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Background

In this chapter, DNR describes the planning area and provides a brief history of the OESF.

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Background

Located on the western Olympic Peninsula, the Olympic Experimental State Forest (OESF) is a place of high rainfall, steep and rugged terrain, numerous streams and rivers, and temperate rain forests with extraordinary tree growth rates that provides both quality timber for harvest and habitat for native species such as northern spotted owls and marbled murrelets.

In the OESF, the Washington State Department of Natural Resources (DNR), a state agency, meets objectives for timber harvest (to produce revenue for trust beneficiaries), and wildlife habitat, biodiversity, and other ecological values through an experimental, integrated management approach. Unlike the more common approach of dividing a land base into one area for harvest and another for habitat, DNR manages the entire land base for both.

A center of experimentation for DNR, the OESF is unique from other experimental forests in the United States because it is not purely a research forest. It is a *working* forest with annual and decadal timber volume targets. Nowhere in the United States is a working forest of this size being managed under an experimental approach with the stated purpose of learning.

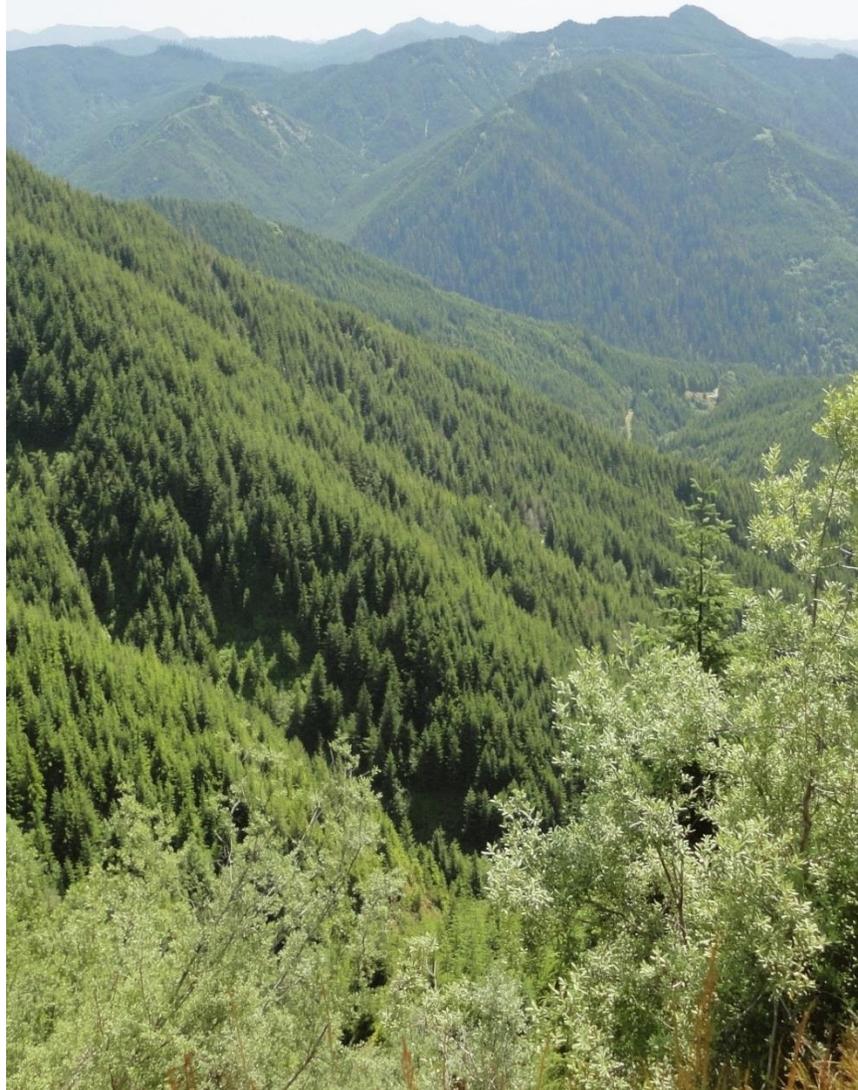
In the OESF, DNR intentionally learns by doing, experimenting with new silvicultural techniques and conducting research and monitoring in conjunction with ongoing timber harvest and other management activities to understand critical links between those activities and resultant ecological conditions. Course corrections are made along the way through an adaptive management process. DNR shares what it learns both within DNR and with other land managers facing similar challenges of meeting multiple objectives in a working forest.

