~across the landscape supports diversity, connectivity, complexity, and redundancy, which support adaptive capacity for sustained ecosystem services delivery under changing conditions~~contributes to ESFM.

Term	Definition
endangered species	As defined by the Endangered Species Act of 1973 (ESA), any species (including subspecies or qualifying population) that is in danger of extinction throughout all or a significant portion of its range.
Endangered Species Act (ESA)	~~Provides~~Federal and state laws that provide a framework to conserve and protect endangered and threatened species and their habitats both domestically and abroad.
endemic species	Species restricted to a geographic location and found nowhere else in the world.
engagement	The involvement and participatory actions of the public and Tribes in planning and decision-making processes.
engineering	The science or profession of developing and using nature's power and resources in ways that are useful to people (as in designing and building roads, bridges, dams, or machines and in creating new products).
environmental gradient	Changes in physical or chemical characteristics across space, such as elevation, soil characteristics, ground slope, air or stream temperature, soil moisture or humidity, average annual precipitation.
~~equity~~Equipment Restriction Zone (ERZ)	~~The quality of being fair and impartial. As part of DEI, equity acknowledges that not all people, or all communities, are starting from the same place due to historic and current systems of oppression. Equity is the effort to provide different levels of support based on an individual's or group's needs to achieve fairness in outcomes. Equity actionably empowers communities most affected by systemic oppression and requires the redistribution of resources, power, and opportunity to those communities.~~A 35-foot buffer within RCAs where ground disturbance and vegetation removal are minimized to project streambanks and aquatic habitat.
erosion	The geological process in which earthen materials are worn away and transported by natural forces such as wind or water.
ethnobotanical	The scientific study of the traditional knowledge and customs of a people concerning plants and their medical, religious, and other uses.

Term	Definition
Evolutionarily Significant Unit (ESU)	An ESU is 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. This term is used by the National Marine Fisheries Service (NMFS) as guidance for determining what constitutes a distinct population segment for the purposes of listing Pacific salmon species under the ESA. 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.

F

~~F~~Term	Definition
~~**field districts**~~	~~The FMP planning area is organized into management districts, or field districts. Northwest districts are Astoria, Tillamook, Forest Grove, West Oregon, and North Cascade. The southwest district covered in this FMP is Western Lane.~~
financial viability	Achieved over the long term through continued protection and management of the forest asset; achieved over the short term with operational tools that ensure cash flow is available to ODF for sound management of state forest lands.
fine filter	See definition for *coarse filter~~-~~, fine filter*.
fiscal conditions	Describes a government's ability to meet its financial and service obligations. If an agency is able to meet these obligations, it is in good fiscal condition; if not, it may experience fiscal stress.
fish passage	See definition for *aquatic organism passage*.
FMP area	See definition for *planning area*.
forest carbon	Atmospheric carbon dioxide that is ~~assimilated~~sequestered and stored by trees and other vegetation through the process of photosynthesis and released during respiration and decomposition.

Forest Development Fund (FDF)	~~Fund through which all BOF expenditures and revenues are managed.~~Revenue derived from BOFL that is retained by ODF and used as the operating fund for management of BOFL. Note that this fund is tracked independently within ODF's general operating funds but does not exist as a separate account.
~~**forest health, healthy forest landscapes**~~	~~Severity, extent, and frequency of events causing injury or death of trees and other organisms living in the forest; ability of forest to resist or recover from disturbance events; ecosystem health.~~

Term	Definition
forest health, healthy forest landscapes	Forest condition where the severity, extent, and frequency of events causing injury or death of trees and other organisms is minimized; ability of forest to resist or recover from disturbances both natural and manmade.
Forest Land Management Classification System (FLMCS)	As codified in OAR 629-035-~~0050~~00550, a method of describing the management emphasis of parcels of state forest lands. The FLMCS is recorded as a geographic information system (GIS) layer. The management emphasis identifies the extent to which a parcel of land can be managed for a variety of forest resources. It also identifies when a particular forest resource may need a more focused approach in its management, or possibly an exclusive priority as designated by the FMP, the WOSF HCP, and other laws or commitments. State forest lands are classified as General Stewardship, Focused Stewardship, Special ~~Stewardship~~Use, or High Value Conservation Areas.
forest product(s)	Products that people take to market or use directly like timber or firewood, mushrooms, and medicinal plants. See *special forest products.*
forest resources	As defined by OAR 629-035-0000, include, but are 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.

Term	Definition
Forest Trust Lands Advisory Committee	An advisory group of elected county commissioners mandated by statute that advise the BOF and state forester on matters related to state forestland managed by ODF. The council represents the 15 counties with state forest lands on policy matters related to the management of the forestlands and distributions of revenues produced from those lands. The counties that receive revenues from these forestlands are Benton, Clackamas, Clatsop, Columbia, Coos, Douglas, Josephine, Klamath, Lane, Lincoln, Linn, Marion, Polk, Tillamook, and Washington. The committee's member roster is established during the middle of November each year when the Council of Forest Trust Land Counties elects their board of directors at the annual meeting of the Association of Oregon Counties.

forestry	The science and practice of establishing, managing, and conserving forests and associated resources in a sustainable manner to meet desired goals, needs, and values.
formation(s)	The action of forming or process of being formed. In geology, a formation is a group of strata, or layers, of the same sort of rock or mineral, or rock having common characteristics. A formation is usually defined distinctive enough in appearance that a geologic mapper can tell it apart from the surrounding rock layers.
fragmentation	~~The relationship of the landscape matrix to other types of patches; as fragmentation increases, the matrix becomes geometrically more complex. Maximum landscape fragmentation occurs when no dominant patch exists. Fragmentation is also defined as the spatial arrangement of successional stages across the landscape as the result of disturbance and is often used to refer specifically to the process of reducing the size and connectivity of late successional or old growth forests.~~Process of breaking up forest types or habitat patches into smaller areas and reducing connectivity by impeding the movement of organisms.
function(s), ecological function	An activity or process that occurs in an ecosystem; some typical functions are plant growth, animal reproduction, and decay of dead plants.

G

~~G~~Term	Definition
geographic information system (GIS)	A system for management analysis and display of geographic knowledge that is represented using a series of information sets such as maps and globes, geographic data sets, processing and workflow models, data models, and ~~meta data~~metadata.
geology	The ~~science that deals with~~study of the earth's physical structure and substance, its history, and the processes that act on it.
geomorphic process	The physical and chemical interactions between Earth's surface and natural forces that shape landforms such as stream channels and floodplains over time. These processes are driven by tectonics and volcanism and weathering, erosion, and deposition by water, wind, and ice.
geothermal	Of or relating to the internal heat of the earth.
goals	A concise, broad statement of an organization's end or process that programs are designed to achieve. OAR 629-035-0030 requires that the FMP contain "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 (Greatest Permanent Value)."
greatest permanent value (GPV)	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 as defined in OAR 629-035-0020.

guidelines	A set of recommended or suggested methods or actions that should be followed in most circumstances to assist administrative and planning decisions, and their implementation in the field. They are provided as a broad framework of recommended actions to be taken and, thus, provide some flexibility for decision-making.
guiding principles	The overall rules, ~~goals~~aims, and responsibilities that guide the planning process for the northwest Oregon state forests. Guiding principles are required elements for the FMP identified in the Forest Management Planning rule (OAR 629-035-0030).

~~H~~

~~**habitat**~~	~~The resources, conditions, and factors necessary to support living organisms over space and through time.~~ ~~Improving habitat means improving the resources or conditions that support a species' health and longevity or the population's persistence.~~
~~**habitat conservation area (HCA)**~~	~~A protected area with site-specific boundaries established by the HCP intended to conserve, maintain, and enhance habitat for the terrestrial covered species.~~
~~**habitat conservation plan (HCP)**~~	~~A comprehensive planning document that is a mandatory component of an Incidental Take Permit (ITP) application pursuant to section 10(a)(2)(A) of the ESA. The *Western Oregon State Forests HCP* enables ODF to comply with the federal ESA for certain covered species while conducting land management activities on state forest lands west of the Cascade Crest.~~
~~**habitat conservation plan (HCP) administrator**~~	~~Serves as the key coordinator to initiate the process when triggers for action are identified from either over- or under-accomplishment of biological goals and objectives, or when alternative conservation practices are available.~~
~~**hardwood stand**~~	~~Found on a minority of state forest lands. ODF classifies hardwood stands as those in which hardwood species comprise more than 50 percent of the tree canopy.~~
~~**harvest units**~~	~~Delineated forest parcels that reflect potential logical harvest operation areas considering topography and access. A unit for clearcut and thinning choices.~~

H

Term	Definition
habitat	The resources, conditions, and factors necessary to support living organisms over space and through time. Improving habitat means improving the resources or conditions that support a species' health or the population's persistence.
habitat conservation area (HCA)	A protected area with boundaries established by the WOSF HCP intended to conserve, maintain, and enhance habitat for the terrestrial covered species.
habitat conservation plan (HCP)	A comprehensive planning document that is a mandatory component of an Incidental Take Permit (ITP) application pursuant to section 10(a)(2)(A) of the ESA. The WOSF HCP enables ODF to comply with the federal ESA for certain covered species while conducting land management activities on state forest lands west of the Cascade Crest.
hardwood stand(s)	Found on a minority of state forest lands. ODF classifies hardwood stands as those in which hardwood tree species comprise more than 50 percent of the stand's basal area.
harvest units	Delineated forest parcels that reflect potential harvest operation areas considering topography and access. A unit for silvicultural prescriptions such as regeneration and thinning harvests.
headwater	The source or uppermost tributaries and wetlands where larger streams begin, located at the higher elevations within a watershed
healthy forest landscapes	See *forest health*.

Term	Definition
historic or historical resources	Defined by state and federal law, these include artifacts, property, and sites: • Historic artifacts - Three-dimensional objects including furnishings, art objects, and items of personal property that have historic significance. Historic artifacts do not include paper, electronic media, or other media that are classified as public records (ORS 358.635). • Historic property - Real property that is 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. • Historic site - Sites created and/or used by humans since the time of Euro-American inhabitance; usually ~~above-ground~~aboveground structural intact remains.
hydrologic processes	Describes how water is exchanged (cycled) through Earth's soil, geology, vegetation, and atmosphere through evaporation, transpiration, condensation, precipitation, infiltration, and subsurface flow. Hydrologic processes relate to how the landscape is shaped by water, for example how streams and floodplains form and change over time.
hydrology	The study of the properties, distribution, and effects of water on the landscape, under the surface, in the rocks, and in the atmosphere.

Term	Definition
implementation monitoring	Used to determine if objectives, standards, and management practices specified by law, regulation, policy, or the HCP are being implemented. Implementation monitoring is used to determine whether specified actions or criteria are being met. See definition for *monitoring*.
Implementation Plan (IP)	An ODF plan that describes the management approaches and activities designed to achieve the FMP goals and the WOSF HCP goals and objectives within a ~~shorter~~ timeframe ~~(e.g., 8–12~~of approximately 10 years~~)~~.

Term	Definition
Incidental Take Permit	~~An Incidental Take Permit (ITP) is~~ A federal exemption to take prohibition of Section 9 of the ESA; the ITP is issued by the U.S. Fish and Wildlife Service pursuant to Section 10(a)(1)(B) of the ESA. An ~~ITP~~Incidental Take Permit is also referred to as a Section 10 Permit or Section 10(a)(1)(B) Permit. To take is to "... to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" with regard to federally listed endangered species of wildlife (Section 3(18) of the ESA). Federal regulations provide the same taking prohibitions for threatened wildlife species (50 CFR 17.31(a)).
~~inclusion~~Indigenous Traditional Ecological and Cultural Knowledge (ITECK)	~~The action or state of including or of being included within a group or structure. In terms of DEI, inclusion is a state of belonging when persons of different backgrounds, experiences, and identities are valued, integrated, and welcomed equitably as decision-makers, collaborators, and colleagues. Ultimately, inclusion is the environment that organizations create to allow these differences to thrive.~~A body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes through interaction and experience with the environment. ITECK can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation. ITECK is grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. ITECK is inherently heterogeneous and unique to each Tribe, due to the cultural, geographic, and socioeconomic differences, as well as their history and the surrounding environment.
integrated pest management	A systematic approach that uses a variety of techniques to reduce pest damage or unwanted vegetation to economically and socially tolerable levels. Integrated pest management 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 resource management	The management of two or more resources in the same general area and period of time (e.g., water, soil, timber, grazing, fish, wildlife, and forests). Integrated resource management means that the design and application of management practices must consider the effects and benefits of all of the forest resources in such a way that those effects and benefits lead to achieving the goals in the FMP over time and across the landscape.

L

~~L~~Term	Definition
landscape(s)	In ecological terms, an area of land containing a mosaic of different patches~~, often within which a particular "target" patch is embedded. Also defined as a unit of land with separate plant communities~~ or ecosystems ~~forming~~that interact through ecological ~~units with distinguishable structure, function, geomorphology,~~processes and ~~disturbance regimes~~may change over time.

landscape context	Refers to the spatial relation of different patches (land management, habitat type, ecological processes, hydrological process, etc.) within the landscape and the values, constraints, or risks they impose on each other. See *landscape*.
landslide(s)	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.~~their cause and impact, such as shallow rapidly moving landslides and slow deep-seated landslides.
leave area	An area of standing timber retained among areas of logging activity to satisfy management objectives, such as providing seed ~~source,~~sources or wildlife habitat~~, or landscape management constraints~~.
leave trees	See *live trees.*
legacy structures, legacies, legacy retention, biological legacies	Structural components within a forest stand that are retained during harvest operations, and that provide habitat diversity in the future stand. Examples of legacy structure include live trees, snags, and downed wood.
lifeways	A traditional way of life reflecting ~~an all-encompassing aspect~~ customs, practices, and belief systems. This may include foods consumed, materials ~~collection~~collected, religious practices~~, and so on~~.
listed, federally listed, or listed species	Species, including subspecies and distinct vertebrate populations, of fish, wildlife, or plants, listed at 50 CFR 17.11-17.12 as either endangered or threatened.
live trees, leave trees	~~Live~~Living trees that are retained to provide short-term habitat needs of wildlife species, to serve as a source of future snags and downed wood, and to provide legacy trees in future stands. This term also refers to ~~live~~living trees present in a stand that are legacies of a previous cohort of trees.

~~M~~

M

Term	Definition
management emphasis	See *emphasis areas.*
management prescription	The management practices and intensity selected and scheduled for application on a specific area to attain predefined goals and objectives.

mass wasting processes	Down slope movement of rock or soil due to the force of gravity. The four most common types of mass-wasting are falls, slides, flows, and creep. Falls are abrupt movements of rocks that have detached from steep slopes of cliffs. Slides are the movement of a mass of earth and rock from a mountain or cliff and can occur slowly or quickly. Examples of flow type are debris, mud, or earth. Creep (or soil creep) is a slow, long-term mass wasting process. The steeper the slope the faster the creep. Precipitation, chemical weathering, lithology (type of rock), and steepness of slope(s) contribute to mass wasting processes.
metrics	A quantifiable value, characteristic, or condition measured by monitoring programs ~~(see definition for~~. See *monitoring*~~)~~.
monitoring	The measurement of metrics—to determine resource status or trends ~~in some aspect~~, document actions, or test research hypotheses with the goal of ~~environmental quality.~~ aiding adaptive ~~monitoring - Iterative framework that enables monitoring questions~~management and ~~protocols to change over time in response to new information or new questions.~~decision-making.. • Implementation, or compliance, monitoring - Asks the question, “Did we do what we said we would do?” For example, did we leave the number of snags during a timber harvest required by law or policy? • Effectiveness monitoring - Asks the question, “Are the management practices producing the desired results?” For example, are snag retention practices resulting in improved habitat for a species of interest? • ~~status monitoring – Asks the question, “What is the state of the resource?” For example, what is the snag density at a point in time?~~ • ~~trend monitoring – Extension of status monitoring, asks the question, “What is the change in status over time?” For example, how has the snag density changed over time?~~

N

Term	Definition
native	Indigenous to Oregon and not introduced.
nine federally recognized Tribes in Oregon, Tribal Partners	Representatives of one or more of the nine federally recognized Tribes of Oregon. ORS 182.162–168 define state agencies' relations with federally recognized Tribes in Oregon when an agency develops or implements programs that may affect Tribes. The nine federally recognized Tribes of Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.
non-point 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 non-point source.
~~**northwest Oregon state forests**~~	~~Includes all state forest lands in the FMP planning area. See definition for *planning area*.~~
noxious weeds	Terrestrial, aquatic, or marine plants designated by the Oregon State Weed Board under ORS 569.615 as representing the greatest public menace and a top priority for action by weed-control programs.
nutrient cycling	Circulation or exchange of elements, such as nitrogen and carbon~~-dioxide~~, between living and nonliving portions of the environment.