In the following forest land plan, DNR describes the history of the OESF, the integrated management approach as implemented today, DNR's goals, objectives, and strategies for managing the OESF, and DNR's approach to the learning that is central to the purpose of this unique area.

DNR's Mission and Vision for the OESF

Mission: To intentionally learn how to integrate revenue production and ecological values in a working forest.

Vision: A productive, healthy, biologically diverse working forest that provides a perpetual supply of revenue to trust beneficiaries as well as ecological values.



About This Plan

This forest land plan provides DNR managers and foresters the practical guidance and direction they need to implement the integrated management approach as well as DNR policies including the *Policy for Sustainable Forests* and the *State Trust Lands Habitat Conservation Plan* (HCP). Following is an overview of these policies and their major provisions affecting the OESF:

- The *Policy for Sustainable Forests* guides the management of 2.1 million acres of forested state trust lands (state trust lands are described later in this chapter). This document includes policies on **producing revenue** for trust beneficiaries and maintaining **ecological values** including forest ecosystem health and productivity, wildlife habitat, riparian conservation, special ecological features, and watershed systems.



- The HCP is a long-term management plan authorized under the Endangered Species Act (16 U.S.C. 1531 et seq.)¹ that describes, in a suite of habitat conservation strategies, how DNR restores and enhances habitat for threatened and endangered species in conjunction with timber harvest and other forest management activities. The HCP includes four major habitat conservation strategies in the OESF: the **riparian conservation strategy**, which includes requirements for salmonid habitat and habitat for other aquatic and riparian-obligate species; the **northern spotted owl** and **marbled murrelet conservation strategies**, which include requirements for restoring and maintaining habitat for these species; and the **multispecies conservation strategy**, which covers unlisted species and species that face at least some risk of local extinction. Per the HCP and the Implementation Agreement (Appendix B to the HCP) DNR also implements **adaptive management** and **research and monitoring**.

Although DNR does not change policies through forest land planning, information gathered through plan implementation may inform future

policy decisions. Should DNR policies change in the future, DNR will revise this plan if and as necessary.

Plan Organization

This plan is organized into five chapters.

1. Background

In this chapter, DNR describes the planning area and provides a brief history of the OESF, including the evolution of the integrated management approach over time.

2. Management Approach

This chapter is a comprehensive overview of the integrated management approach as is implemented today.

3. Goals, Objectives, and Management Strategies

This chapter spells out the *what* and the *how* of this forest land plan for foresters and others responsible for day-to-day management. It includes DNR's goals, measurable objectives, and management strategies for generating revenue and implementing the HCP conservation strategies and research, monitoring, and adaptive management.

4. Research, Monitoring, and Adaptive Management

This chapter provides a detailed description of the adaptive management process and research and monitoring program. DNR describes both in a separate chapter to highlight their importance to the OESF.

5. Glossary of Terms

DNR provides brief definitions of the key terms used in this plan.

6. References

This chapter provides a list of references used in this plan.

This plan is intended as a living document that will be updated as needed during plan implementation. DNR will consider each change to ensure it falls within the range of the potential environmental impacts analyzed in

the final environmental impact statement prepared for this plan. If not, additional environmental analysis may be required.

In addition to this plan, DNR also maintains a “living library” of up-to-date information that foresters and managers need on a daily basis. Located on DNR’s intranet, the OESF Living Library includes documents, such as this forest land plan; links to DNR’s research database; a discussion board; mapping; and business intelligence such as current harvest volumes, progress toward management objectives, and other data that is continually updated to inform timber sale planning.



Old Growth Forest in the OESF

Planning Area

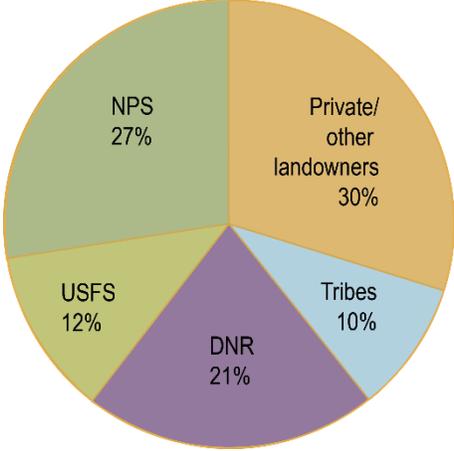
The OESF is bordered approximately by the Pacific Ocean to the west, the Strait of Juan de Fuca to the north, and the Olympic Mountains to the east and south (refer to Map 1-1).

Map 1-1. OESF and Vicinity



The OESF is one of nine planning units designated under the HCP. Because planning unit boundaries are established largely along watershed lines, the OESF includes lands managed by DNR as well as other owners, such as the National Park Service (NPS), United States Forest Service (USFS), tribes, private landowners (including timber companies), and others (Chart 1-1). DNR manages about 21 percent

Chart 1-1. Land Ownership in the OESF



(approximately 272,000 acres) of the OESF. **This forest land plan applies *only* to DNR-managed lands within the OESF boundaries.**

The Natural Environment

Mostly forested, DNR-managed lands in the OESF ranges in elevation from approximately 18 to 3,790 feet and spans three major vegetation zones: western hemlock (approximately 43 percent of DNR-managed lands), Sitka spruce (33 percent) and Pacific silver fir (24 percent).



Forested Valley in the OESF

Seasonal rainfall of 80 to 180 inches per year is a notable climatic feature of the OESF. The climate



is maritime (strongly influenced by the Pacific Ocean) with relatively dry summers and significant precipitation (usually rain) during the winter. High rainfall often translates to extraordinary tree growth rates.

Steep terrain and heavy annual precipitation promote an abundance of small streams. Stream density (miles of stream per square mile of land area) is particularly high in U-shaped glacial valleys such as the Hoh, Bogachiel, and Sol Duc drainages.

Wetlands are found in the coastal lowlands and valley bottoms of the major river systems in the OESF, including the lower Queets, Clearwater, Kalaloch, Hoh, Mosquito, Goodman, Bogachiel, Quillayute, Dickey, and Ozette rivers and their tributaries. Bogs, a special type of wetland that accumulates peat, are generally rare across Washington but are found in the OESF because of its geological history.



Wetland in the OESF

Types of DNR-managed Lands in the OESF

Most of the lands DNR manages in the OESF are state trust lands. State trust lands are lands held as fiduciary trusts for specific trust beneficiaries, such as schools and universities (refer to Text Box 1-1 on p. 1-9). On these lands, DNR produces revenue for its beneficiaries primarily through the sale and harvest of timber. The term “state trust lands” includes both State Lands and State Forest Lands:

- **State Lands** (RCW 79.02.010(14)): Shortly before Washington became a state in 1889, Congress passed the Enabling Act (25 U.S. Statutes at Large, c 180 p 676) to grant the territory more than 3 million acres of land as a source of financial support, primarily for its public schools and colleges. Unlike states that sold many of their federally granted lands early in the 1900s, Washington retained ownership of most of these lands and continues to manage them to provide revenue and other benefits to the people of Washington (DNR 2006). These lands are called State Lands.
- **State Forest Lands** (RCW 79.02.010(13)): Other lands were acquired by Washington from the counties. By the 1930s, counties had acquired 618,000 acres of foreclosed, tax-delinquent, cut-over, and abandoned forestlands. These scattered lands were difficult for the counties to manage, so the Washington State Legislature directed the counties to deed them to the state. The legislature directed that these lands be held and managed in trust, the same as State lands. These lands are called State Forest Lands.

Text Box 1-1. What is a Trust?

A trust is a relationship in which a person (or entity), the trustee, holds title to property that must be kept or used for the benefit of another, the beneficiary. According to the *Policy for Sustainable Forests*, a trust includes a grantor (the entity establishing the trust, such as the federal government), a trustee (the entity holding the title), one or more trust beneficiaries (entities receiving the benefits from the assets), and trust assets (the property kept or used for the benefit of the beneficiaries) (DNR 2006 p. 14). Washington state is the trustee of state trust lands and DNR is the trust land manager.

The 1984 landmark decision *County of Skamania v. State of Washington* addressed two key trustee duties. Washington's Supreme Court stated that 1) a trustee must act with undivided loyalty to the trust beneficiaries, to the exclusion of all other interests; and 2) a state's duty as trustee is to manage trust assets prudently (DNR 2006). The Washington State Legislature, as trustee, requires the Board of Natural Resources and DNR, as the trust land manager, to establish policies to ensure that, based on sound principles, trust assets are managed for sustainable benefit to the trusts in perpetuity. Refer to the *Policy for Sustainable Forests*, pages 9 through 16, for a complete description of DNR's trust management duties.