O

Term	Definition
objective(s)	A clear and specific statement of results to be achieved within a defined time period. An objective is measurable and implies precise time-phased steps to be taken and resources to be used, which, together, represent the basis for defining and controlling the work to be done.

Term	Definition
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 downed wood (such as fallen trees) on the ground. In western Oregon, old-growth characteristics begin to appear in unmanaged forests at 175–250 years of age.
operationally limited	By the FLMCS (OAR 629-035-0055), 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.
operational policy(ies)	Documented, specific standards and best practices for implementation and resource protection. Operational policies guide decisions within the range of options by outlining specific procedures and BMPs that allow for management flexibility, while ensuring sound management and resource protection. Operational policies include quantitative standards (e.g., riparian buffer widths, upland leave tree requirements) that align with laws and regulations, and FMP and WOSF HCP goals and strategies. Operational policies are developed within the State Forests Division under the direction of the State Forests Division Chief.
Operations Plan (OP)	~~Describe~~Describes individual projects for achieving expected FMP and WOSF HCP outcomes, over the near term (for example 1~~ to ~~–2 years), that align with fiscal budgets and IPs.
Oregon Conservation Strategy	Created by the Oregon Department of Fish and Wildlife to outline a set of priorities and recommendations for addressing Oregon's fish, wildlife, and habitat conservation needs. Strategy species in the Oregon Conservation Strategy are Oregon's species of greatest conservation need because they are experiencing population decline, habitat loss, and other issues that put them at risk.
outcomes	Projected or realized results of management activities conducted during IP and OP implementation.

P

~~**Oregon Conservation Strategy**~~**Term**	~~Created by the Oregon Department of Fish and Wildlife (ODFW) to outline a set of priorities and recommendations for addressing Oregon's fish, wildlife, and habitat conservation needs. Strategy species in the Oregon Conservation Strategy are Oregon's species of greatest conservation need because they are experiencing population decline, habitat loss, and other issues that put them at risk.~~**Definition**
~~**outcomes**~~	~~Management or plan outcomes.~~

~~P~~

passive management	Typically allows resources to change over time with minimal human intervention. For example, forest stands could be allowed to grow and regenerate along their current successional trajectory—no reforestation, thinning, harvesting, site preparation or prescribed burning activities would be used.
patch(es)	A term fundamental to landscape ecology and silviculture, it is defined as a relatively homogeneous (same/similar) area of habitat or forest stand that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics.
pathogen(s)	A specific causative agent (such as a bacterium, fungus, or virus) of a disease.
~~**people of Oregon**~~	~~People living in the state of Oregon.~~
performance measure(s)	~~Developed by the BOF,~~ A select set of metrics ~~with targets or acceptable ranges~~the BOF uses to evaluate management outcomes to ensure that ~~track progress toward FMP goals and indicate if~~ the FMP ~~strategies are working as intended~~continues to provide GPV. The performance measures have specific components set and monitored by the BOF with trends reported publicly.
planning area, plan area, or FMP area	Approximately 640,000 acres consisting of BOFL, Common School lands, and administrative sites west of the Cascade Crest.
policy	A definite, stated method or course of action adopted and pursued by an entity that guides and determines present and future decisions and actions. A policy establishes a commitment by which an entity is held accountable.

pollutant	A substance of such character and existing in such quantities as to degrade an environmental resource (i.e., water, air, or soil) by impairing its usefulness (including its ability to support living organisms).
population(s)	The organisms that constitute a particular group of a species, or that live in a particular habitat or area. A group of fish (e.g., Nehalem River fall chinook salmon) that spawn in a particular area at a particular time, and that 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 are considered a population (OAR, Division 7, 635-07-501(38)).

Term	Definition
prescribed burn/burning	Controlled fire burning under specified conditions to accomplish planned objectives; also called slash burning, as a frequent objective is to reduce the amount of slash left after logging. Objectives may include site preparation for planting and reduction of fire hazards or pest problems.
private and domestic drinking water	Systems serving three or fewer homes or connections with a water use permit issued by the Oregon Water Resources Department.
properly functioning aquatic habitat *or* condition	The range of diverse aquatic and riparian conditions over time and space that emulate the habitat conditions that resulted from natural disturbance regimes under which native species evolved. ~~There is no one condition that is properly functioning.~~

~~R~~

R

Term	Definition
reciprocity	Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.
redundancy	The duplication of components or functions of a system with the intention of increasing the resilience of the system~~.~~ by assuring that some components remain intact even if a disturbance degrades a similar component elsewhere.
reforestation	~~A management action~~Management to renew tree cover by ~~establishing~~planting and cultivating young trees. This can be accomplished by planting an area with trees or aerial seeding or ~~letting an area naturally seed in. This work is done to maintain appropriate forest cover, achieve a desired ecological condition, and/or restore forests for wildlife, watersheds, and recreational experiences~~passive natural regeneration.
refugia	Areas that remain unchanged while surrounding areas change markedly. The changes could be short term, such as wildfires, elevated stream temperatures, or human activity, or much longer term, such as periods of glaciation. Alternatively, refugia could refer to locations and habitats that support population of organisms that are limited to small fragments of their previous geographic range.

~~**refugia**~~	~~Locations and habitats that support population of organisms that are limited to small fragments of their previous geographic range, and areas that remain unchanged while surrounding areas change markedly (the areas serve as a refuge for those species requiring specific habitats). The changes could be short term, such as wildfires, elevated stream temperatures, or human activity, or much longer term, such as periods of glaciation.~~
regeneration	The process of renewal of a forest or stand of trees, or young trees in a stand.

Term	Definition
regeneration harvest(s), regeneration harvesting	The removal of trees to make regeneration possible or to assist in the development of the established regeneration (young trees). Regeneration harvests can range from a clearcut to a retention cut. A clearcut removes almost all trees from a stand (see definition for *clearcut*) resulting in a new even-aged stand of trees. A retention cut retains more residual trees within the unit (between 33 and 80 square feet of basal area per acre), similar in look to a heavy thinning resulting in a stand with two distinct ages of trees following tree planting.
resilience, resiliency, resilient	~~The ability to recover from the disturbance.~~Broadly, the ability of ecosystems to persist in response to pressure from episodic disturbances (e.g., wildfire) and chronic stress (e.g., warmer temperatures or prolonged drought from climate change). A resilient forest recovers the delivery of ecosystem services in response to multiple pressures.
resistance	The ability of a system to withstand ~~the disturbance~~disturbances.
restoration	Management actions taken to rehabilitate degraded forest lands to properly functioning condition such that lands are delivering ecosystem goods and services such as timber, fish and wildlife habitat, special forest products, carbon sequestration, and drinking water.
revenue(s)	The total income produced by an organization's operations, such as income generated by timber harvest operations.
~~**riparian conservation area (RCA)**~~	~~A protected area with site-specific boundaries established by ODF; the width varies according to the stream classification or special protection needs. The purpose of an RCA is to protect the stream, aquatic resources, and riparian area. Aquatic resources include water quality, water temperature, fish, stream structure, and other resources.~~
riparian, 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 streambed or lakeshore.
riparian conservation area (RCA)	A protected area with boundaries established by the WOSF HCP; the width varies according to the stream classification or special protection needs. The purpose of an RCA is to protect the stream, aquatic resources, and riparian area. Aquatic resources include water quality, water temperature, fish, stream structure, and other resources. The WOSF HCP defines the rules that govern RCAs.

S

Term	Definition
salvage harvesting	The utilization of standing or downed trees that are dead, dying, or deteriorating, for whatever reason, before the timber values are lost.
scenic	Providing or relating to views of impressive or beautiful natural scenery.
scenic waterways, scenic river	A river, lake, or segment thereof, including related adjacent land and the airspace above, that has been so designated by or in accordance with the Scenic Waterways Act ~~(ORS 390.805–390.925)~~(ORS 390.805–390.925)
sensitive plants	~~Threatened, endangered, or rare plants (collectively, sensitive plants), as listed under the state of Oregon's ESA and~~Oregon's ESA listed threatened and endangered plant species administratively protected by the Oregon Department of Agriculture Native Plant Conservation Program (ORS 564.105; OAR 603-073~~).~~), and candidate plant species considered for ESA listing.
seral, seral stages	Developmental stages that succeed each other as an ecosystem changes over time; specifically, the stages of ecological succession as a forest develops.
~~**shallow, rapid landslide**~~	~~Debris-flow slides that occur in the forest rooting zone, generally less than 10 feet deep. They are typically initiated by intense rainfall and/or rapid snowmelt. Shallow slides usually follow a long saturation period that is punctuated by an intense burst of precipitation over several hours or a few days. At some point, gravity overtakes the hillside and the muddy soil mass breaks loose. See definitions for *landslide* and *debris flow*.~~
silvicultural, silviculture, silvicultural prescriptions	The practice of ~~controlling~~managing the establishment, composition, health, quality, and growth of the vegetation of forest stands~~. Silviculture involves the manipulation, at the stand~~ and ~~landscape levels, of~~ forest ~~and woodland vegetation, and the control or production of stand structures such as snags and downed wood to meet the needs and values of society and landowners such as wildlife habitat, timber, water resources, and recreation~~landscapes.
silviculturally capable	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).

site productivity	A measure of an area's relative capacity for producing timber or other vegetation. Forest site productivity is controlled by a complex relationship among topography, slope, aspect, soil depth, porosity, biology, and the availability of nutrients in the soil.

~~**site class**~~	~~A measure of an area's relative capacity for producing timber or other vegetation. It is an index of the rate of tree height growth, with lower values indicating faster-growing trees. The site index is expressed as the height of the tallest trees in a stand at an index age. In this document, an age of 50 years is used. The five 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~~
slash	Logging debris left in the forest after a harvest such as tree limbs and tops. Sometimes called logging residue.
slope stability	The degree to which a slope resists the downward pull of gravity. The more resistant, the more stable.
snag	A standing dead tree.

Term	Definition
Soil and Water Conservation Districts (SWCD)	The Oregon Department of Agriculture's SWCD Program provides services to the 45 Soil and Water Conservation Districts throughout Oregon. The districts work with local landowners and residents, natural resource organizations, natural resource users, and local, state, and federal governments to conserve natural resources, control and prevent soil erosion, conserve and develop water resources and water quality, preserve wildlife, conserve natural beauty, and promote collaborative conservation efforts to protect and enhance healthy watershed functions. The Oregon Department of Agriculture Soil and Water Conservation District Program offers trainings to help support district operations, directors, and staff. Their staff is also available to provide operational technical assistance by phone, email, or in person. SWCDs in Oregon are governed by an independently elected board of directors.
soil composition	The mixture of minerals, dead and living organisms (organic materials), air and water that make up soil. This mix of ingredients varies from place to place ~~as soil composition varies.~~.
source areas	Areas in which a watershed is delivering water to a water system.
special forest products	Products, other than timber, collected for personal and commercial uses from forests.

species	~~When referring to the federal ESA, "…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 ESA].~~Organisms of the same species share similar DNA, physical shape, form, and structure and are capable of producing fertile offspring.
species diversity	Diversity among species in an ecosystem. Species diversity accounts for the number of different species (species richness) and the relative abundance of each species (species evenness).
species of conservation concern	Those species included on federal or state ESA lists, state sensitive species, and ~~ODFW's~~the Oregon Department of Fish and Wildlife's Oregon Conservation Strategy species, which are currently present or have the potential to be present on state forest lands.
stand(s)	A contiguous group of trees or other vegetation in a specific area sufficiently uniform in composition, structure, age, size, or condition, such that it is distinguishable from adjacent areas for management purposes.

Term	Definition
stand density	In silviculture, measured as the amount of tree biomass per unit area of land. This can be measured as the number of trees, basal area, wood volume, or foliage cover.
stand initiation	Begins when new seedlings actively invade or sprout or are planted and begin to grow following 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.
Stand Level Inventory	Acquires and updates state forest vegetation information at the ~~specific site level (~~forest stand~~).~~. This information is used for tactical and operational decision-making. The Stand Level Inventory includes vegetation sampling protocols, forest stand data arranged in a database, computer programs for managing and using the information, and documentation of inventory elements.
stand management	Silvicultural techniques to be applied at the stand level in pursuit of ~~the owner's~~ management objectives. See *silviculture*.
~~**stand(s)**~~	~~A contiguous group of trees sufficiently uniform in composition, structure, age, size, class, distribution, spatial arrangement, condition, or location on a site of uniform quality to distinguish it from adjacent communities.~~
standard(s)	A working principle that establishes the measure of performance extent, values, quantity, or quality for a given activity or item.
State Forester	~~The BOF-appointed chief executive officer and secretary~~The Chief Executive Officer of the State Forestry Department and the Secretary to the BOF (ORS 526.031~~).~~), nominated by the governor and confirmed by the State Senate.
State Forests Division Chief	The head of the State ~~Forest~~Forests Division.

State Historic Preservation Office	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.
State Land Board	Composed of the governor, secretary of state, and state treasurer. It was established under the Oregon Constitution to manage Common School Trust Lands and serve as trustee of the CSF.
~~status monitoring~~stewardship	~~A snapshot in time of the status of a variable or resource. For example, status monitoring answers a question like, "how many acres are affected by this insect infestation?" See definition for *monitoring*.~~Responsible management of forest land to ensure its health, productivity, and biodiversity for current and future generations
stocking	A measure of the number of trees or basal area per acre in a stand.

Term	Definition
storied landscape	Within tribal contexts, refers to a multitude of intrinsically linked and deeply held understandings, relationships, and actions between indigenous cultures and the landscapes with which they interact throughout time, including but not limited to ~~creation~~origin stories, landscape features, and wildlife attributes that signal hunting, gathering, planting, and other seasonal use patterns.
strategy(ies)	A carefully considered plan or method, more encompassing and on a larger scale than tactics, for achieving an objective. For the FMP, OAR 629-035-0030 requires "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."
stream	A water course having a distinct 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 because this type of flow does not have a defined channel.
stream classification	Used to apply stream protections. Streams are classified using a combination of ~~Oregon~~ FPA and ~~Western Oregon State Forests~~WOSF HCP classifications.
stream reach	A section of a stream along which similar hydrologic conditions exist, such as channel gradient, form, or other physical parameters.
structure(s)	The physical parts of an ecosystem that can be seen and touched; typical structures in a forest are trees of various sizes, standing dead trees (snags), and fallen dead trees.
~~**structured decision-making**~~	~~A process that supports multi-objective decision-making based on deliberation, estimated outcomes of alternative actions, and clear choices upon which decision-makers can act.~~

successional	A series of changes by which one group of organisms succeeds another group; a series of developmental stages in a plant community.

Term	Definition
sustainability ~~or~~, sustainable	Sustainability is the ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time. Sustainable forest management describes forest management regimes that maintain the productive and renewal capacities, as well as the genetic, species, and ecological diversity of forest ecosystems.
swale	Shallow, gently sloping, or depressed area of land that functions to capture and infiltrate runoff, that can collectively serve to reduce erosion and sustain streamflows.
Swiss needle cast (SNC)	A foliage disease specific to Douglas fir caused by the fungal pathogen *Nothophaeocryptopus gaeumannii*. SNC symptoms include yellow needles and decreased needle retention, resulting in sparse crowns and reduced diameter and height growth.

T

Term	Definition
tectonic	Resulting from changes in the Earth's crust.
threatened and endangered species	Endangered species are those plants and animals that have become so rare they are in danger of becoming extinct. Threatened species are plants and animals that are likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Federal and state agencies make formal classifications of wildlife species, according to standards set by federal and state ESAs.
trade-offs	An exchange of one thing for another. Understanding trade-offs is a critical part of decision-making and planning where maximizing benefits ~~to~~from all resources ~~are~~is not ~~attainable~~possible everywhere at the same time.