The OESF also includes approximately 3,500 acres of natural resource conservation areas and natural area preserves. These areas are permanently deferred from timber harvest and contribute towards DNR's conservation objectives. Following is a list of these areas in the OESF.

- **South Nolan Natural Resource Conservation Area:** Old-growth coastal forest, forested sphagnum bog,² and low elevation sphagnum bog.
- **Clearwater Corridor Natural Resource Conservation Area:** Mature coastal forest, aquatic-riparian habitat.
- **Shipwreck Point Natural Resource Conservation Area:** Straight of Juan de Fuca beach, stream and riparian habitat, and coastal forest.
- **Clearwater Bogs Natural Area Preserve:** Forested sphagnum bog, low elevation sphagnum bog.

► A Changing Land Base

DNR expects the land base to change over time. For example, DNR may consolidate state trust lands in certain areas to allow for more cost-effective management. To consolidate state trust lands, DNR often works

with owners of adjacent lands to exchange their properties for parcels of state trust lands of equal value elsewhere. DNR’s long-term goal for land transactions is to maintain approximately the same value of the land to keep each trust “whole.”

Administrative Designations

► Landscapes

To assist in the planning and management of state trust lands in the OESF, DNR divided the OESF into 11 administrative areas called landscapes. Based on current data, acres of DNR-managed lands within each landscape range from approximately 8,900 to over 50,000 acres (refer to Table 1-1). Landscapes are used to implement the northern spotted owl conservation strategy, as will be explained in Chapter 3.

Table 1-1. Acres of DNR-managed Lands in the OESF, by Landscape (Current as of 2016)

Landscapes	Acres of State Trust Lands
Clallam	18,043
Clearwater	57,467
Coppermine	20,646
Dickodochtedar	28,387
Goodman	25,197
Kalaloch	20,203
Queets	23,586
Reade Hill	10,453
Sekiu	8,990
Sol Duc	20,159
Willy Huel	39,375
TOTAL	272,506

► Type 3 Watersheds

To manage the OESF, DNR also uses a much smaller unit called a Type 3 watershed. There are over 600 Type 3 watersheds in the OESF. Type 3 watersheds are used to implement the riparian conservation strategy, as will be explained in Chapter 3.

A Brief History of the OESF

Past Harvest

Timber harvest operations on the Olympic Peninsula began in the late 1800s when the harvested timber was hauled out by trains. The extent of harvest was limited by difficult terrain that trains could not navigate.

Demand for Pacific Northwest timber in the late 1800s was spurred largely by the Klondike gold rush of 1897 and the building boom in Seattle (Rutkow 2012). By the early 1900s, demand for Pacific Northwest lumber was being influenced by World War I: strong Sitka spruce was needed to construct airplane wings (Evans and Comp 1983). The best stands of Sitka spruce, in terms of both quality and accessibility, resided exclusively in the Pacific Northwest (Rutkow 2012).

Timber harvesting increased substantially with the advent of the logging truck in the 1920s and the completion of a loop road that encircled the Olympic Peninsula (present-day US Highway 101) in the 1930s (Evans and Comp 1983). Pacific Northwest production soon accounted for 30 percent of the national total (Rutkow 2012). Harvest of older forests accelerated between 1949 and 1970, with most harvest taking place in old-growth forests (United States Fish and Wildlife Service [USFWS] 1997).

Until the late 1980s, DNR had a policy to harvest the oldest timber first (DNR 1979) to provide greater long-term financial benefits to the trusts. Between 1970 and 1990, over half of the state trust lands that would later be included in the OESF were clearcut and replanted. Per Washington's



Example of a Forest Plantation

forest practices rules, clearcutting is a harvest method in which the entire stand of trees is removed in one timber harvest operation (WAC 222-16-010). Clearcutting was common across ownerships at that time and left a legacy of forest plantations that were structurally simple and provide little support for ecological values (refer to photo, above).