Term	Definition
Traditional ~~Ecological Knowledge (TEK)~~Cultural Places	~~A body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes through interaction and experience with the environment. TEK can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation.~~ ~~TEK is grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. TEK is inherently heterogeneous and unique to each Tribe, due to the cultural, geographic, and socioeconomic differences, as well as their history and the surrounding environment.~~The National Historic Preservation Act and the 36 CFR 800 regulations implementing the act refer to "properties of traditional religious and cultural significance." These are geographic places prominent in a particular group's cultural practices, beliefs, or values, when those practices, beliefs or values: (i) are widely shared within the group, (ii) have been passed down through the generations, and (iii) have served a recognized role in maintaining the group's cultural identity for at least 50 years.
transformation	The process of ~~changing the~~an ecosystem changing to a condition that is different from historic structure, composition, or function. Both active and passive management ~~techniques~~ can guide or allow transformation, respectively. ~~In academic literature, "Ecosystem transformation can be defined as the emergence of a self-organizing, self-sustaining, ecological or social–ecological system that deviates from prior ecosystem structure and function." (Thompson et al. 2021)~~
Travel Management Area(s)	Designated areas where it is restricted to operate or to be transported in a motor-propelled vehicle during certain dates as designated by the Oregon Department of Fish and Wildlife.
~~**trend monitoring**~~	~~Designed to uncover change in target variables over space and time. For example, trend monitoring may answer a question like, "How many acres are affected by an insect infestation each year?" See definition for *monitoring*.~~

Tribal Partners, ~~Tribal Nations,~~nine federally recognized Tribes of Oregon	Representatives of one or more of the nine federally recognized Tribes of Oregon. ORS 182.162–168 define state agencies' relations with federally recognized Tribes in Oregon when an agency develops or implements programs that may affect Tribes. The nine federally recognized Tribes of Oregon are Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.

U

Term	Definition

~~U~~

understory	The layer of vegetation beneath the main canopy of a forest.
unimpeded access	Provides reasonable opportunity for access, considering ~~public~~human safety, infrastructure, and topographic constraints.
uplift (geologic)	~~The process by which Earth's~~The process by which Earth's surface slowly rises either due to an increasing upward force applied from below or decreasing downward force (weight) from above.

~~V~~

~~**viewshed**~~	~~An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point and often is considered valuable or worth preserving for aesthetic reasons.~~

V

Term	Definition
variable retention harvest	Timber harvest that is a combination of thinned and unthinned areas with regeneration patch cuts to create openings intended to mimic small-scale natural disturbances.
viewshed(s)	An area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point and often is considered valuable or worth preserving for aesthetic reasons.
visually sensitive corridor	The area within 150 feet (measured on the slope) of the outermost edge of the roadway along both sides of the highway.

W

Term	Definition
watershed(s)	An area within which all water that falls as rain or snow drains to the same stream or river. Watersheds can vary greatly in size, from that of a small stream to a larger waterbody.
watershed council(s)	Based in local communities across the state. While natural resource specialists lead the councils, their boards of directors are made up of local community members. They assess and monitor environmental conditions and conduct voluntary conservation projects to restore and enhance the waters and lands for native species and people. They work with local landowners, community members, companies, elected officials and agencies. The Oregon legislature encourages local governments to form watershed councils (ORS 541.910).
watershed restoration project(s)	Per the Oregon Watershed Enhancement Board, specifies involvement of an on-the-ground element such as riparian planting, fish habitat construction, wetland restoration, livestock grazing plans, and water conservation projects that support watershed processes, which support watershed health.
wetland(s)	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."

~~wetland~~Term	~~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."~~Definition
windthrow	Trees felled by high winds.
working forest(s)	As defined by Oregon Forests Resources Institute,~~[1]~~ "forests where the sustainable production of timber is carefully balanced with protecting other important resources such as water quality and wildlife habitat are known as 'working forests.' After timber is harvested from these forests, they are replanted and harvested again in a sustainable process that may span decades, and even lifetimes."

Y

Term	Definition
young stand management	Activities that benefit growth of stands after regeneration harvest or natural disturbance and can include replanting, herbicide application to reduce competition, and precommercial thinning to enhance tree size and growth rate.

~~[1] https://oregonforests.org/working-forests#:~:text=Forests%20where%20the%20sustainable%20production,sustainable%20process%20that%20may%20span~~

APPENDIX A

Public Engagement

The engagement process ~~ensures~~ensured that interested parties had opportunities to provide meaningful input on the development of the *Western Oregon State Forests Management Plan* (FMP). This appendix ~~serves as~~is a high-level summary of the stakeholder, public, and tribal engagement efforts, including the engagement approach, goals, and activities.

Goals, Methods, and Key Audiences

A comprehensive strategy for public engagement and communications was developed early in the FMP process. The goals of the stakeholder engagement process ~~include~~included the following items.

- Fully informing counties, Tribes, stakeholders, and the general public throughout the FMP development process.
- Providing counties, Tribes, stakeholders, and the public with opportunities to engage and offer input at multiple levels throughout the process.
- Obtaining a better understanding of what Oregonians care about when it comes to forest management.
- Ensuring state agencies are engaged as an integral part of the process and are supportive of the FMP outcomes.
- Providing clear expectations for how stakeholder and public input will be used and integrated into the FMP.
- Aligning engagement and outreach opportunities with related processes such as the *Western Oregon State Forests Habitat Conservation Plan* (WOSF HCP) National Environmental Policy Act (NEPA) process and other Oregon Department of Forestry (ODF) processes.

~~The Oregon Department of Forestry (ODF)~~ODF developed the FMP through a combination of content development by staff and technical experts and feedback from stakeholders and the public. The process for developing the FMP and integrating feedback from stakeholders and the public is listed below.

- **Internal content development**. ODF worked with staff and technical experts to develop draft content.
- **Internal review**. ODF distributed content to ODF leadership, field staff, executive sponsors, and state partners for review.
- **Internal revisions**. ODF staff and technical experts reviewed internal feedback and revised content.
- **Leadership review and approval**. ODF leadership reviewed revised content and requested additional edits or approved content for external sharing.
- **~~Share~~Shared content with the Board of Forestry ~~(BOF)~~ and committees**. ODF shared content with the ~~BOF,~~Oregon Board of Forestry (the BOF), Forest Trust Lands Advisory Committee, and State Forests Advisory Committee.
- **External review and input**. ODF shared content with the public and stakeholders for review.
- **Review of external feedback and revisions**. ODF reviewed external input and revised content accordingly.

Key Audiences

The engagement effort sought to involve all potentially affected and/or interested individuals, communities, and organizations. The process involved the following groups.

- The BOF
- Counties, including the Forest Trust Land Advisory Committee (FTLAC)
- Business and economic organizations
- Civic groups
- Conservation and wildlife groups
- ~~Counties, including the Forest Trust Land Advisory Committee~~
- Elected officials
- Existing ODF advisory groups, including the State Forests Advisory Committee
- Federal and state agencies
- General public
- Groups involved in forest management including foresters and fisheries
- Media
- ODF district staff
- Recreational users of the forest

- Small woodland, private forest landowners, and farm and agricultural interest groups
- Tribal representatives
- Timber and forest products industry

The following sections outline the key stakeholder and public engagement activities and include details on the convening interviews, surveys, FMP state agency meetings, meetings open to the public, and stakeholder meetings.

Interviews

~~A variety of stakeholders and~~ County representatives and stakeholders provided their reflections from the past WOSF HCP engagement process, discussed ideas and suggestions for an effective FMP public engagement process, and expressed key interests and concerns related to FMP development. Thirteen virtual interviews took place with individuals of the following entities.

- FTLAC
- 350PDX
- Association of Oregon Counties
- Association of Oregon Loggers
- Cascadia Wildlands
- County Commissioners
- EcoTrust
- ~~Forest Land Trust Advisory Committee~~
- Hampton Lumber
- Oregon Forest ~~and Industry~~Industries Council
- Oregon Wildlife Society
- Rasmussen Group
- State Forests Advisory Committee
- ~~State Forests Advisory Committee and Recreation~~
- The Nature Conservancy
- Trout Unlimited
- Wild Salmon Center
- ~~350PDX~~

Surveys

ODF developed two surveys to gather feedback from the public on draft goals and strategies. For the draft goals survey, participants were asked to rank support for each goal and provide general feedback. ODF then summarized the goals and posted them to the project website. For the draft strategies survey, participants were asked if the strategies were sufficient to meet their corresponding goal. Participants were also asked to share if the strategies were on the right track, if anything was missing, or if any modifications were needed. A feedback summary was posted to the website. The following is a summary of those results.

- The survey on the Draft FMP Goals was sent out in August 2021; 54 individuals responded, providing a total of 459 comments.
- The survey on the Draft FMP Strategies was sent out in December 2021; 1,344 individuals responded, providing a total of 3,322 comments.
- ODF also solicited email feedback from stakeholders and the public on the Draft FMP Strategies and received 318 email responses.

State Agency Meetings

ODF has continued to work with state agencies throughout the development of the FMP. The FMP state agencies include government agency representatives from the Oregon Department of Environmental Quality, ~~the~~ Oregon Department of State Lands, and ~~the~~ Oregon Department of Fish and Wildlife. Members have been meeting approximately monthly from June 2021 through spring ~~2023~~2026. Members voluntarily work together to provide advice on how the FMP can achieve a mutually acceptable outcome that satisfies, to the greatest degree possible, the interests of all participants. FMP state agencies also serve on the WOSF HCP Scoping Team, allowing for continuity between the two processes.

Meetings Open to the Public

~~Because of COVID-19 concerns~~ODF engaged the public early in the FMP development process, occurring between 2021 and ~~safety precautions~~2023, and during the FMP rulemaking process, starting in 2025. During early FMP development, ODF held public meetings via webinars, because of COVID-19 pandemic concerns. Stakeholders and members of the public were invited to meetings open to the public using ODF's GovDelivery notification system.
GovDelivery was also used to share links to materials, meeting recordings, and surveys.

Five western Oregon FMP meetings open to the public took place between May 2021 and ~~January~~February 2023. The meetings open to the public included updates on the FMP process, presentations, and question-and-answer discussions followed by informal discussions with meeting participants to discuss topics of most interest to participants. During meetings open to the public, ODF answered questions and received comments on the development of the FMP. Following the meetings, comments related to goals and strategies were provided to ODF to inform revisions.

ODF notification to inform stakeholders and the public about the meetings included the following methods.

- Email distributions to interested parties
- Posts on ODF social media including Facebook and Twitter

- Meeting notices via FlashAlert to media in areas that ~~would~~could be ~~potentially~~ covered in the WOSF HCP (including Portland media)
- Posts on the ODF news site
- Posts on the WOSF HCP and FMP project webpages

The meetings open to the public received strong participation and engagement. Attendance ranged from approximately 40 to 90 participants (Table A-1).

TABLE A-1 Public Meetings

Open Public Meeting Date	Attendees	Meeting Purpose
May 6, 2021	Over 70 members of the public attended via webinar	• Provide an introduction to the FMP project and describe the engagement process for this effort. • Provide an update on the WOSF HCP and orientation to the Draft WOSF HCP on the ODF website. • Provide updates on the WOSF HCP NEPA process.
August 10, 2021	Over 70 members of the public attended via webinar	• Provide an update on the FMP project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.
October 12, 2021	40 members of the public attended via webinar	• Provide an update on the FMP and regional project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.

Open Public Meeting Date	Attendees	Meeting Purpose
December 7, 2021	Over 50 members of the public attended via webinar	• Provide an update on the FMP and regional project and describe the engagement process for this effort. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.
February 7, 2023	Over 90 members of the public attended via webinar	• Provide an update on the WOSF FMP and describe the upcoming engagement process. • Provide an update on the Administrative Draft WOSF HCP. • Provide an update on the WOSF HCP NEPA process.

As part of the rulemaking process, ODF held two public comment periods. The first public comment period took place from November 1, 2025 through January 31, 2026. The second public comment period took place in June 2026. The first comment period included one virtual public hearing and three in-person public hearings—located in Forest Grove, Tillamook, Eugene—in January 2026. One virtual public hearing was held in June 2026, as part of the second public comment period. ODF revised the draft FMP in consideration of public comments.

Stakeholder Meetings

The project team conducted meetings with interested parties who expressed a cross-section of interests. The purpose of these meetings was to review and discuss FMP goals and strategies or topics as requested. The project team conducted three large meetings and several small meetings as requested. Stakeholder groups included conservation interests, industry representatives, and recreation interests.

ODF held several joint stakeholder meetings to discuss the development of the FMP (Table A-2). These meetings provided an opportunity for stakeholders to learn more about the FMP development process and to provide specific feedback on the draft and strategies of the FMP. Feedback from the meetings was captured in meeting summaries and shared with ODF to inform the FMP. Links to meeting summaries, recordings, and surveys were made available to participants via email.

TABLE A-2 Stakeholder Meetings

Meeting Date	Attendees	Meeting Purpose
Joint Stakeholders		
August 18, 2021	24 stakeholders attended the meeting, 71 comments received	• Review and discuss draft FMP goals.
December 9, 2021	42 stakeholders attended the meeting	• Review and discuss draft FMP strategies on climate change, carbon, drinking water, forest resilience, wildfire, and soil.

~~Meeting Date~~	~~Attendees~~	~~Meeting Purpose~~
December 13, 2021	40 stakeholders attended the meeting	• Review and discuss draft FMP strategies on timber production, restoration, wildlife, aquatics and riparian, revenue, and recreation, education, and interpretation.
Conservation Interests		
June 24, 2021	Two stakeholders attended the meeting	• Discuss drinking water issues related to the FMP.
February 14, 2022	Three stakeholders attended the meeting	• Discuss FMP goals and strategies feedback.
Industry Representatives		
February 17, 2022	Three stakeholders attended the meeting	• Discuss FMP goals and strategies feedback.

ODF also engaged in several meetings and phone calls with individual stakeholders throughout the process to check in on the development of the FMP and to understand their interests, concerns, feedback, and suggestions as they relate to the FMP.

Forest Trust Land Advisory Committee

ODF provided updates on the FMP during the following ~~Forest Trust Land Advisory Committee~~FTLAC meetings.

- May 28, 2021
- August 27, 2021
- September 17, 2021
- October 8, 2021
- December 3, 2021

- February 18, 2022
- August 12, 2022
- February 24, 2023
- April 14, 2023
- August 11, 2023
- November 3, 2023
- February 23, 2024
- May 24, 2024
- November 15, 2024
- May 23, 2025
- November 7, 2025
- December 19, 2025

In fall 2024, the BOF, FTLAC, and State Forests Division (Division) staff discussed potential timber harvest scenarios the Division would model to demonstrate a range of possible trade-offs among resource goals under the proposed FMP and WOSF HCP governance framework. At the June 4, 2025 BOF meeting, Division staff shared the results of the modeled scenarios for discussion between the BOF, FTLAC, and Division staff to assess whether the range of potential outcomes under the proposed FMP could be sufficient to meet greatest permanent value (GPV). Informed by the discussion with FTLAC, the BOF provided feedback to guide the Division in developing subsequent harvest scenarios presented in fall 2025 and winter 2026, which inform future Implementation Planning and contribute to further defining measures for reporting to the BOF on FMP performance.

State Forests Advisory Committee

ODF provided updates on the FMP during the following State Forests Advisory Committee meetings.