1989 Commission on Old Growth Alternatives for Washington's Forest Trust Lands

Under DNR's policy to harvest the older timber first, harvest projections in 1988 indicated that most of the remaining natural, mature forests (approximately 60,000 acres) on state trust lands on the western Olympic Peninsula would be harvested within 15 years (Commission on Old Growth Alternatives for Washington's Forest Trust Lands [Commission] 1989). Harvest levels would then drop steeply for several decades until sufficient second growth was available to support higher harvest levels around 2030 (Commission 1989).

DNR recognized that this policy would have repercussions for trust beneficiaries, local communities, and the ecological diversity of the forest environment. To address these concerns, in 1989 DNR created the Commission to advise then-Commissioner of Public Lands Brian Boyle and DNR on the future management of old-growth forests on state trust lands on the western Olympic Peninsula. The Commission was comprised of 32 citizens broadly representative of the timber industry, conservation and wildlife groups, school and other trust beneficiaries, tribes, local Olympic Peninsula community leaders, members of the legislature, and financial, legal, and forestry experts. The Commission charter required balanced solutions to address the following issues:

- The future generation of revenue to trust beneficiaries, and the future flow of timber from state trust lands to local industry and communities and to ultimate markets;
- The future ecological diversity of state trust lands on the western Olympic Peninsula;
- The availability of wildlife habitat on state trust lands, especially habitat for rare and endangered species including the northern spotted owl, which was being considered at that time for listing under the Endangered Species Act; and
- The possibility of preserving in perpetuity on state trust lands some examples of original forest cover for aesthetic, recreational, and spiritual values.

To address these issues, the Commission made a consensus recommendation to establish the OESF on western Olympic Peninsula state trust lands. In the OESF, DNR would stabilize the supply of revenue and provide for ecological values by investigating a new management concept:

“Forest scientists and managers are increasingly discussing the ability to sustain key elements of ecological diversity within managed commercial forests as an alternative to past approaches. The Commission sees a clear need for further research in this area and a great opportunity to conduct it on state-owned lands. The intent is to experiment with harvest and regeneration methods to enhance habitat characteristics and commodities production” (Commission 1989).

The basic concept was to continue harvesting old-growth forests at a slower rate than before, while simultaneously studying such forests to understand their functions and how to replicate them within managed forest stands. To this end, the Commission recommended that for 15 years, DNR defer harvest of 15,000 acres of mature, natural stands identified by wildlife biologists as crucial to northern spotted owls. During this time, DNR would conduct research “aimed particularly at showing how future harvest in these deferred areas could occur simultaneously with retention of key ecological features” (Commission 1989). At the end of 15 years, DNR would make a decision on whether to harvest these 15,000 acres. In addition, the Commission recommended that 3,000 acres of state trust lands with special ecological, aesthetic, or interpretive values be deferred permanently from timber harvests. These areas were designated as natural area preserves and natural resource conservation areas.

The Commission also recommended designating the OESF as an independent sustainable harvest unit. As an independent unit, the OESF would be assigned its own decadal sustainable harvest level. Assigning the OESF its own level would stabilize the supply of wood to the local economy and slow (but not stop) the harvest of old-growth forest on state trust lands. (The sustainable harvest level will be discussed in Chapter 3.)

These recommendations united interests from a broad group of stakeholders and demonstrated the power of cooperation. All recommendations were accepted by the Board of Natural Resources.

Preliminary Planning: the 1991 Draft OESF Forest Management Plan

DNR carried the recommendations of the Commission on Old Growth Alternatives forward into the draft 1991 OESF Management Plan (1991 Plan). DNR developed the 1991 Plan in cooperation with an old-growth advisory group comprised of a subset of participants from the Commission, a scientific panel, and a local technical group. Although this plan provided a conceptual framework for management of state trust

lands in the OESF, it was neither finalized nor adopted, as will be explained later in this section.

DNR believed, then as now, that good stewardship in the OESF means more than managing state trust lands for long-term income; it means ensuring successful renewal of the forest and maintenance of the forest ecosystem (DNR 1991). To this end, DNR identified four general categories of ecological values as a starting point for research and management. These categories were long-term site productivity, watershed/aquatic habitat, biological diversity, and ecosystem resilience (refer to Text Box 1-2).

Per the 1991 Plan, management of state trust lands in the OESF would focus on meeting goals and objectives for revenue production and ecological values across the *same* lands, rather than designating some areas strictly for revenue and others for ecological values. This approach, later called “integrated management,” would test the hypothesis that commercial harvest is possible without jeopardizing identified ecological values (DNR 1991).

DNR’s primary approach to achieving ecological values and revenue production was to manage for forest structure at both a stand and landscape level. This approach was based on the following premise: that if DNR left (when harvesting mature forests) or created (when managing second growth) a diversity of forest structures across state trust lands, DNR could meet most of the habitat needs of native plant and wildlife species (DNR 1991). Examples of structure include snags, down wood, multiple canopy layers, forest openings, and stands in different development stages. DNR further refined this approach by defining preliminary target percentages for specific forest structure types such as old growth, open canopy, closed canopy, understory, layered canopy, or hardwoods/brush across state trust lands (DNR 1991). These targets would be further refined and tested through research and monitoring.

Text Box 1-2. What are Ecological Values?

Ecological values are defined by DNR as the elements (for example trees, wildlife, soil, water) and natural relationships between these elements that are biologically and functionally important to the continued health of the forest ecosystem (DNR 1991).

- **Long-term site productivity:** The ability of an area to support plants and wildlife.
- **Riparian areas and aquatic habitat:** Aquatic habitat includes streams and other water bodies. Riparian areas are where aquatic and terrestrial ecosystems interact (such as wetlands and riparian forests).
- **Biodiversity:** the full range of life in all its forms (Washington Biodiversity Council).
- **Ecosystem resilience:** Ability of an ecosystem to recover from disturbance.

DNR did not assume that the needs of all wildlife species would be met by managed stands. DNR assumed that old-growth forests would remain on the landscape in natural area preserves, natural resource conservation areas, and adjacent ecological reserves such as Olympic National Park and Olympic National Forest (DNR 1991).

The 1991 Plan also recommended that the OESF be divided into 11 landscapes, primarily along hydrologic boundaries. DNR believed that if initial planning was based on broad geographic areas and was tied to structural features important to the health of the ecosystem, decisions could be made that optimized revenue production and ecological values (DNR 1991).

DNR's Olympic Region developed a landscape plan for the Clallam landscape in 1995. DNR's Olympic Region staff also developed preliminary landscape plans for the Goodman, Reade Hill, Willy-Huel, and Kalaloch landscapes (collectively referred to as the Mid-coast landscape) in 2001.

The 1991 Plan provided broad guidance for selecting research activities and implementing adaptive management. The plan also outlined a harvest techniques program. The goal of the program was to develop and apply harvest techniques to better integrate revenue production and ecological values (DNR 1991). Techniques included retention during harvest of key structural features such as large trees, large snags, down woody debris, and remnants of intact forest.

1992 Forest Resource Plan

The OESF's status as an experimental forest and a separate sustainable harvest unit was confirmed in the 1992 *Forest Resource Plan*. This plan, which guided management of all forested state trust lands in Washington, described the purpose of the OESF as “to gain and apply knowledge about old-growth forests and modern commercial forest management,” establishing it as an experimental forest. This plan also described the OESF as a forest that would be managed separately from other lands in western Washington, establishing it as an independent sustainable harvest unit (DNR 1992).

Threatened Species and the HCP

In 1990, USFWS issued a final rule listing the northern spotted owl (*Strix occidentalis caurina*) as a threatened species under the Endangered Species Act. Listing of the marbled murrelet (*Brachyramphus marmoratus*) followed two years later.

In 1992, the United States Congress passed the Olympic Experimental Forest Act (Title II of P.L. 102-436(106 Stat. 2217)). The Act gave DNR permission to prepare a plan that would “provide for the conservation of the northern spotted owl on the forest and reflect scientifically sound ecosystem management to aid conservation of fisheries, other sensitive species, and the ecology of the forest in general” through an experimental management program. Once this plan was approved by USFWS, actions conducted under this plan would not be considered prohibited take of the northern spotted owl under the Endangered Species Act (refer to Text Box 1-3).

Text Box 1-3. What is Prohibited Take?

The Endangered Species Act makes it unlawful to “take” a listed animal without a permit. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” Through regulations, the term “harm” is defined as “an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering” (USFWS 2013).

At this point, DNR had a number of options. It could finalize the 1991 Plan to meet the requirements of the Olympic Experimental Forest Act. It could designate critical habitat. Or it could prepare a multi-species HCP. Under the direction of Jennifer Belcher, the newly elected Commissioner of Public Lands and former member of the Commission, DNR chose the latter.