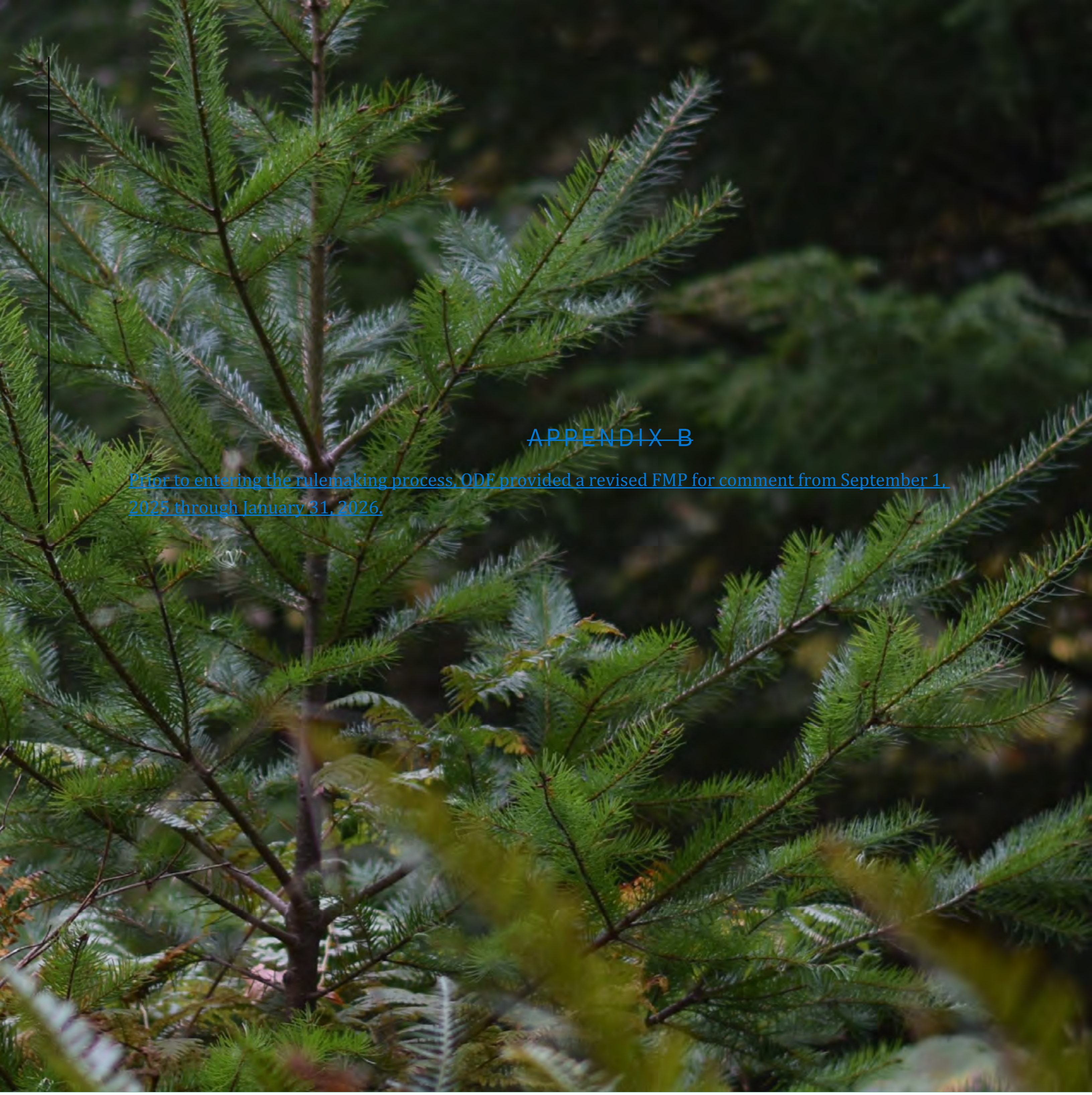
- April 23, 2021
- June 11, 2021
- October 29, 2021
- April 8, 2022
- June 24, 2022
- October 27–28, 2022
- April 7, 2023
- June 1–2, 2023

- October 27, 2023
- March 8, 2024
- May 17, 2024
- October 25, 2024
- October 24, 2025
- March 20, 2026

Tribal Sovereign Nations' Coordination

ODF has engaged Tribal Partners in the government-to-government framework on the development of the cultural resources goals and strategies through six individual tribal workgroup meetings from August 2021 to March 2022. ODF will continue to work with Tribal Partners in this forum to integrate their interests in ODF's planning and implementation processes at every level.

Tribal Partners include the following nine federally recognized Tribes of Oregon: Burns Paiute Tribe; Confederated Tribes of Coos, Lower Umpqua ~~&~~, and Siuslaw Indians; Confederated Tribes of Grand Ronde; Confederated Tribes of Siletz Indians; Confederated Tribes of the Umatilla Indian Reservation; Confederated Tribes of the Warm Springs Reservation; Coquille Indian Tribe; Cow Creek Band of the Umpqua Tribe of Indians; and The Klamath Tribes.



~~APPENDIX B~~

Prior to entering the rulemaking process, ODF provided a revised FMP for comment from September 1, 2025 through January 31, 2026.

FIGURE B-1

Western Oregon FMP Planning Area

639,573 Acres Managed by ODF

Airbus,USGS,NGA,N
and the GIS User
Community

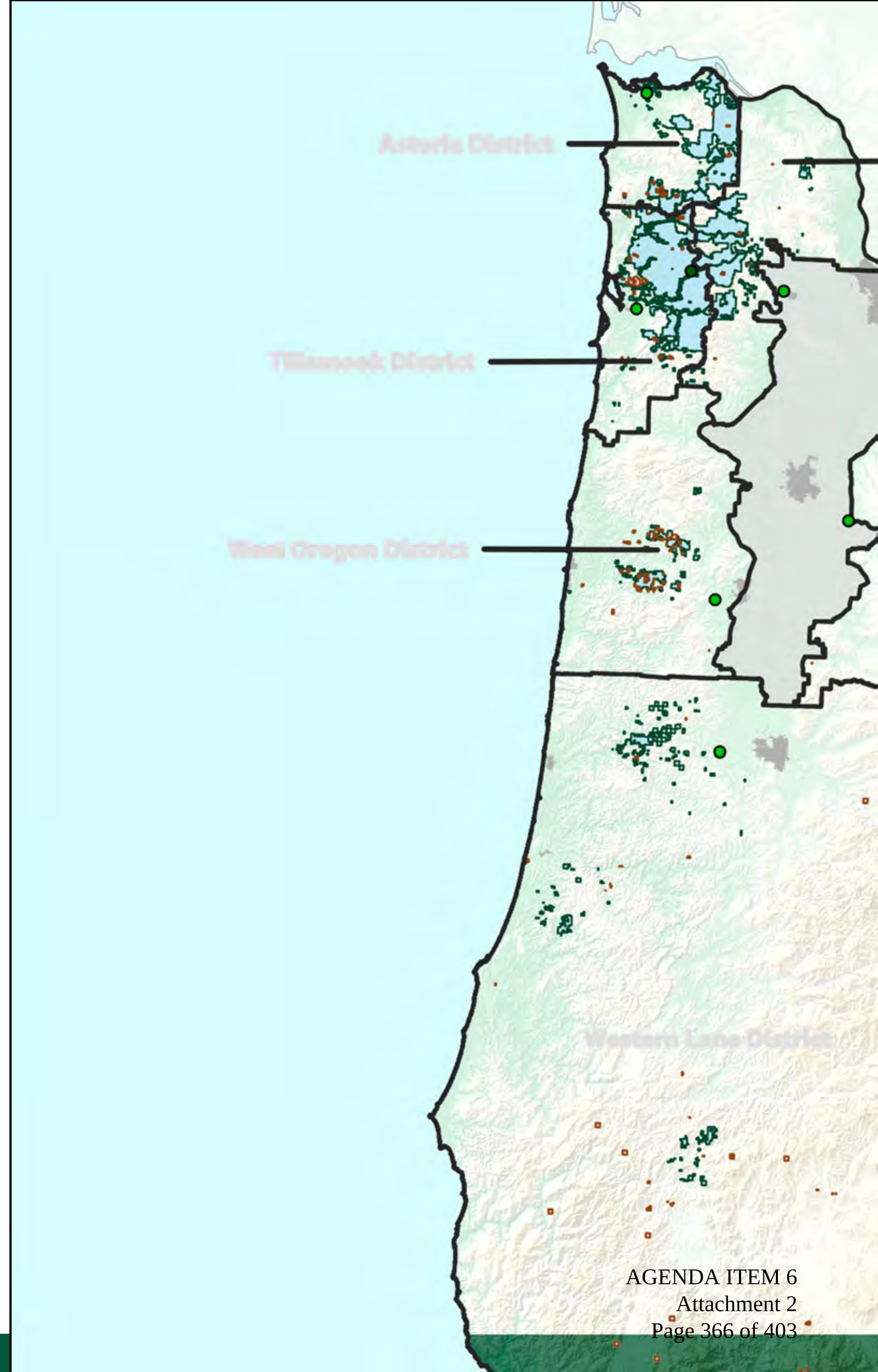

Forest Grove District
WASHINGTON
Astoria
Astoria District
Forest Grove District
Portland
Tillamook
Tillamook District
Salem
Western Oregon District
North Cascade District
Detroit
Corvallis
Eugene
Florence
Reedsport
Pacific Ocean
Western Lane District

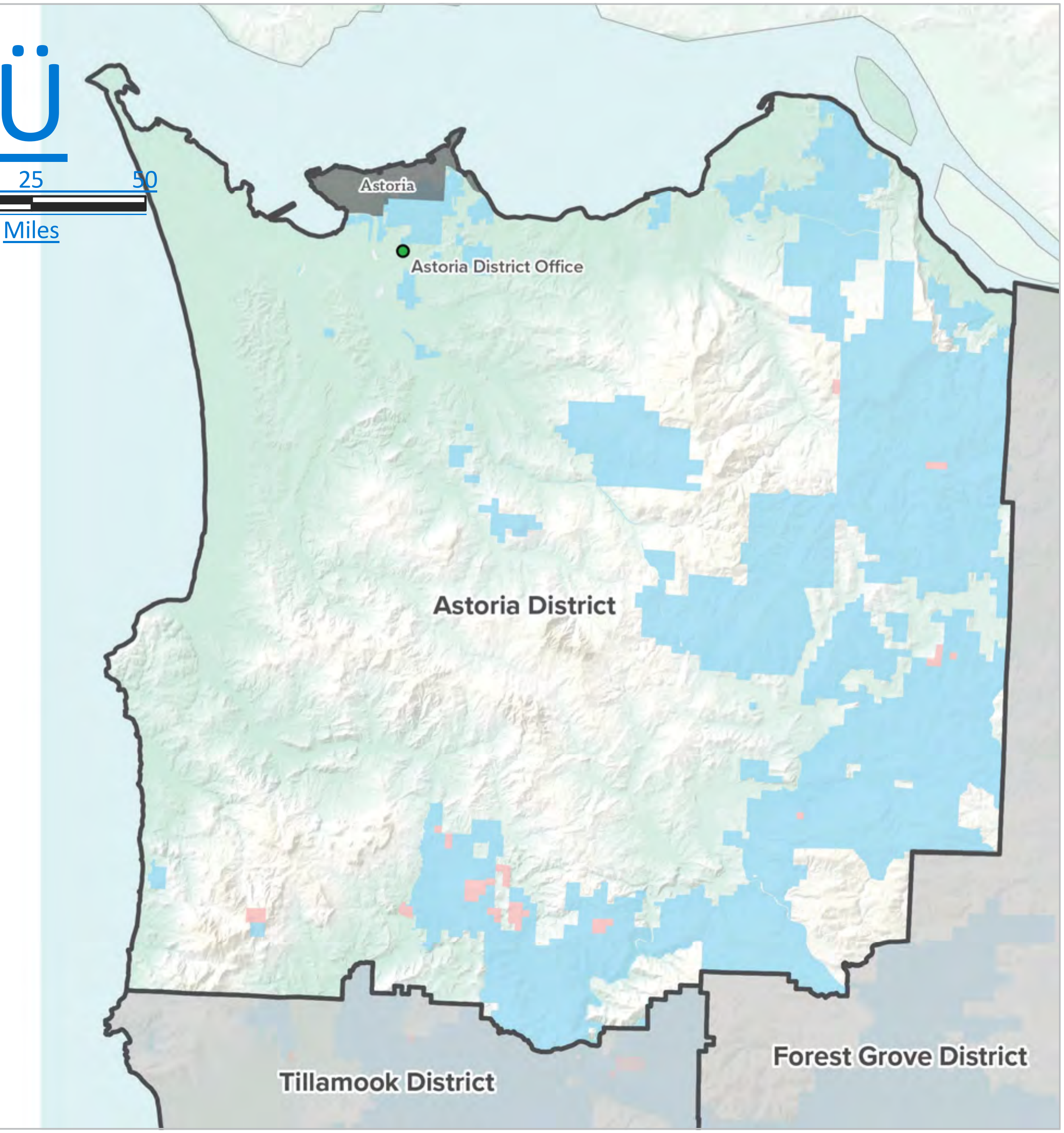
Western ~~Oregon FMP Planning Area~~Lane District

~~639,542 Acres Managed by ODF~~

District Boundary <u>City Limit</u>

FMP Planning Area Board of Forestry ~~Lands~~ Common School ~~Forest~~ Lands

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Tillamook District
Forest Grove District

Astoria

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Astoria District

District Boundary City Limit

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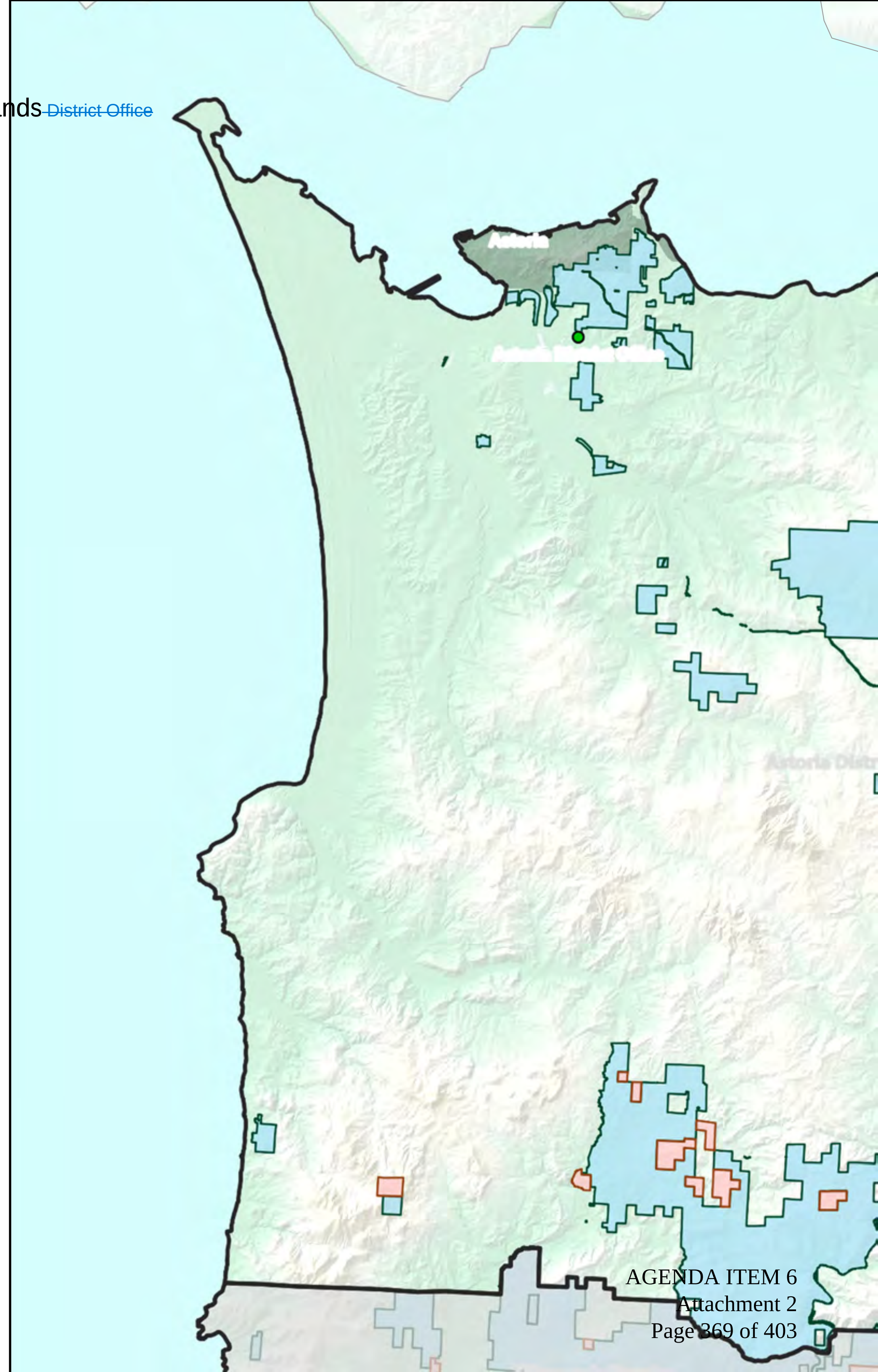

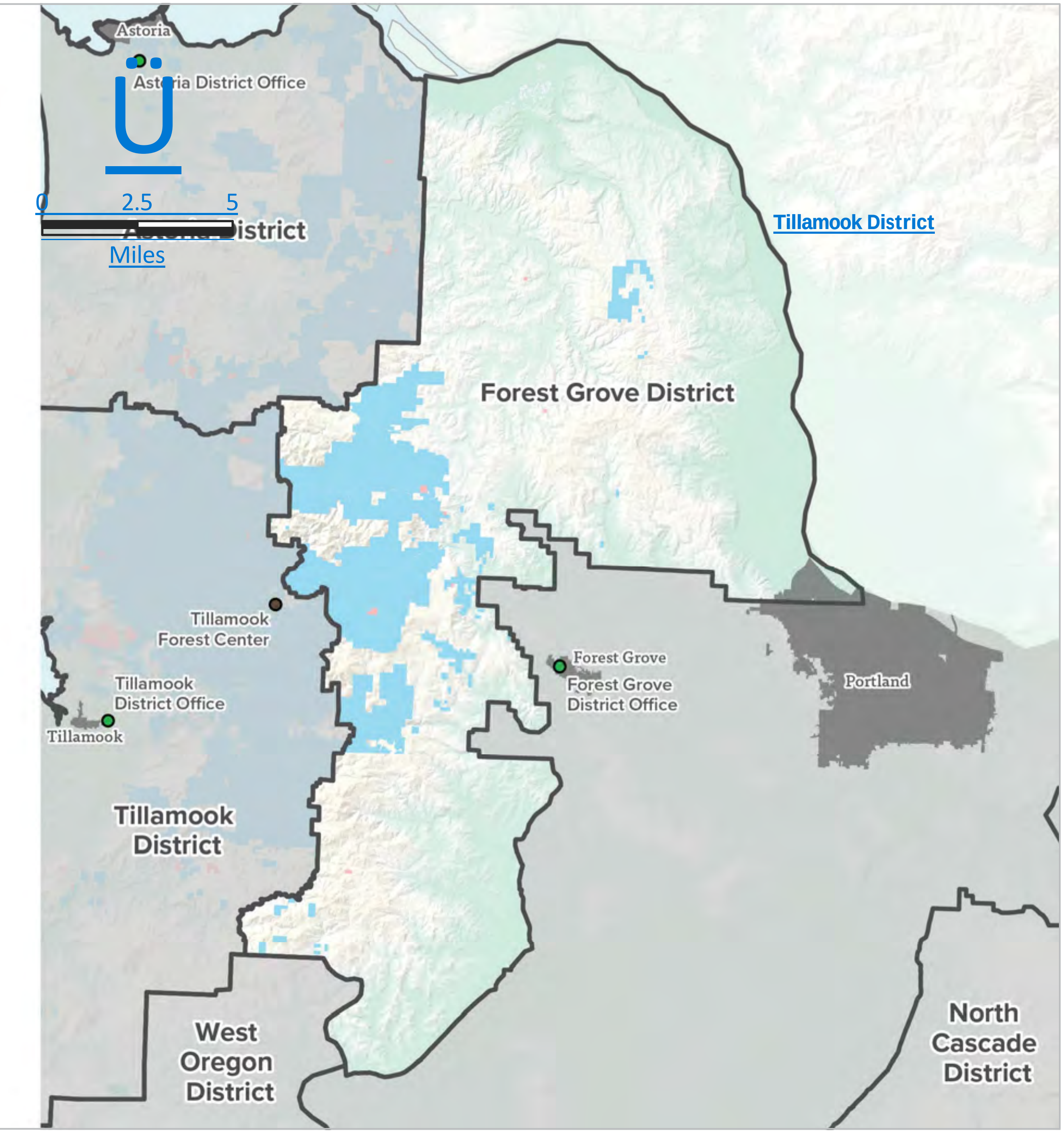

Forest Grove District~~-~~
~~Planning Area~~

Astoria

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Forest Grove District

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Tillamook Forest Center

Forest Grove District Office

Forest Grove

Portland

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District Boundary City Limit

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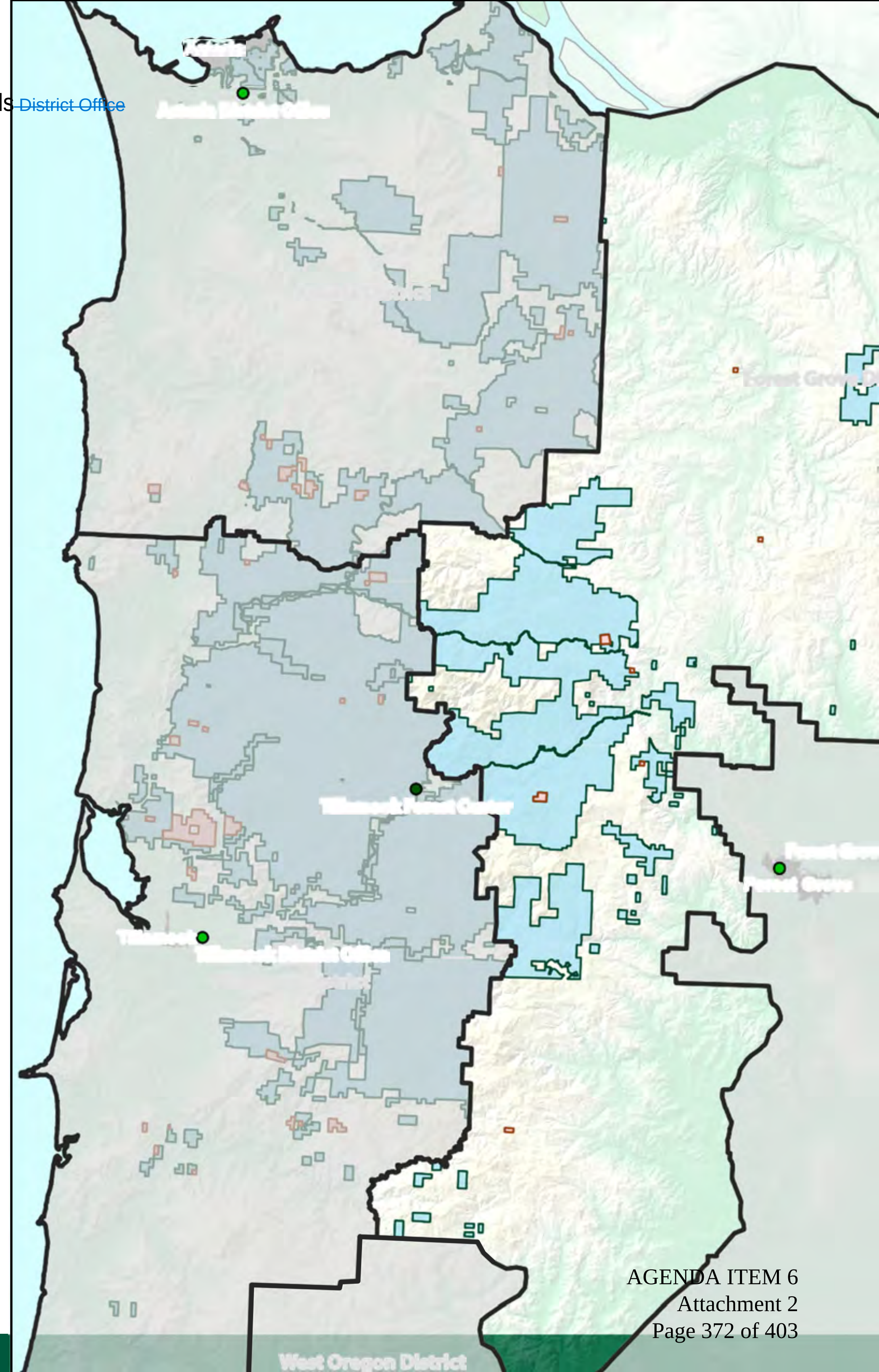

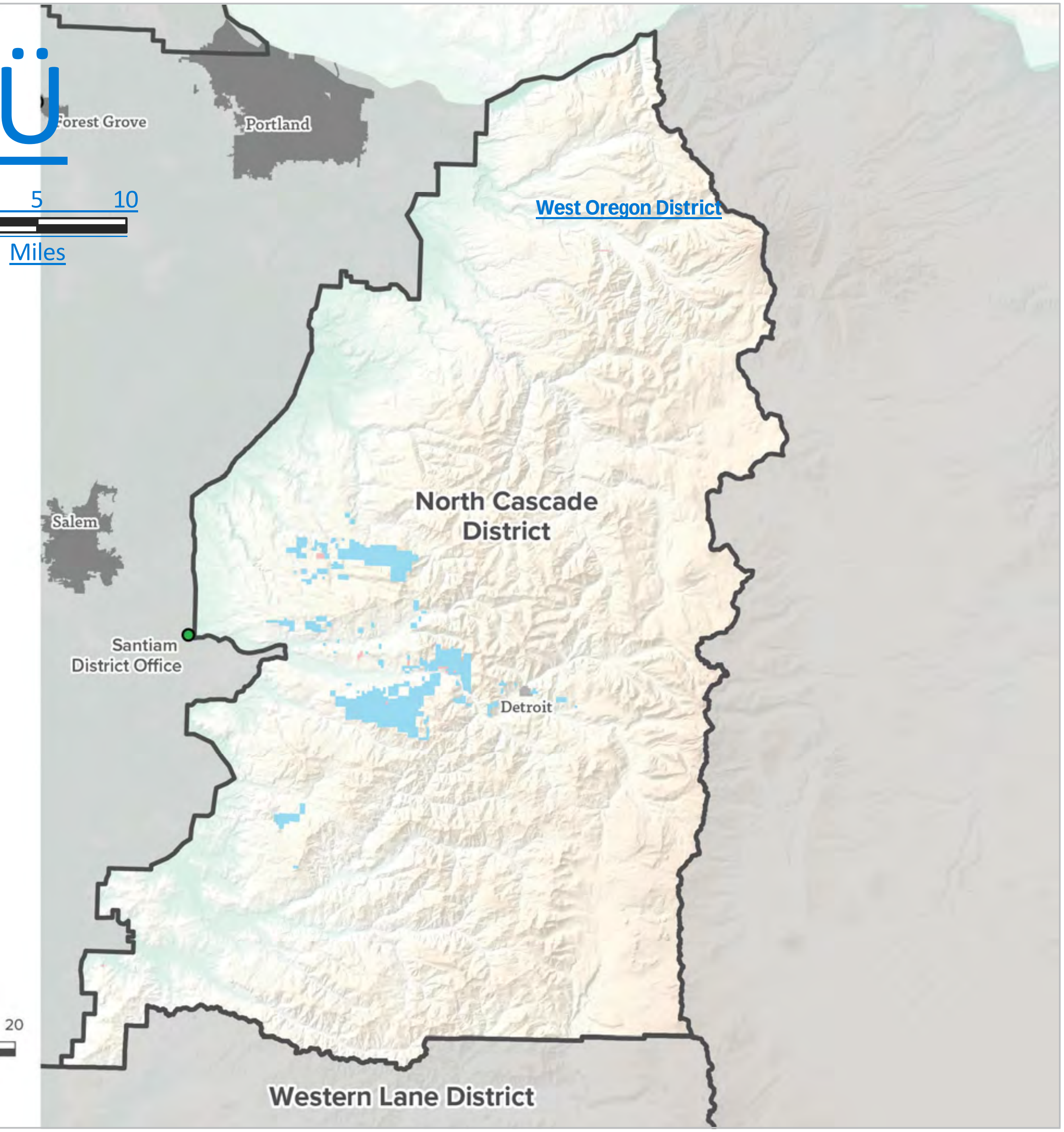

North Cascade District ~~Planning Area~~

Forest Grove District

Forest Grove District Office

Forest Grove

Portland

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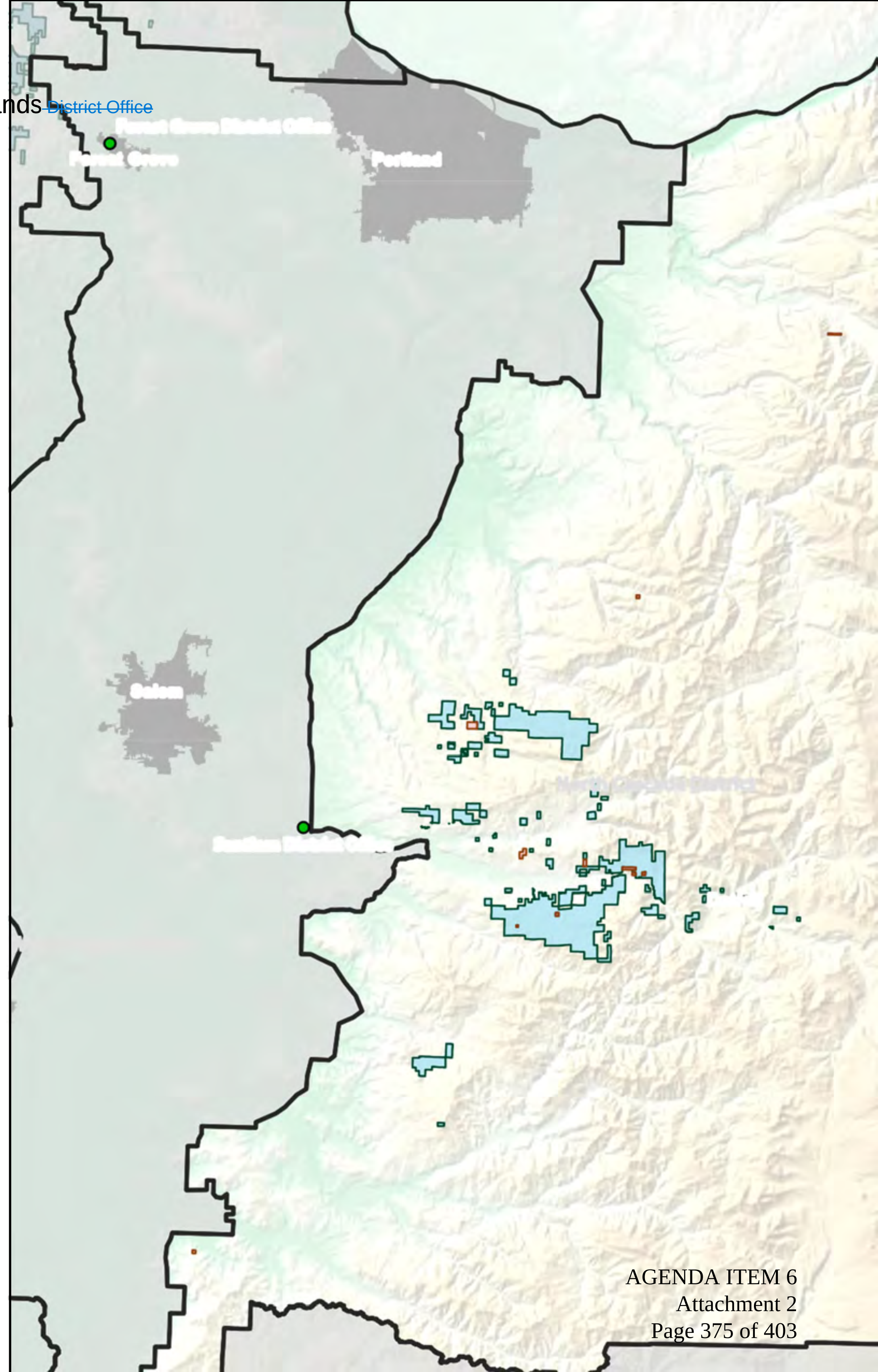
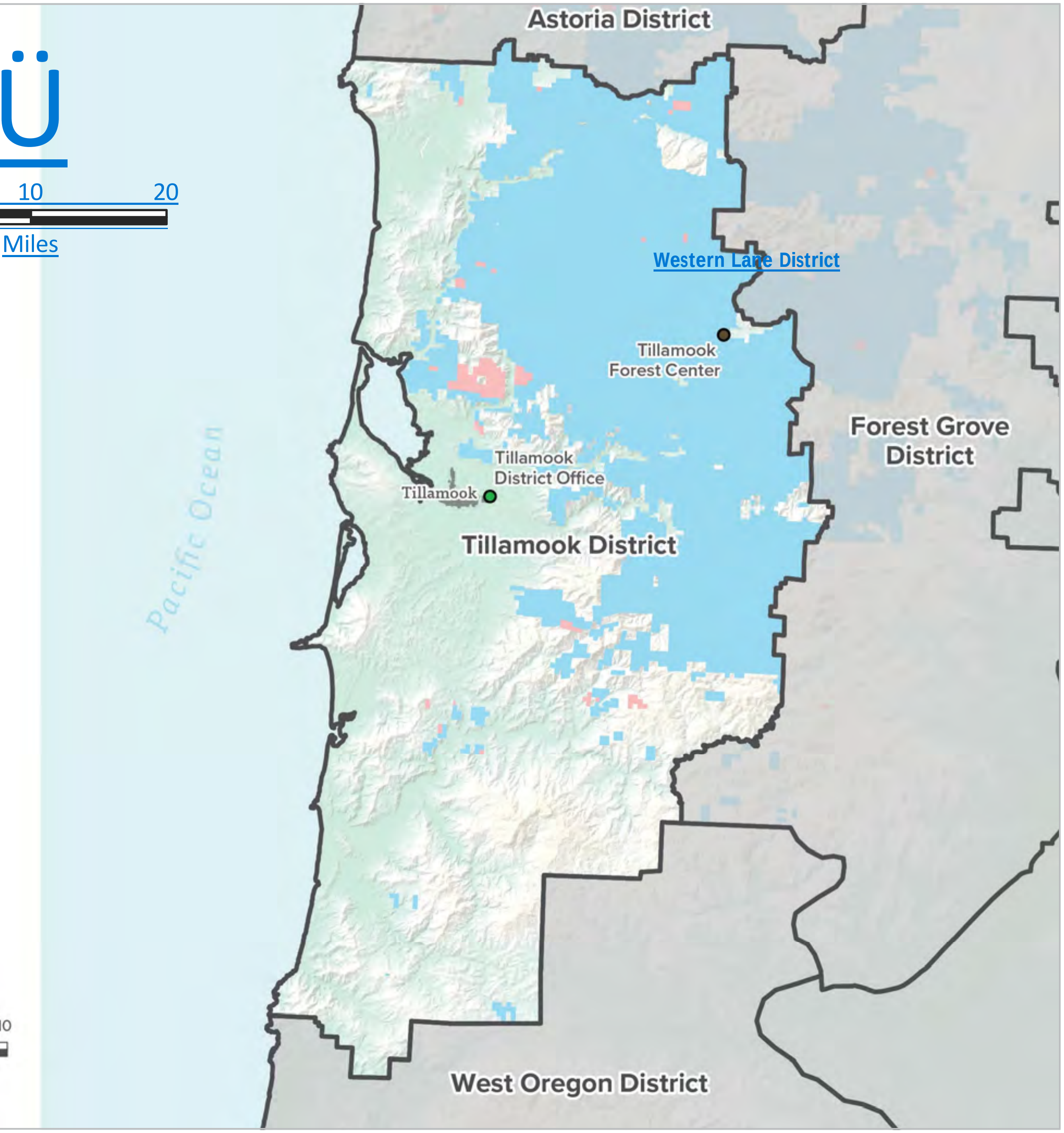
West Oregon District