Authorized under the Endangered Species Act, an HCP is a plan that takes a broad, landscape approach to minimizing and mitigating impacts to threatened and endangered species while conducting lawful activities such as forest practices (DNR 1997). The HCP describes the steps DNR takes to offset any harm of individual members of a listed species by promoting the conservation of the species’ habitat.

An HCP is part of an application for an incidental take permit, which allows incidental take of a threatened or endangered species. Incidental take is the taking of a federally listed wildlife species, if such take is incidental to, and not the purpose of carrying out otherwise lawful activities (DNR 1997).

DNR originally considered preparing the HCP specifically for the OESF, but later decided to prepare one HCP for all state trust lands within the range of the northern spotted owl and to include the OESF as a separate planning unit. The HCP was completed and approved in 1997 and an incidental take permit was issued.

► A Shift in Management

The HCP represented a shift in how DNR managed the OESF. The 1991 Plan was not species specific; DNR would manage the entire OESF to support a diversity of native species, rather than manage some areas specifically for one species. DNR would create “a broad landscape spectrum of wildlife habitat from grass, forb, and shrub to mature timber” (DNR 1991).

However, to meet the requirements of the Endangered Species Act, DNR needed provisions for specific types of wildlife habitat. DNR developed conservation strategies for northern spotted owl, riparian (for salmon and other riparian-obligate species), and marbled murrelet habitat. A fourth strategy covered habitat for multiple species.

DNR designed each of these strategies in a way that ensures the original intention of the OESF—to learn how to integrate revenue production and ecological values across the land base—remained intact. DNR provides an overview of these strategies and how they relate to integrated management in Chapter 2.

Biodiversity Pathways and the Washington Forest Landscape Management Project

In 1992, a group of leading scientists from DNR, USFS Pacific Northwest Research Station, Washington State Department of Fish and Wildlife (WDFW), University of Washington, and Oregon State University formed a working group for the Washington Forest Landscape Management Project (Project). The Project’s original purpose was to explore ways in which landscape management could be implemented across ownerships to meet the needs of wildlife associated with late-seral stage forests while minimizing impacts on revenue production in Washington’s Forests (Carey and others 1996). The original study area was the 770,000-acre Quileute/Hoh water watershed. However, due to the difficulties of attaining sufficient and comparable data across ownerships and other challenges, the working group decided to focus the project on a much smaller area (approximately 17,000 acres) managed primarily by DNR: the Clallam Landscape in the OESF. (This project was completely separate from development of the Clallam Landscape plan described earlier in this history.)

The Project developed six forest management scenarios, one of which was maximizing biodiversity through an approach they termed “biodiversity pathways.” Biodiversity pathways included techniques

such as conservation of biological legacies at harvest (snags, down wood, large trees, and other features); pre-commercial thinning to bypass the competitive exclusion stand development stage and promote woody plant diversity; thinning at variable densities to promote heterogeneity; widely spaced planting of Douglas-fir and natural regeneration of western hemlock, western red cedar, and deciduous trees; and longer rotations (70-130 years). Other scenarios included no management, wide riparian buffers and maximizing net present value on remaining areas, forest practices-defined riparian buffers and maximizing net present value in remaining areas, and two variations on biodiversity pathways (thinning in different decades with shorter or longer rotations plus maximizing net present value). All scenarios had the goal of achieving 30 percent of the landscape in late-seral forest.

Through modeling, the Project simulated changes that would occur in the landscape over a 300-year period under each management scenario. Results showed that maximizing biodiversity through biodiversity pathways achieved 30 percent late-seral forest more quickly than other management scenarios and produced significant economic benefits (Carey and others 1996). By contrast, those scenarios that involved maximizing net present value resulted in a higher economic value but the highest risk to species (Carey and others 1996). Results were published in *Washington Forest Landscape Management Project – a Pragmatic, Ecological Approach to Small-Landscape Management*.