District Boundary City Limit

FMP Planning Area Board of Forestry ~~Lands~~ Common School ~~Forest~~ Lands ~~District Office~~

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Pacific Ocean
West Oregon District

Astoria District

Tillamook ~~District Planning Area~~Forest Center

Forest Grove District Office
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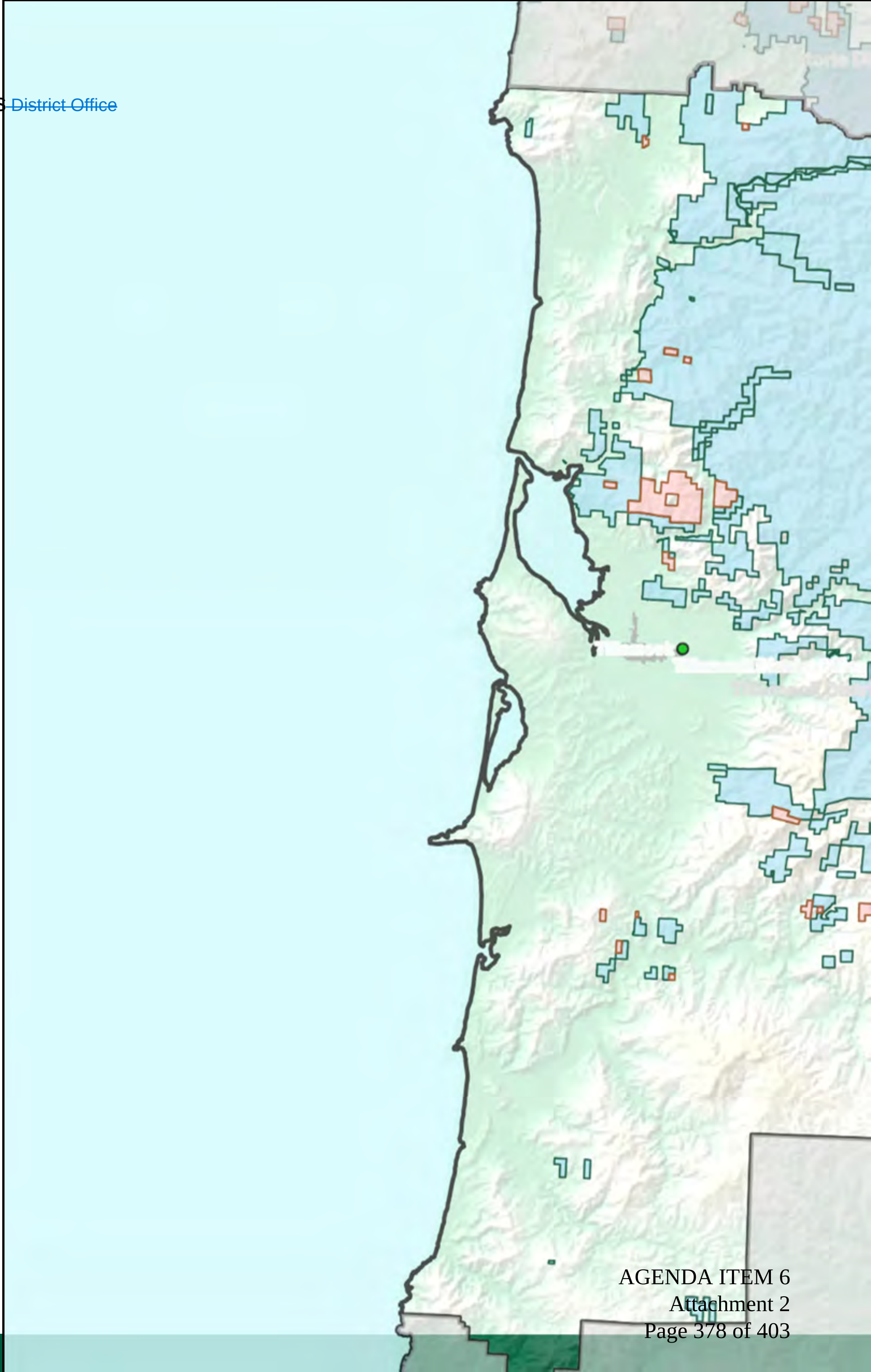
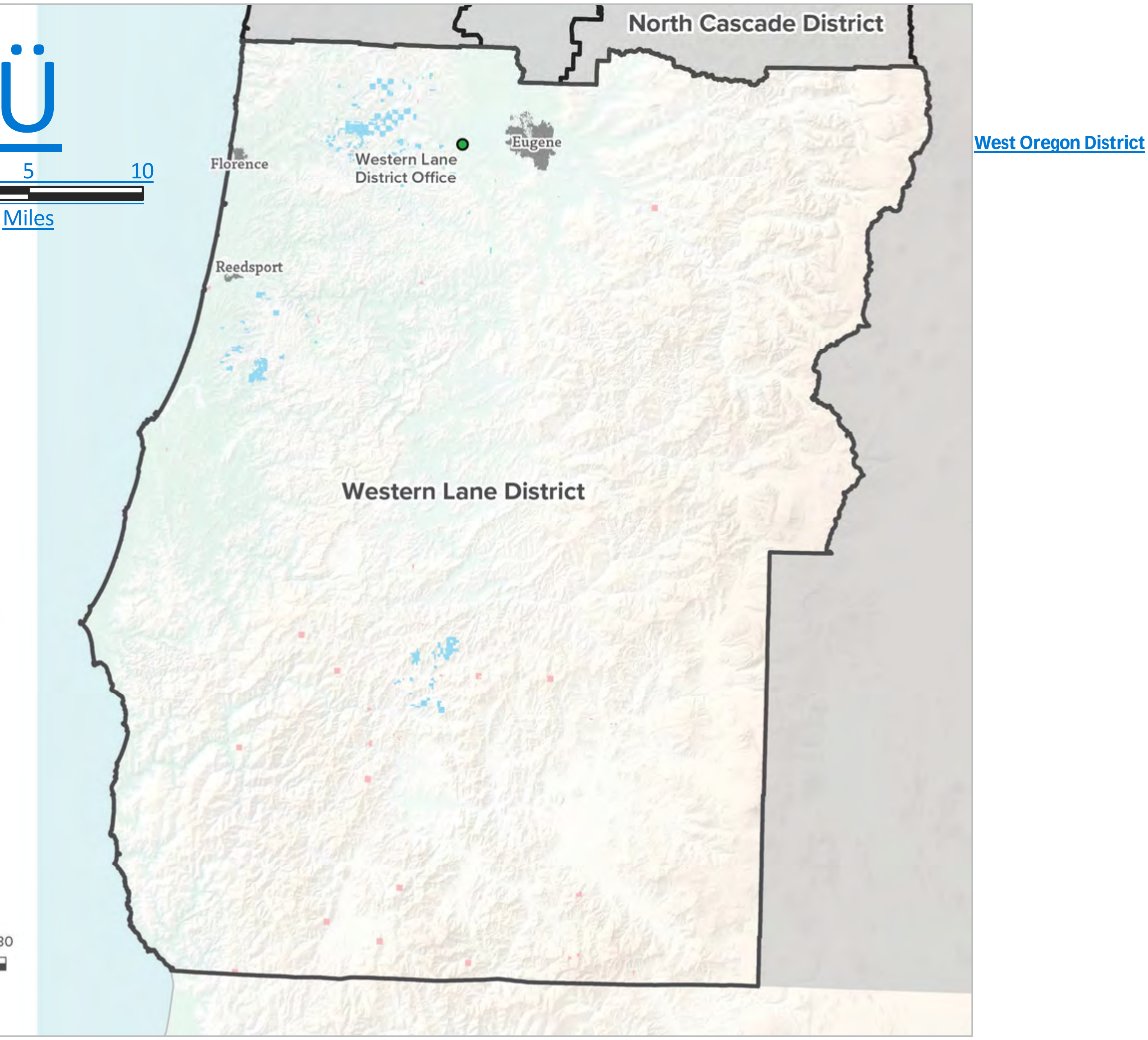


AGENDA ITEM 6
Attachment 2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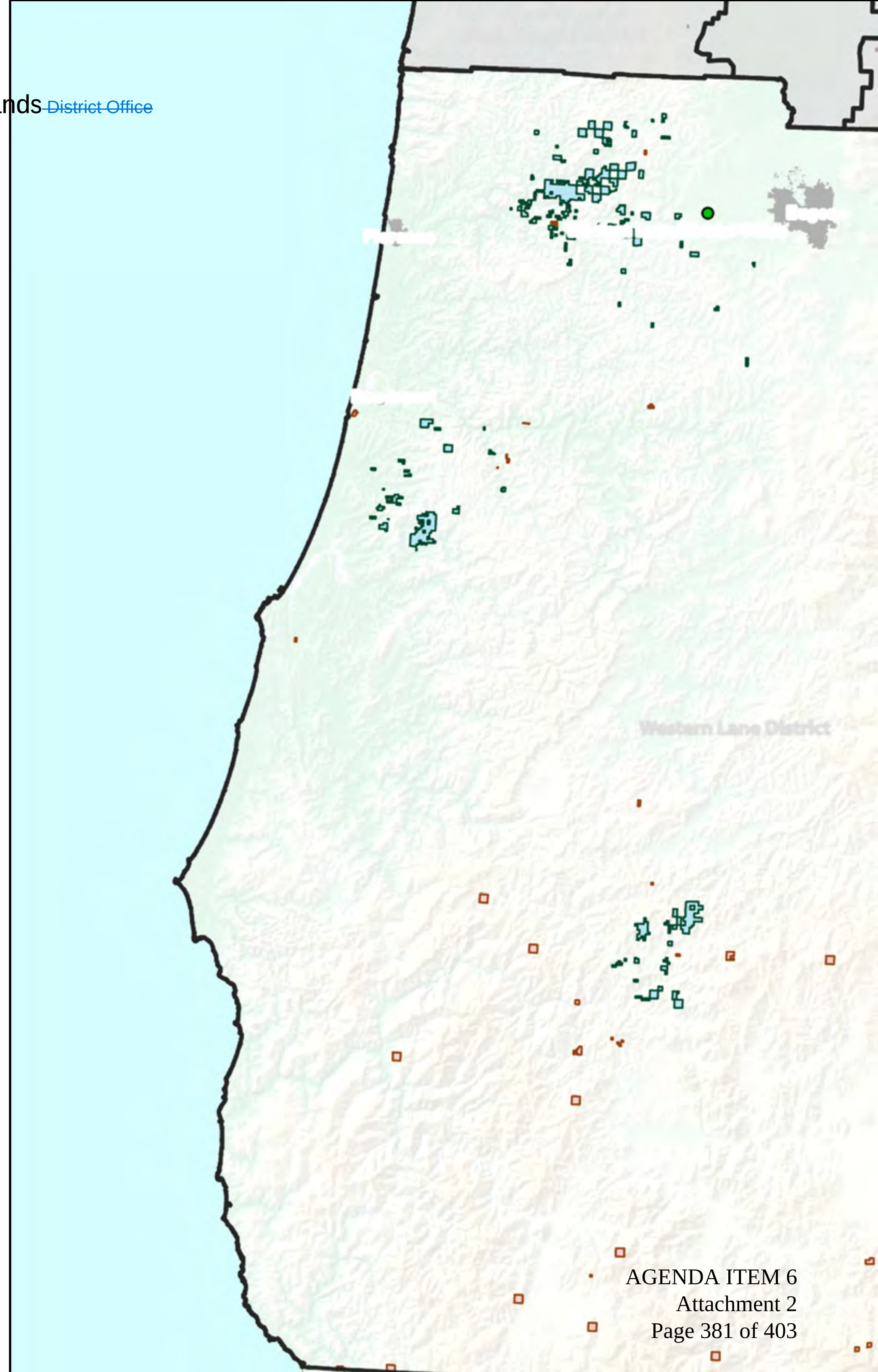
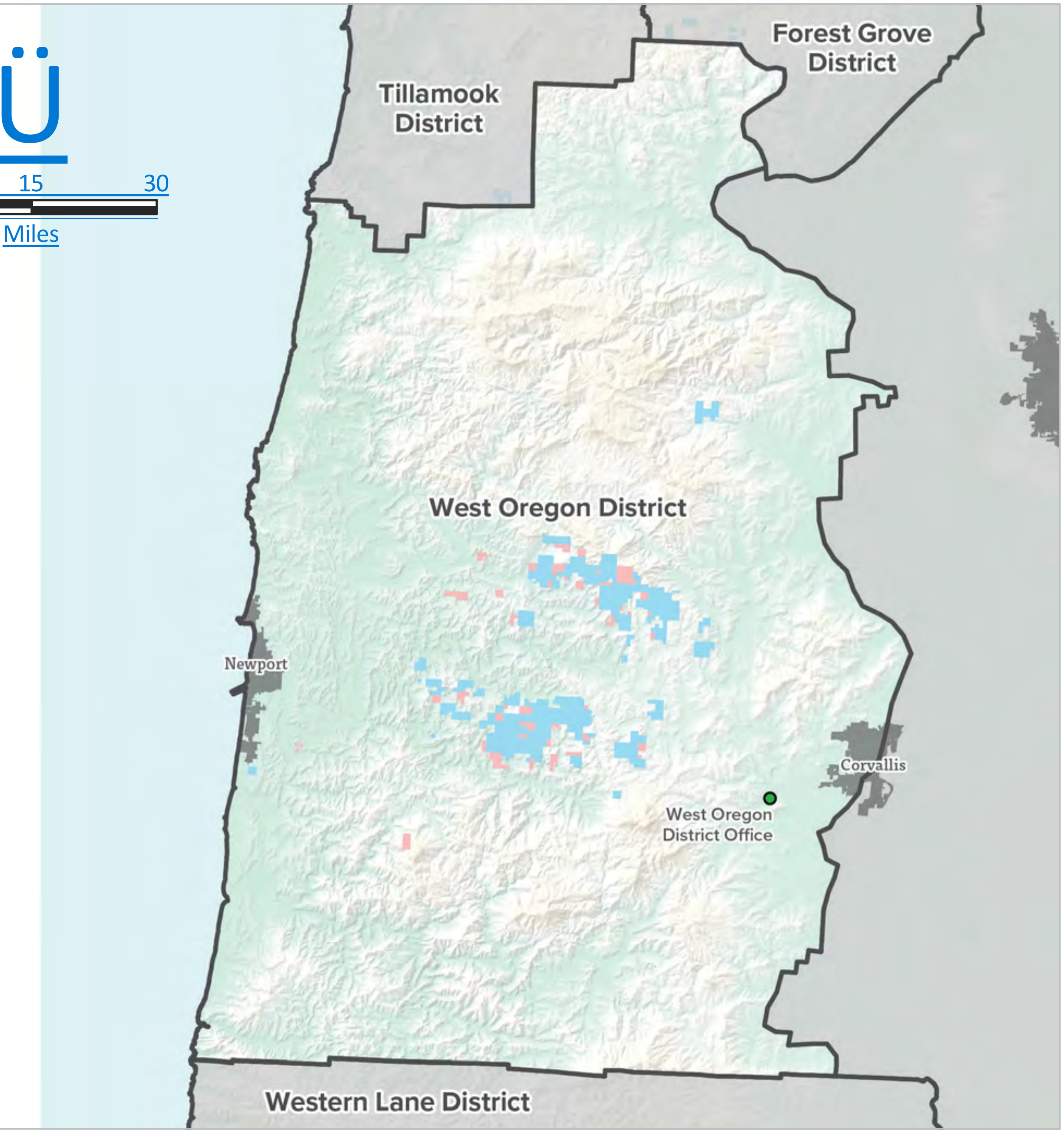
District Boundary City Limit

FMP Planning Area Board of Forestry ~~Lands~~ Common School ~~Forest~~ Lands ~~District Office~~





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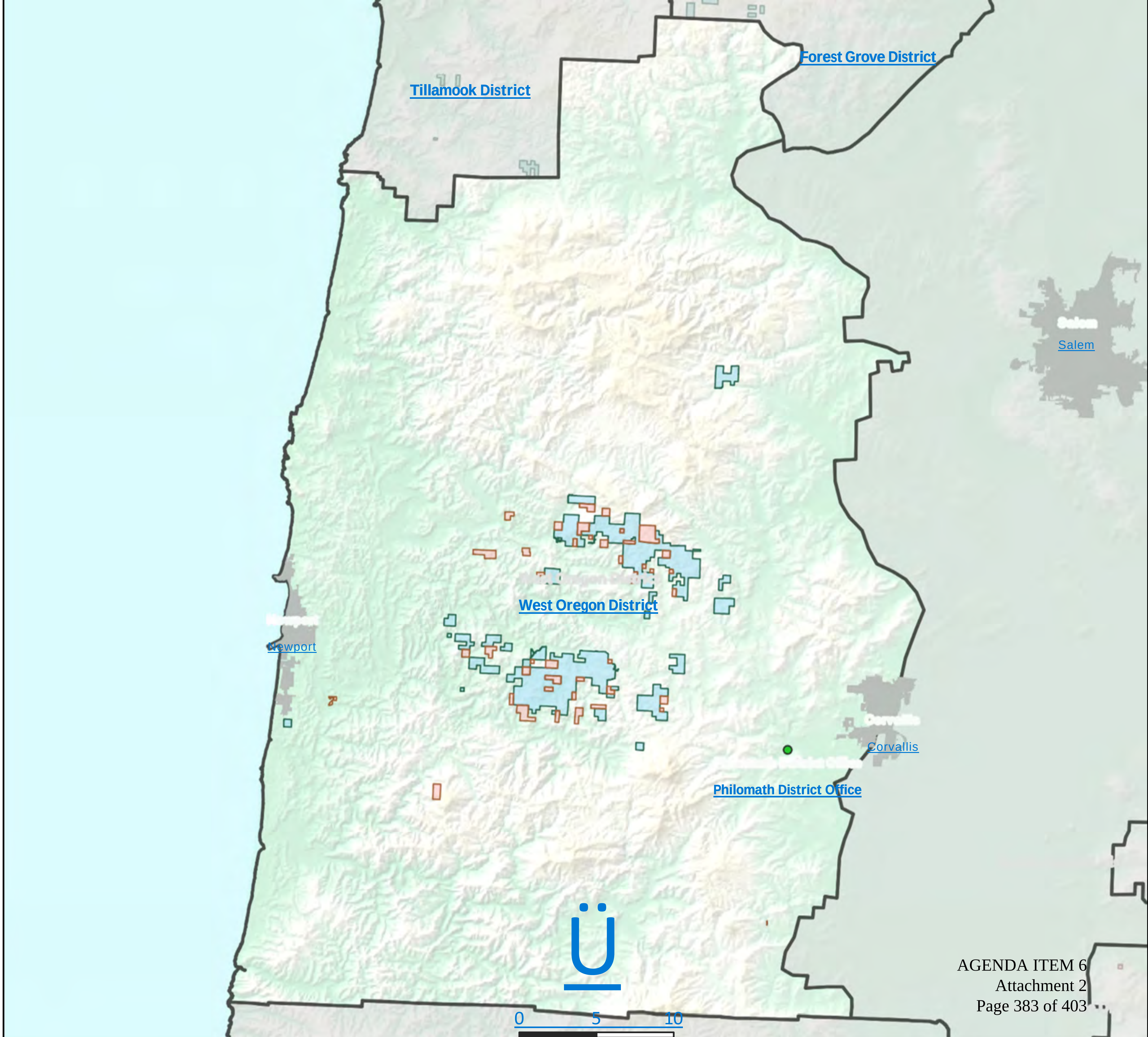

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ascade District

Appendix C
Description of Figures

The Oregon Department of Forestry (ODF) makes every attempt to ensure our documents are accessible. Should you need additional assistance, please contact us at ODF.StateForestMP@ODF.oregon.gov for accessibility assistance.

~~Acknowledgements~~

~~No figures.~~

~~Executive Summary~~
Land Acknowledgement

No figures.

Chapter 1 Introduction

Figure Number	Figure Title	Description of Figure

1-1	**Greatest Permanent Value Categories and Icons.** GPV category icons are used throughout Chapter 3, *Forest Resources, Goals, and Strategies*, to indicate connections with social, economic, and environmental resources and concepts.	Examples of social connections include the protection of cultural resources; recreation, education, and interpretation opportunities; and opportunities to collect special forest products (e.g., firewood, edible fungi, and salal). Examples of economic connections include sustainable and predictable production of forest products that support local and regional economies, including revenue generation for local taxing districts and management of state forest lands. ~~forest products that support local and regional~~Examples of environmental connections are healthy, sustainable, resilient forests; properly functioning

Figure Number	Figure Title	Description of Figure
		aquatic habitats for native fish and aquatic life; habitat for native wildlife; and carbon sequestration and storage.
1-2	~~economic, and environmental resources and concepts.~~ **Relationship with Other Supporting Plans and the Planning Process.** This figure provides additional detail about how federal and state laws and supporting implementation documents work in conjunction with the FMP to inform the tiered planning levels of implementation.	~~economies, including revenue generation for local taxing districts and management of state forest lands. Examples of environmental connections are healthy, sustainable, resilient forests; properly functioning aquatic habitats for native fish and aquatic life; habitat for native wildlife; and carbon sequestration and storage.~~The FMP provides overall high-level forest management goals and strategies. It is based on federal and state law and the plan itself is a state law. Supporting documents provide additional standards or requirements to implement the FMP. Federal and state laws, including the FMP, as well as the supporting documents, guide IPs, IPs are sub-geographic plans with mid-level objectives, management approach, and activities. IPs guide OPs. OPs include operational and project-level detail. Monitoring and reports are the result of implemented OPs, and those results inform the adaptive management process. The adaptive management process is the process by which supporting documents may be adjusted.

Chapter 2 Management Approach

Figure Number	Figure Title	Description of Figure

2-1	**Social, Economic, and Environmental Reciprocity.** Ecosystem services deliver social and economic benefits, and social and economic benefits can be obtained in a way that supports environmental benefits.	Figure 2-1 is a flowchart that depicts the connections between ecosystems, humans, and the reciprocity between ecosystem services and services to ecosystems. Ecosystem services provided by the ecosystem itself include provisioning services like timber products, food, and clean air and water~~,~~; regulating services like carbon storage~~,~~; cultural services like recreational and spiritual benefits~~,~~; and supporting services like soil formation and pollination. Human actions that can serve ecosystems include protecting services like fish and wildlife habitat protection, enhancing services like thinning, restoring services like stream enhancement projects, and supporting services like natural resource stewardship practices.
~~2-2~~	~~**Ecologically Sustainable Management.** Practices that promote adaptive capacity to secure GPV.~~	~~Figure 2-2 is a flowchart of ecologically sustainable forest management that promotes adaptable, productive, sustainable ecosystems through conservation emphasis areas in a landscape context, management of landscape conditions, and management of stands. Ecologically sustainable forest management aims to provide social, economic, and environmental ecosystem services, such as recreation, education, and interpretation opportunities; properly functioning aquatic habitat for fish and aquatic life;~~

Figure Number	Figure Title	Description of Figure
		~~habitats for native wildlife; clean air and water; and other important services.~~
2-~~3~~2	~~**Emphasis Areas and Their Value to the Ecosystem**. The design of emphasis areas across the landscape supports diversity, connectivity, complexity, and redundancy, which support adaptive capacity of the ecosystem for sustained ecosystem services delivery under changing conditions.~~ **Ecologically Sustainable Forest Management.** Practices that promote adaptive capacity to secure GPV.	~~Figure 2-3 shows three pictures characterizing different forest ages: young, middle-age, and older. All emphasis areas contribute value to the ecosystem. The design of emphasis areas across the landscape supports diversity, connectivity, complexity, and redundancy, which enhance function and improve adaptive capacity. Young forests (depicted by picture of a deer) are sunlight-filled and provide many wildlife species with abundant food resources, including berries, forbs, and grasses. Middle-age forests (depicted by picture of a salamander) are transitional forests contributing to wildlife habitat connectivity as they mature and develop stand characteristics found in older forests. Older forests (depicted by picture of an owl) contain multi-layered canopies, large trees, snags, and downed wood that provide wildlife nesting, roosting, and denning habitats.~~Figure 2-2 is a flowchart of ecologically sustainable forest management that promotes adaptable, productive, sustainable ecosystems through designated emphasis areas, management of landscape conditions, and management of stands. Within emphasis areas, example practices include protection of wetlands and steep slopes. Within Landscapes, example practices include habitat connectivity and structural diversity. Within Stands, example practices include retention and reforestation with diverse or alternate species mixes. Ecologically sustainable forest management aims to provide social, economic, and environmental ecosystem services, such as cultural values, recreation, education, and interpretation opportunities; sustainable and predictable production of forest products that generate revenue and support the economy; properly functioning aquatic habitat for fish and aquatic life; habitats for native wildlife; clean air and water; and other important services.

~~2-4~~ Text Box	~~**Examples**~~ **Subclasses of ~~Emphasis Areas across~~ the ~~Landscape.~~** ~~Active management~~**Forest Land Management Classification System.** Each area designated as focused, special, or high value conservation stewardship is ~~integrated across~~categorized according to subclasses that denote the ~~landscape guided by~~ resource ~~management~~ emphasis ~~areas~~.	~~Figure 2-4 shows two aerial views of the same landscape highlighting different subclasses and stewardship classes. View A shows an emphasis on aquatic and riparian habitat subclasses with the stewardship class focused on areas of high value conservation around and near streams in a landscape of partial-cut, variable-density, and regeneration harvest. View B shows recreation subclass emphasis areas, where special stewardship and focused stewardship classes are depicted.~~The text box lists the subclasses and their FLMCS stewardship class. Administrative sites are classified as Special Use stewardship. Agriculture, grazing, and wildlife forage areas can be classified as Focused Stewardship or Special Use. Aquatic and riparian habitat areas can be classified as Focused Stewardship or High Value Conservation Stewardship. County or Local Comprehensive Plan areas are classified as Special Use. Cultural resources areas are classified as Focused Stewardship or Special Use. Deeds are classified as Focused Stewardship or Special Use. Domestic water use areas are classified as Focused Stewardship or Special Use. Easements are classified as Focused Stewardship or Special Use. Energy and materials areas are classified as Focused Stewardship or Special Use. Operationally limited is classified as Special Use. Plant areas are classified as Focused Stewardship. Recreation areas are classified as Focused Stewardship or Special Use. Research and
~~2-5~~	~~**Application of the Ecologically Sustainable Approach Management to Deliver Ecosystem Services.**~~ ~~The emphasis areas, policies, and strategies are applied across the planning area to support decision-makers as they strive to further improve~~	~~Figure 2-5 is an infographic with three text boxes describing different planning and management levels in western Oregon state lands. Box 1: Within the overall planning area, lands are managed according to: Oregon Revised Statutes, Oregon Administrative Rules, Forest Land Management Classification System (FLMCS), Habitat Conservation Plan (HCP), and policies. Box 2: When managing the smaller scales of landscape or planning areas, as informed by emphasis~~

Figure Number	Figure Title	Description of Figure
		Monitoring areas are classified as Focused Stewardship or Special Use. Transmission corridors are classified as Focused Stewardship or Special Use. Unique Threatened or Endangered Plant areas are classified as HVCAs. Areas with visual values are classified as Focused Stewardship or Special Use. Wildlife habitat areas are classified as Focused Stewardship, Special Use, or HVCAs.
2-3	~~conditions, adapt plans to response to change; and improve performance over time.~~ **Landscape-Level Forest Stand Diversity Contributions to Ecosystem Function.** Management across the landscape supports diversity, connectivity, complexity, and redundancy, which, in turn, supports adaptive capacity of the forest for sustained ecosystem services delivery under changing conditions.	~~area, decisions are made to improve adaptive capacity to climate change; apply Forest Management Plan (FMP) strategies to FMP goals, including carbon storage; meet HCP Conservation Actions across the landscape, including slope protection, legacy components, in-unit downed wood, and leave trees; and meet Implementation Plan targets, including timber harvest level outputs. Box 3: Adaptive management uses a systematic and rigorous approach to learning from actions to improve management plans, decisions, and implementation; and respond to changes in ecosystem and society.~~Figure 2-3 shows three pictures characterizing different contributions of seral stand conditions: young, middle-age, and older. Stand seral diversity contributes value to the ecosystem. The design of stand seral conditions across the landscape supports diversity, connectivity, complexity, and redundancy, which enhances function and improves adaptive capacity. Young forests (depicted by picture of a deer) are sunlight-filled and provide many wildlife species with abundant food resources, including berries, forbs, and grasses. Middle-age forests (depicted by picture of a salamander) are transitional forests contributing to wildlife habitat connectivity as they mature and develop stand characteristics found in older forests. Older forests (depicted by picture of an owl) contain multi-layered canopies, large trees, snags, and downed wood that provide wildlife nesting, roosting, and denning habitats.

2-4	**Examples of Emphasis Areas across the Landscape.** Active management is integrated across the landscape guided by resource management emphasis areas.	Figure 2-4 shows two aerial views of the same managed landscape highlighting how different timber harvest treatments may be applied in areas with different management emphasis by subclasses and stewardship classes. View A shows aquatic and riparian habitat and wildlife habitat subclasses around and near streams with the stewardship class being HVCAs. View B shows recreation subclass emphasis areas day use sites and the Tillamook Forest Center, where Special Use applies, and trails and dispersed campsites, where Focused Stewardship applies.

Chapter 3 Forest Resources, Goals, and Strategies

Figure Number	Figure Title	Description of Figure
3-1	**Distribution of Stand Ages as a Percentage of Area of Western Oregon State Forests.** ~~Compared to even-aged~~ Stands in the 60–89 year age bracket represent the plurality of stands, ~~forests with uneven-aged stands often support~~reflecting the management history of state forest lands. Reforestation following a ~~greater~~period of salvage logging and a series of wildfires in the early 20th century resulted in a large number of ~~species and are more resistant to windfall and insect outbreaks~~stands in this age range.	Figure 3-1 is a bar graph showing the age distribution of stands in western Oregon state forests in percentages by ~~20~~30-year-old age groups. The percent of acres with stands 0–~~19 years old is 19.5%, 20–~~29 years old is ~~10.5%, 40~~24%, 30–59 years old is ~~19.7~~24%, 60–~~79~~89 years old is 40%, 90–119 years old is ~~31.1~~ 10%, and ~~80–99 years old is 14.3%. The rest of the age class groupings, from 100~~120 years or older~~, are <~~ is 2~~% of forests.~~%.
3-2	~~Dominant~~ **Tree Species Composition in Western Oregon State Forests.** ~~Tree species richness and~~Stand composition ~~affect~~affects potential vulnerabilities or resilience to disturbances and stressors such as insect outbreaks, pathogens, fire, windthrow, drought, and climate change.	Figure 3-2 is a bar graph showing the ~~percent~~percentage of acres of different tree species in western Oregon state forests~~ in percentages.~~. The dominant forests are mixed Douglas-fir at ~~40~~42%, followed by homogenous Douglas-fir at ~~27%.~~31%. Hemlock and mixed hemlock stands are approximately ~~13~~9%. Hardwoods and mixed hardwoods are ~~12%. Open and ready for planting is at 5%, and~~14%. Other species and non-forested lands are at approximately ~~3~~4%.
Text Box	**State Forests Revenue Disbursement**	The text box shows a pie chart of state forests revenue disbursement. 98% of State Forests Division revenue is generated from timber sales. 63.75% of state forest revenue is distributed to local counties and taxing districts for local services and schools. 36.25% of state forest revenue is retained by the State Forests Division for forest management and restoration.