In 2004, DNR incorporated biodiversity pathways techniques into the preferred alternative for the 2004-2014 sustainable harvest calculation environmental impact statement. Called “Innovative Silvicultural Management,” this alternative consisted of existing DNR silvicultural practices, more intensive silviculture, and the following biodiversity pathways techniques: retaining biological legacies at harvest; underplanting widely-spaced, site-appropriate coniferous species to supplement natural regeneration of tree and shrub species; minimizing site preparation (to disturb fewer forest ecosystem processes); thinning to variable densities to encourage development of an understory; and improving habitat by creating snags and felling trees to create structure (DNR 2004).

As an outcome of the 2004 sustainable harvest calculation, DNR wrote a silvicultural policy based on the preferred alternative. Called the “General Silvicultural Strategy Applied to Timber Resources Base Available for Sustainable Harvest in Western Washington,” this policy stated that “the department will use intensive and innovative silviculture to guide the desired progression of stand development to simultaneously produce trust revenue and create structural complexity” (DNR 2004). The policy described biodiversity pathways as a type of innovative

silviculture that could be used to “create, develop, enhance, or maintain forest biodiversity and health” (DNR 2004).

In 2006, DNR finalized and incorporated the general silvicultural strategy into the *Policy for Sustainable Forests* (DNR 2006, p. 46). In this manner, biodiversity pathway techniques became part of DNR’s policy for creating and maintaining structural diversity in all of its management areas, including the OESF. These techniques have been integrated into cohort management, the silvicultural system DNR uses to manage state trust lands throughout Washington. (Cohort management will be described in Chapter 2).

Biodiversity pathways are an important tool for integrating revenue production and ecological values. Although today these techniques are being practiced in all DNR planning units, only in the OESF are they implemented within the full framework of integrated management. The OESF is where DNR learns how effective these techniques are in achieving multiple objectives in managed stands.

Deferrals and the Policy for Sustainable Forests

Adopted in 2006, the *Policy for Sustainable Forests* deferred all old-growth forests³ in the OESF, including the 15,000 acres deferred temporarily at the founding of the OESF and all remaining acres for a total of approximately 48,000 acres. In addition to old growth, the *Policy for Sustainable Forests* also continued the deferral of gene pool reserves, which are examples of natural forest cover needed to sustain the native gene pool. Both gene pool reserves and old-growth forests will remain deferred until and unless policies change.

Today, DNR uses deferrals to help meet its ecological objectives per the conservation strategies. For example, many old-growth stands are also Old Forest Habitat that contributes toward requirements for northern spotted owl habitat. And because deferrals are not co-located in a single contiguous block but interspersed with more actively managed areas, they help DNR realize an important concept of integrated management: a working forest with a full-range of forest conditions (DNR 1997 p. IV.81).

2016 Final Environmental Impact Statement and Forest Land Plan

In 2016, DNR prepared a final environmental impact statement for this forest land plan. In that document, DNR identified a range of possible

alternatives for the future management of the OESF. One of these alternatives was to apply management “pathways” to each landscape to help implement the northern spotted owl conservation strategy. All of DNR’s alternatives were based on the integrated management approach.

After publishing the final environmental impact statement, DNR prepared this forest land plan and incorporated the pathways concept into its strategies for northern spotted owl habitat. Pathways will be discussed in Chapter 3.

The 1991 Plan and the HCP anticipated that DNR would write separate management plans for each landscape in the OESF. At that time, technology for processing and analyzing large amounts of data was limited. Today, the sophistication of current analysis tools enables DNR to write one plan that covers all 11 landscapes. These tools and DNR’s planning process will be discussed in Chapter 2.

Integrated Management: Looking Back, Looking Forward

The integrated management approach has evolved over time. This is an experimental forest; such change are expected and will continue to occur in the future. In Chapter 2, DNR describes the processes it uses to implement integrated management today, with the understanding that DNR’s approach may change again in the future as DNR continues its intentional learning in the OESF.

¹ The Endangered Species Act of 1973 (as amended) provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend. The Endangered Species Act authorizes federal fish and wildlife agencies to list species that are threatened with or in danger of extinction and prohibits the unauthorized taking of listed species.

² Sphagnum is a genus of approximately 120 species of mosses, commonly known as peat moss.

³ Per the *Policy for Sustainable Forests*, structurally complex forest stands five acres or larger that originated naturally prior to 1850. Per current policy, Old-growth forests in the OESF are deferred from harvest, but DNR may conduct operations in old-growth consistent with the requirements of the HCP to meet the research objectives of the OESF (DNR 2006).