3-3	**State Forest Roads by District.** There are approximately 4,500 miles of road on state forest lands; approximately 85% of these roads are surfaced (primarily graveled, though	Figure 3-3 is a bar chart showing the miles of state forest roads by district and what portion of those roads are unsurfaced. Astoria District has approximately 1,000 miles of roads of which 7% are unsurfaced, Forest Grove has approximately 800 miles of which 5% are unsurfaced. North Cascade has

Figure Number	Figure Title	Description of Figure
~~3-3~~	~~**Distribution of Quadratic Mean Diameter of Trees in Western Oregon State Forests.** Quadratic mean diameter affects the quality of habitat for some wildlife species and tree bole merchantability.~~some main travel routes are paved).	~~Figure 3-3 is a bar graph showing the distribution of the quadratic mean diameter of trees in western Oregon State forests as a percentage of forest acres. There is approximately 18% of stands that are non-forested or 0.1–4.9 inches. There is 4% that range between 5 and 99 inches, 28% that is 10–14.9 inches, 35% that is 15–19.9 inches, 12% that is 20–24.9 and 3% that is 25 inches or greater.~~approximately 400 miles of which 16% are unsurfaced, Tillamook has almost 1,500 miles of which 18% are unsurfaced. West Oregon and Western Lane Districts each have approximately 350 miles of roads. Approximately 27% of roads for West Oregon and 44% for Western Lane are unsurfaced.
Text Box	**Tillamook Forest Center Annual Overview**	The text box shows average data from fiscal year 2024 and 2025. Approximately 62,700 people visited the Tillamook Forest Center. People gave approximately 3,070 volunteer hours. Approximately 2,700 people participated in education programs and 5,200 people participated in interpretive services.
3-4	~~**Distribution of Dominant Tree Species on Western Oregon State Forests.** Douglas-fir-dominated forests comprise the majority of all districts other than Tillamook, but forests dominated by species other than Douglas-fir or by multiple species exist in all districts.~~ **Scenic Waterways.** Scenic-designated segments of the Nestucca, Nehalem, and Rogue Rivers flow through the planning area.	Figure 3-4 ~~shows two side-by-side maps~~ is a four-panel map showing ~~tree distribution in~~the scenic-designated segments of rivers within different districts ~~on~~of the planning area. One panel shows an overview of western Oregon state forest ~~lands. One map shows the~~ districts ~~in the north~~and the state's scenic-designated water ways. The other panels show details of which ~~includes~~districts have sections of scenic waterways. A segment of the Nehalem River Scenic Waterway flows through the Astoria~~, Forest Grove,~~ and Tillamook~~. The other map shows the districts in the south which includes West Oregon, North Cascade, and~~ Districts. A segment of the Nestucca Scenic Waterway flows through both Tillamook and Forest Grove Districts. And a segment of the Rogue Scenic Waterway flows through Western Lane~~. Douglas-fir-dominated forests comprise most of all districts other than Tillamook, which also has a large proportion of mixed hardwoods and hardwood-dominated forests. However, forests~~

		~~dominated by species other than Douglas-fir or by multiple species are present in all districts~~ District.
3-5	~~**Swiss Needle Cast on State Forest Lands.** Annual observations and 3-year moving average of Swiss needle cast-infected acres across state forest management since 2010.~~**Slope Steepness across the Planning Area.** The highest percentage of steeper slopes in the planning area are in the Tillamook and Western Lane Districts.	~~Figure 3-5 is a combination of a bar graph showing acres infected by Swiss needle cast on state forest lands in annual observations from 2010 until 2018 and a line graph showing the 3-year moving average. From 2010 to 2014, the total and average acres infected remained below 40,000. In 2015, the annual observations increased to 70,000 acres and 3-year average increased to 50,000. By 2018, while the annual observation of acres has dropped since 2015 to approximately 55,000, the moving average has continued to increase to above 60,000.~~Figure 3-5 is a bar graph showing acres of each district that are 0–30% slope, 30–60% slope, and >60% slope. Tillamook District has approximately 125,000 acres of the total district area of 250,000 acres that have slopes greater than 60%, the largest area of all districts.
3-6	**Forest Soils Developed on Marine Siltstones in Less Rugged Coastal Areas.** Soils formed on underlying marine sedimentary formations from deep weathering are predominantly silts, sands, and clays with minor amounts of	Figure 3-6 is an annotated photograph of a soil profile, showing the demarcation between underlying geologic formation of marine siltstone below the forest soils composed of silt, clay, and sand. A rock hammer is located in the center of the photo at the line indicating the border between soil and underlying marine silt stone to show scale.

Figure Number	Figure Title	Description of Figure
~~3-6~~	~~**Percent of Planning Area District Lands by Overall Wildfire Risk Category as of 2018.** Risk is a product of the likelihood and consequences of wildfire to infrastructure and natural resources. Wildfire can be either beneficial or detrimental.~~	~~Figure 3-6 is a bar graph that describes the overall fire risk level for each district by percentage of its' land within wildfire risk categories as of 2018. Most district lands are low risk, with 76–85% falling within that category and ≤14% in any of the moderate, high, or very high risk classifications. Two districts have higher wildfire risk than other districts. North Cascade has 55% of its lands at moderate risk and 14% at high risk, with 1% at very high risk. Western Lane has 34% at moderate risk, 12 % at high risk, and 12% at very high risk.~~
~~3-7~~	~~**Scenic Waterways.** Scenic designated segments of the Nestucca, Nehalem, and Rogue Rivers flow through the planning area.~~gravel and can be wet most of the year.	~~Figure 3-7 is a four-panel map showing the scenic-designated segments of rivers within different districts of the planning area. One panel shows an overview of western Oregon State forest districts and the state's scenic-designated water ways. The other panels show details of which districts have sections of scenic waterways. A segment of the Nehalem River Scenic Waterway flows through the Astoria and Tillamook Districts. A segment of the Nestucca Scenic Waterway flows through both Tillamook and Forest Grove Districts. And a segment of the Rogue Scenic Waterway flows through Western Lane District.~~
~~3-8~~	~~**Slope Steepness across the Planning Area.** The highest percentage of steeper slopes in the planning area are on the Tillamook and Western Lane Districts.~~	~~Figure 3-8 is a bar graph showing acres of each district that are 0–30% slope, 30–60% slope, and >60% slope. Tillamook District has approximately 125,000 acres of the total district area of 250,583 acres that have slopes greater than 60%, the largest area of all districts.~~
3-~~9~~7	**Fine- and Coarse-Grained Soils by District.** The Tillamook District has the highest proportion of coarse-grained soils in the planning area.	Figure 3-~~9~~7 is a bar graph showing acres of each district that are either fine- or coarse-grained soils. Astoria, West Oregon, and Western Lane Districts have predominantly fine-grained soils. Forest Grove, North Cascade, and Tillamook Districts have predominantly coarse-grained soils.

3-~~10~~8	**Paths of the Forest Carbon Cycle.** Forest vegetation sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils.	Figure 3-~~10~~8 is a flow diagram showing carbon dioxide capture and emissions as part of a forest's carbon cycle. Carbon dioxide is removed from the atmosphere as forests grow and age. Carbon dioxide is released by fire, decomposition, biomass products like wood pellets, and short-term consumer products like paper. Long-lived products, like lumber, can sequester carbon until they start to decompose.
3-9	**Estimated Average Aboveground Carbon in Live Trees across ODF Districts.** Data are based on the 2022 Forest Inventory and Analysis estimate on western Oregon state forests.	Figure 3-9 is a bar graph of aboveground carbon in woody biomass measured by US tons per acre. The average aboveground carbon of all districts is 59.3. The aboveground carbon of individual districts are as follows: Astoria is 59.6, Forest Grove is 60.3, North Cascade is 57.6, Tillamook is 53.9, West Oregon is 54.0, and Western Lane is 86.6.
3-10	**Watersheds Overlapping with North Coast Districts and the Planning Area**. The median percentage of ODF-managed lands in northwest districts by HUC-12-sized sub-watersheds is 26% (range <1% to 100%).	Figure 3-10 is a map of the north coast districts within the planning area with Hydrologic Unit Code (HUC)-12 watersheds overlayed. HUC-12s are the smallest-sized watershed delineated by the U.S. Geological Survey.
3-11	**Watershed Enhancement Actions.** In-stream, riparian, road improvement, and donations tracked by OWEB, 1995–2025.	Figure 3-11 shows representative photographs of five types of watershed enhancement projects, along with quantities. ODF has implemented over 200 projects with over 200 miles of stream enhanced; donated over 8,000 trees for in-stream projects; improved over 350 road-stream crossings to enable aquatic organism access to over 300 miles of upstream habitat;

Figure Number	Figure Title	Description of Figure
	~~sequesters carbon dioxide from the atmosphere in living tissues and provides long-term storage of carbon in trees, snags, downed wood, other plants, and soils.~~	~~cycle. Carbon dioxide is removed from the atmosphere as forests grow and age. Carbon dioxide is released by fire, decomposition, biomass products like wood pellets, and short-term consumer products like paper. Long-lived products, like lumber, can sequester carbon until they start to decompose.~~improved over 2,500 road-stream crossings on other streams to improve water quality; restored over 200 miles of riparian areas; closed or vacated over 175 miles of road; and donated over $50 million in-kind from ODF and $12 million from outside sources.
~~3-11~~	~~**Estimated Average Aboveground Carbon in Woody Biomass across ODF Districts**. Data are based on the 2020 Forest Inventory and Analysis Plots on western Oregon State forests.~~	~~Figure 3-11 is a bar graph of aboveground carbon in woody biomass measured by metric tons per hectare. The average aboveground carbon of all districts is 133. The aboveground carbon of individual districts are as follows: Astoria is 142, Forest Grove is 129, North Cascade is 165, Tillamook is 125, West Oregon is 110, and Western Lane is 146.~~
~~3-12~~	~~**Watersheds Overlapping with Northwest Districts and FMP Planning Area**. The median percentage of ODF-managed lands ownership in northwest districts by HUC-12-sized is 26% (range <1% to 100%).~~	~~Figure 3-12 is a map of the FMP planning area districts with Hydrologic Unit Code (HUC)-12 watersheds overlayed. HUC-12s are the smallest-sized watershed delineated by the U.S. Geological Survey.~~

Chapter 4 Guidelines

Figure Number	Figure Title	Description of Figure

4-1	**Links among the FMP ~~and~~, Major Example Laws, Other Plans, and Policy Guidance**. This figure provides additional detail of the laws and supporting documents that inform the FMP and implementation.	~~Figure 4-1 is a flow diagram showing the connections and feedback between FMP direction and implementation. FMP direction described as falling under the Board of Forestry (BOF), shows two boxes with arrows connecting them in both directions: one for the FMP and one for the BOF review of FMP performance measures. The FMP box in turn connects to a separate section with many interacting components under FMP implementation, which is carried out by the State Forester/ODF Department of Forestry staff. Implementation Plans,~~Figure 4-1 is a flow diagram showing the connections and feedback between federal and state laws, including the FMP, and the tiered planning process. It is a more detailed version of Figure 1-2. It provides an example subset of laws that inform the FMP, including the Forest Practices Act, Stewardship Agreement, Clean Water Act, Clean Air Act, Endangered Species Act, Forest Land Management Classification System, and OAR Smoke Management. The supporting implementation documents are also provided in more detail and include the WOSF HCP, BOF Policy like the CCCP and VOF, OPs, the BOF Performance Measures, Adaptive Management Plan, and modeling. The figure highlights that supporting implementation documents inform the FMP goals and strategies specifically. Both the laws and the supporting documents inform IPs, which set mid-term objectives. IPs, in turn, inform the OPs, which set short-term objectives and guide operations. Monitoring and reporting communicate operations results and inform the adaptive management process, which may influence change of supporting documents.

~~Figure Number~~	~~Figure Title~~	~~Description of Figure~~
		~~which set medium-term targets are informed by the FMP, FLMCS, HCP, and policies lead to Operation Plans, which set short-term targets. Funding level, Operation Plans, and monitoring lead back to adaptive management plans that are reviewed by the BOF and then informs the FMP, HCP, and FLMCS, and operational policies.~~
~~4-2~~	~~**Structured Decision-Making Process.** The process supports multi-objective decision-making based on deliberation, estimated outcomes of alternative actions, and clear choices upon which decision-makers can act.~~	~~Figure 4-2 is a diagram depicting the circular connection between the five steps for making decisions in a structured process; all steps are connected by a dashed line. After the five steps are taken and a decision is made, step six is to implement, monitor and review, which connects back to step one of the process.~~
~~4-3~~	~~**Adaptive Management Plan Workflow.** This workflow shows key AMP roles and how they can affect FMP implementation through decision support, monitoring, and reporting.~~	~~Figure 4-3 is a workflow diagram for adaptive management, which uses a structured decision-making process that necessitates monitoring and reporting. Monitoring leads to decision support for adaptive management and reporting that will inform any needed structured decision-making. Monitoring is also designed to incorporate performance measures and habitat conservation plans. Decision recommendations through the adaptive management structured decision-making process leads to Implementation Plans, HCPs, policies, best management practices, etc.~~

Description of Figures

Glossary

No figures.

References

No figures.

Appendix A Engagement

No figures.

Appendix B District Maps

Figure Number	Figure Title	Description of Figure
B-1	**Western Oregon FMP Planning Area,** 639,~~542~~573 Acres Managed by ODF	Figure B-1 is a map of the ~~FMP~~ planning area with all districts managed by ODF that are west of the Cascade Mountains.
B-2	**Astoria District Planning Area,** 136,856 Acres Managed by ODF	Figure B-2 is a map of the Astoria District that is in the north-coast part of the ~~FMP~~ planning area.
B-3	**Forest Grove District Planning Area,** 115,~~004~~009 Acres Managed by ODF	Figure B-3 is a map of the Forest Grove District that is in the northern part of the ~~FMP~~ planning area, east of the Astoria and Tillamook Districts.
B-4	**North Cascade District Planning Area,** 47,475 Acres Managed by ODF	Figure B-4 is a map of the North Cascade District that is in the northern part of the ~~FMP~~ planning area. The North Cascade District is east of Astoria, Tillamook, Forest Grove, and ~~Western~~West Oregon Districts. The district goes as far north as the ~~Astoria~~Forest Grove District and ends in the south at the Western Lane District, but state forest lands are generally east of Salem.
B-5	**Tillamook District Planning Area,** 250,~~583~~589 Acres Managed by ODF	Figure B-5 is a map of the Tillamook District that is in the north-coast part of the ~~FMP~~ planning area, south of the Astoria District and west of the Forest Grove District.
~~B-6~~	~~**Western Lane District Planning Area,** 53,035 Acres Managed by ODF~~	~~Figure B-6 is a map of the Western Lane District that is in the southern part of the FMP planning area. The Western Lane District lies south of all other western districts.~~
~~B-7~~	~~**West Oregon District Planning Area,** 36,587 Acres Managed by ODF~~	~~Figure B-7 is a map of the West Oregon District that is in the western part of the FMP planning area. It is north of the Western Lane District and south of the Tillamook and Forest Grove Districts.~~

Figure Number	Figure Title	Description of Figure
B-6	**Western Lane District Planning Area,** 53,031 Acres Managed by ODF	Figure B-6 is a map of the Western Lane District that is in the southern part of the FMP planning area. The Western Lane District lies south of all other western districts.
B-7	**West Oregon District Planning Area,** 36,613 Acres Managed by ODF	Figure B-7 is a map of the West Oregon District that is in the western part of the planning area. It is north of the Western Lane District and south of the Tillamook and Forest Grove Districts.